Bart, W. M., Can, I., & Hokanson, B. (2020). Exploring the relation between high creativity and high achievement among 8th and 11th graders. *International Online Journal of Education and Teaching (IOJET), 7*(3). 712-720. https://iojet.org/index.php/IOJET/article/view/847

Received: 15.03.2020
Received in revised form: 01.06.2020
Accepted: 03.06.2020

EXPLORING THE RELATION BETWEEN HIGH CREATIVITY AND HIGH ACHIEVEMENT AMONG 8TH AND 11TH GRADERS

Research Article

William M. Bart
University of Minnesota
bartx001@umn.edu

Iclal Can
Middle East Technical University Northern Cyprus
iclal@metu.edu.tr

Brad Hokanson
University of Minnesota
brad@umn.edu

Correspondence: Iclal Can, Guidance and Psychological Counseling Program, Middle East Technical University Northern Cyprus Campus, Academic Buildings, R-138, 99738, Kalkanlı, Güzelyurt, Mersin 10, Turkey. Iclal@metu.edu.tr

William M. Bart is a Professor of Educational Psychology at the University of Minnesota. He teaches in the area of creativity and intelligence and publishes research in the fields of creativity and the psychological and educational effects of chess training.

Iclal Can is an Assistant Professor of Educational Sciences at Middle East Technical University, Northern Cyprus Campus. She publishes research in the fields of teacher education, creativity, professional learning, and effective learning and teaching environments.

Bart Hokanson is the Mertie Buckman Professor of Design Education in the College of Design at the University of Minnesota. He teaches in the area of creative problem solving and publishes research in the fields of creativity and educational technology.

EXPLORING THE RELATION BETWEEN HIGH CREATIVITY AND HIGH ACHIEVEMENT AMONG 8TH AND 11TH GRADERS[1]

William M. Bart
bartx001@umn.edu

Iclal Can
iclal@metu.edu.tr

Brad Hokanson
brad@umn.edu

Abstract

This study explores the relationship between high creativity and high scholastic achievement in mathematics, reading, and science among 8th and 11th grade students. A quantitative methodology was used in the study. Data were collected from 941 eighth-grade students and 605 eleventh-grade students at an independent public school district in Minnesota, a Midwestern State in the U.S.A. The data collection instruments included a general personal questionnaire**,** the Torrance Tests of Creative Thinking (TTCT) Figural Form A, and the Minnesota Comprehensive Assessment Test (MCA). Correlations were computed and chi-square analyses were performed to address research questions. Grade-based standard scores were used in the measurement of creativity and academic achievement with the top 20% cutoff scores being used to identify students with high achievement and students with high creativity. The results indicated that the relation between high creativity and high academic achievement varies among eighth and eleventh graders. High mathematics and high reading achievement are related to high creativity among both eighth- and eleventh-grade students, but with small effect sizes. High achievement in science is related to high creativity among eleventh-graders. Our results indicate that high creativity and high achievement in reading, mathematics, and science achievement tend to be positively related, but those relationships are at best weak, indicating that there are substantial components to high creativity that are not shared by high achievement in mathematics, reading, and science and vice versa.

Keywords: creativity, academic achievement, eighth grade, eleventh grade

1. Introduction

The relationship between creativity and scholastic achievement has been increasingly the focus of empirical research. However, a systematic understanding of the relation between creativity and scholastic achievement is still lacking. The related literature offers contradictory findings between creativity and achievement (Gralewski & Karwowski, 2012). Some of the

[1] This research was supported in part by a grant from the Metropolitan Research Grant Program of the University Metropolitan Consortium and the University of Minnesota Center for Urban and Regional Affairs. The authors express thanks to the School District personnel, who helped in the implementation of the research and in the collection of the data.

studies indicate that there is no significant (e.g., Olatoye, Akintunde, & Yakasai, 2010; Yamamoto, 1967) or limited (Renzulli, 2005) relation between creativity and scholastic achievement; whereas, other studies indicate a positive relationship between creativity and scholastic achievement (e.g., Ai, 1999; Asha, 1980; Getzels & Jackson, 1962; Freund & Holling, 2008). Gralewski and Karwowski (2012), who found contradictory results within the same study, posited that the contradictory results might be due to different mediating factors which relate to different (a) measures of creativity in studies (e.g., teacher nominations, divergent thinking tests), (b) tools used to assess school grades, (c) statistical approaches to control for the influence of general intelligence, (d) methods of analysis, and (e) places and times of the research. Thus, it becomes much more important to replicate studies about creativity and scholastic achievement in different cultures and times using different measures of creativity and achievement as well as different data analytic approaches.

When the related literature is examined, it is seen that one group of studies provided no evidence in support of a strong positive association between creativity and scholastic achievement. To illustrate, in one of the earliest studies, using data based on 75 ninth-grade and 84 eleventh-grade students responding to the Lorge-Thorndike Intelligence Tests, the IOWA Tests of Educational Development, and the Minnesota tests of creative thinking, Yamamoto (1967) found that creativity did not have a strong relation to school achievement. He found high correlations between achievement and IQ but low correlations between IQ and creativity.

Bowers (1969) is among the earliest researchers to investigate the relationships among creativity, achievement, and IQ. 278 ninth graders participated in his study. He used grade point averages (GPAs) with ninth-grade norms, the IOWA Tests of Educational Development Form YS to assess student achievement levels; the Torrance Tests and some other creativity measures to measure creativity; and the Otis Quick Scoring Mental Ability Test, Form Beta to assess IQ. The results indicated "a mild interactive effect of IQ and creativity upon achievement" and suggested that "the regression of achievement on IQ decreases as creativity score increases, and the regression of achievement on creativity score decreases as IQ rises" (Bowers, 1969, p. 175).

Similarly, Gralewski and Karwowski (2012) conducted a study on the relation between creativity and school achievement among 589 high school students in Poland using the Test of Creative Thinking-Drawing Production (TCT-DP) and GPA to assess creativity and school achievement respectively. Controlling for the effect of gender and intelligence, they found no evidence of a significant relation between creativity and achievement for students.

Ai (1999) conducted a study on the relationship between creativity and achievement among 2,264 students in Spain. He used the TTCT, the Abedi-Schumacher Creativity Test, the Villa and Auzmendi Creativity Test, and teacher ratings to assess creative thinking. As for the scholastic achievement, he used self-reports of student achievement in Spanish, Basque, English, natural science, social science, and mathematics. The results indicated a relationship between creativity and academic achievement when teacher ratings were used to assess creativity. However, there was only a slight relationship between creativity and achievement when creativity tests were used.

Gajda (2016) carried out a study on the relationship between creativity and achievement among 1,106 students enrolled in Polish primary, secondary, and high school students. She used the Test of Creative Thinking-Drawing Production (TCT-DP) to assess creativity and grade point average (GPA) and standardized achievement test scores for the available grades to measure school achievement. The results indicated a positively weak relationship between creativity and school achievement as assessed by GPA. However, this relationship was stronger

when standardized achievement test scores were used instead of the GPA. Apart from the overall relationship between creativity and achievement, she also found that elaboration and fluency were related to school grades but originality and nonconformity were not related to school grades.

Freund and Holling (2008) conducted a study on the relationships among creativity, reasoning ability, and scholastic achievement among 1,113 students in Germany using a multilevel analysis. They used GPA to assess achievement and the Berlin Structure of Intelligence Test for Youth: Assessment of Talent and Giftedness (BIS-HB) to assess student creativity and reasoning ability. The result indicated "a rather strong effect for reasoning ability and, to a somewhat lesser degree, also for creativity when predicting GPA" (p.317).

Similarly, Hansenne and Legrand (2012) conducted a study among 73 elementary school students in Belgium using the TTCT figural and verbal to assess creativity. As for school achievement, they used the mean scores for French and mathematics courses. The results indicated that creativity as assessed by the TTCT predicted achievement in both mathematics and French.

In a recent study, Zhang, Ren, and Deng (2018) collected data from 1082 primary school students in Beijing, China. The participants were from the fourth, fifth, and sixth grade levels. The authors utilized TTCT Figural Form A and students' self-reported achievement scores in Chinese and mathematics. They found that there was a significant positive relationship between creativity and academic achievement as assessed by the teachers.

In a meta-analysis study of 120 studies conducted since 1960s, Gajda, Karwowski, and Beghetto (2017) found a modest, yet significant relationship between creativity and achievement (r = .22). As for the factors impacting that relationship, they found that when creativity tests were used rather than self-report scales to measure creative thinking abilities, the association between creativity and scholastic achievement was significantly stronger. Similarly, the effect size was found to be stronger when standardized achievement tests were used instead of GPA to assess student achievement level. Another major result was that verbal tests to assess creativity were found to have a stronger correlation with scholastic achievement when compared to figural forms of creativity. Gajda et al. (2017) suggests that "... the best that can be said about whether there is a link between creativity and academic achievement is this: It depends." (p. 269).

The inconsistent findings regarding the relation between creativity and achievement highlight a need for further studies to explore whether there is a relation across two different domains, i.e. achievement and creativity. As populations are changing, there is a need to understand that relation in different times and settings. In this study which is a part of a larger project, a quantitative methodology is employed to explore the relation between creativity as measured by the Torrance Tests of Creative Thinking (TTCT) Figural Form A and achievement as measured by a standardized test, ie., the Minnesota Comprehensive Assessment Test (MCA). The research questions being investigated in this study are as follows:

1. Is there a relation between high creativity and high scholastic achievement in mathematics, reading, and science for eighth-grade students when the top 20% of students for each measure (i.e., science, math, reading, creativity) are considered for each grade?
2. Is there a relation between high creativity and high scholastic achievement in mathematics, reading, and science for eleventh-grade students when the top 20% of students for each measure (i.e., science, math, reading, creativity) are considered for each grade?

3. Is the relation between high creativity and high scholastic achievement in mathematics, reading, and science for eighth-grade students different from that of eleventh-grade students when the top 20% of students for each measure (i.e., science, math, reading, creativity) are considered for each grade?

2. Method

A quantitative methodology was used in the study to answer the research questions. The data collection instruments included a general personal questionnaire, The Torrance Tests of Creative Thinking (TTCT) Figural Form A and the Minnesota Comprehensive Assessment (MCA) test. Information about the participants, instruments, and data collection procedures are explained in the subsequent sections below.

2.1. Participants

The participants in this study were students in an independent public school district in Minnesota, a Midwestern State in the U.S.A. The sample included 941 eighth-grade students (473 boys and 468 girls; M_{age} = 14.10 years, SD_{age} = .34 years) and 605 eleventh-grade students (322 boys and 283 girls; M_{age} = 17.32 years, SD_{age} = .34 years).

2.2. Instruments

Three different instruments were utilized in the study. First of all, a general personal questionnaire was used to collect data about the participants. The Torrance Tests of Creative Thinking (TTCT) Figural Form A served as the measure of creativity. Developed by Torrance and his associates, the TTCT has three activities: picture completion, repeated figures of lines or circles, and picture construction, and five subtests: fluency, originality, elaboration, abstractness of titles, and resistance to premature closure (Torrance, 1990, 1998, 2008). TTCT Figural forms are less biased as they deploy the use of figures and drawings instead of requiring participants to display their ability to use the language (Kim, 2006).

As for the assessment of achievement, the Minnesota Comprehensive Assessment (MCA) test served as the primary measure of scholastic achievement. The MCA provides data on student achievement in mathematics, reading, and science. The MCA helps "districts measure student progress toward Minnesota's academic standards and also meet federal and state legislative requirements" (MDE, 2020). Student scores in mathematics, reading, and science were used as the primary data source for scholastic achievement in the study.

2.3. Procedure

The approval of the university human subjects review board and the approval of associated parents for the study were received prior to conducting the study. Participating students completed the TTCT-Figural Form A and the MCA. Any identification data were removed from the data set by the related District office before the researchers started to work on the data set. Thus, confidentiality of the data was maintained.

There are different suggestions about determining the cutoff points in the literature to determine students who have high achievement and creativity. Among the first who investigated the relation between creativity and achievement were Getzels and Jackson (1962), who viewed the top 20% of students as high achievers and the lower 80% of students as the general level of students. Similarly, Renzulli (2005) stated that "I clearly have in mind persons who are capable of performance or possess the potential for performance that is representative of the top 15 to 20 percent of any given area of human endeavor" (p. 260). In line with this perspective, the decision was made to use the 20% score as the cutoff score in the data analysis for the four measures (i.e., creativity, science, mathematics, reading) in the current study. Table

1 presents the cut-off points for both eighth-grade students and eleventh-grade students with percent values rounded to the nearest percent.

Table 1. *Cut-off points for 8th and 11th graders*

	8th grade		11th Grade	
	Cut off score	Number of High Achievers	Cut off score	Number of High Achievers
Creativity	116	191	114	130
Science	863	191	1059	125
Math	863	197	1162	137
Reading	866	194	1066	135

Note. Cut off Percentile Rank=80%

3. Results

Cross-tabulations involving chi-square analyses were performed using SPSS version 20 (IBM Corp, 2011) to explore the relation between high creativity and high academic achievement among 8th grade and 11th grade students using the top 20% score as the cutoff point. Cross-tabulation with chi-square analysis allowed us to "determine whether the variables are statistically independent or if they are associated" (Michael, 2001, p.1).

The creativity scores used in the data analysis were the grade-based standard scores for the five dimensions of creativity, i.e., fluency, originality, elaboration, abstractness of titles, and resistance to premature closure. The achievement scores used in the data analysis were the grade-based standard scores for academic achievement in mathematics, science, and reading. Through use of the phi coefficient (ϕ), effect sizes were computed. Tables 2 and 3 present the results of the cross-tabulation analyses for eighth-grade students and eleventh-grade students using the top 20% scores for high creativity and achievement respectively.

Table 2. *Relation between high creativity and high achievement among 8th graders (top 20% as high creativity and high achievement - low 80% for general creativity and achievement)*

	Low Creativity				High Creativity			
	Low (%)	High (%)	Chi-S (Sig)	Phi (Sig.)	Low (%)	High (%)	Chi-S (Sig)	Phi (Sig.)
Science	606 (64.4%)	144 (15.3%)	2.75 (.097)	.05 (.097)	144 (15.3%)	47 (5%)	2.75 (.097)	.05 (.097)
Math	604 (64.2%)	146 (15.5%)	4.81 (.028)	.07 (028)	140 (14.9%)	51 (5.4%)	4.81 (.028)	.07 (.028)
Reading	611 (64.9%)	139 (14.8%)	9.80 (.002)	.10 (.002)	136 (14.5%)	55 (5.8%)	9.80 (.002)	.10 (.002)

Table 3. *Relation between high creativity and high achievement among 11th graders (top 20% as high creativity and high achievement - low 80% for general creativity and achievement)*

	Low Creativity				High Creativity			
	Low (%)	High (%)	Chi-S (Sig)	Phi (Sig.)	Low (%)	High (%)	Chi-S (Sig)	Phi (Sig.)
Science	384 (63.5%)	91 (15%)	5.30 (.021)	.09 (.021)	93 (15.4%)	37 (6.1%)	5.30 (.021)	.09 (.021)
Math	379 (62.6%)	96 (15.9%)	7.48 (.006)	.11 (006)	89 (14.7%)	41 (6.8%)	7.48 (.006)	.11 (.006)
Reading	381 (63%)	94 (15.5%)	8.13 (.004)	.12 (.004)	89 (14.7%)	41 (6.8%)	8.13 (.004)	.12 (.004)

The results indicated that when the top 20% of students were identified as high creative individuals and high achievers in three basic disciplines, namely, mathematics, science, and reading, there were the following results: (a) high creativity is positively related to high achievement in mathematics [χ^2 (1, 941) = 4.81, $p < .05$, $\phi = .07$] and reading [χ^2 (1, 941) = 9.80, $p < .05$, $\phi = .10$], for eighth graders, and (b) high creativity is positively related to high achievement in science [χ^2 (1, 605) = 5.30, $p < .05$, $\phi = .09$], mathematics [χ^2 (1, 605) = 7.48, $p < .05$, $\phi = .11$], and reading [χ^2 (1, 605) = 8.13, $p < .05$, $\phi = .12$], for eleventh graders.

However, all of the effect sizes are quite small. For eighth graders, the effect size relating high creativity to high achievement in mathematics is small with $\phi = .07$ and to high achievement in reading is also small with $\phi = .10$. For eleventh graders, the effect size relating high creativity to high achievement in mathematics is small with $\phi = .11$, to high achievement in reading is small with $\phi = .12$, and to high achievement in science is small with $\phi = .09$.

4. Conclusions and Discussion

This study was an investigation as to whether high creativity as assessed by TTCT Figural form A is associated with high achievement in basic disciplines, namely, mathematics, reading, and science as assessed by the MCA. Thus, the present study explores whether high ability is generalizable across two domains, i.e., creativity and achievement. We found that the relationships between high creativity and high achievement in mathematics, reading, and science achievement tend to be positively related, but those relationships are at best weak. Specifically, high achievement in mathematics and reading achievement is related to high creativity among both eighth-grade and eleventh-grade students. In addition, high achievement in science is related to giftedness in creativity among eleventh-grade students.

Although our results suggest that high creativity is related to high achievement in the basic disciplines, one should note that the effect sizes of the relations between high creativity and high achievement in mathematics, science, or reading are small. Thus, these results should be interpreted with caution as there seem to be substantial components to high creativity that are not shared by high achievement in mathematics, reading, and science and vice versa.

In accordance with the present results, some previous studies have demonstrated that there is a positive relation between creativity and scholastic achievement (e.g., Ai, 1999; Asha, 1980; Freund & Holling, 2008; Gajda, 2016; Hansenne & Legrand, 2012; Zhang et al., 2018). However, the degree of this relationship depends on various factors, as posited by Gralewski and Karwowski (2012). Gralewski and Karwowski (2012) suggested that different measures of creativity in studies (e.g., teacher nominations, divergent thinking tests); the tools used to assess school grades; statistical approaches to control for the influence of general intelligence;

methods of analysis, and places and times of the research could be regarded as factors affecting the existence and degree of a relationship between creativity and achievement.

Our findings could be discussed considering these mediating factors. Specifically, our results seem to be consistent with that of Ai (1999) who found that there was only a slight relationship between creativity and achievement when creativity tests were used rather than teacher ratings. Our results are also in agreement with the evaluation of Renzulli (2005) who suggested a limited relation between creativity and scholastic achievement.

In their meta analysis study, Gajda et al. (2017) found that verbal tests to assess creativity had a stronger correlation with scholastic achievement when compared to figural forms of creativity. Thus, it would have been interesting to use TTCT verbal forms within the same sample to find out whether the relationship between creativity and scholastic achievement would be stronger with verbal measures of creativity.

As Gajda (2016) indicated: "it would be ideal if school achievement and creativity went hand in hand" (p.247). However, our results suggest that being a high achiever in mathematics, reading, or science does not guarantee that the individual is highly creative, or being highly creative does not guarantee that the individual is a high achiever in mathematics, reading, or science. High achievement in mathematics, reading, or science may rely more on memorization and application of skills and knowledge than the creative production of novel ideas and methods.

The reader should bear in mind that this study involved data from Minnesota and thus may not be generalizable to students in eighth and eleventh grades in other educational regions as well as other grades. Further research is needed to replicate this study in different educational settings to determine the extent to which the relation between high creativity and high scholastic achievement is generalizable. Another limitation is that although the top 20% was used as the cut-off score in the sample of 8th and 11th grade students, we do not have sufficient information about the extent to which the high achievers in mathematics, science, and reading in our sample would be considered high achievers in a nationally normative sense.

5. Conflict of Interest

The authors declare that there is no conflict of interest.

6. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Ai, X. 1999. Creativity and academic achievement: An investigation of gender differences. *Creativity Research Journal*, *12*(4), 329–337. https://doi.org/10.1207/s15326934crj1204_11

Asha, C. B. 1980. Creativity and academic achievement among secondary school children. *Asian Journal of Psychology and Education, 6(1), 1-4*

Bowers, J. (1969). Interactive effects of creativity and IQ on ninth-grade achievement. *Journal of Educational Measurement, 6(3)*, 173–177. http:// dx.doi.org/10.1111/j.1745-3984.1969.tb00675.x

Freund, P. A., & Holling, H. (2008). Creativity in the classroom: A multilevel analysis investigating the impact of creativity and reasoning ability on GPA. *Creativity Research Journal, 20*(3), 309-318. https://doi.org/10.1080/10400410802278776

Gajda, A. (2016). The relationship between school achievement and stages. *Thinking Skills and Creativity, 19,* 246-259. https://doi.org/10.1016/j.tsc.2015.12.004

Gajda, A., Karwowski, M., & Beghetto, R. A. (2017). Creativity and academic achievement: A meta-analysis. *Journal of Educational Psychology, 109*(2), 269-299 http://dx.doi.org/10.1037/edu0000133

Getzels, J.W.J., & Jackson, P.W. (1962). *Creativity and intelligence*. New York: Wiley.

Gralewski, J. & Karwowski, M. (2012). Creativity and school grades: A case from Poland. *Thinking Skills and Creativity, 7*, 198-208. https://doi.org/10.1016/j.tsc.2012.03.002

Hansenne, M., & Legrand, J. (2012). Creativity, emotional intelligence, and school performance. *International Journal of Educational Research, 53*, 264-268. doi.org/10.1016/j.ijer.2012.03.015

Kim, K. H. (2006). Can we trust creativity tests? A review of the Torrance Tests of Creative Thinking (TTCT). Creativity Research Journal, 18, 3–14. doi: 10.1207/s15326934crj1801_2IBM Corp. (2011). IBM SPSS statistics for windows. Version 20.0. Armonk, NY.

MDE (2020). *Statewide testing*. Retrieved from http://education.state.mn.us/MDE/fam/tests/

Michael, R. S. (2001). *Crosstabulation and chi square*. Retrieved from http://www.indiana.edu/~educy520/sec6342/week_10/chi_sq_summary011020.pdf

Olatoye, R. A., Akintunde, S. O., & Yakasai, M. I. (2010). Emotional intelligence, creativity and academic achievement of business administration students. *Electronic Journal of Research in Educational Psychology*, *8*(2), 763-786.

Renzulli, J. (2005). The three-ring conception of giftedness: A developmental model for promoting creative productivity. In Sternberg, R. J., & Davidson, J. E. (Eds.), *Conceptions of giftedness* (pp. 246-279). New York, NY: Cambridge University Press.

Torrance, E. P. (1990). *The Torrance tests of creative thinking: Norms-technical manual figural (streamlined) forms A & B*. Bensenville, IL: Scholastic Testing Service.

Torrance, E. P. (1998). *The Torrance tests of creative thinking: Norms-technical manual figural (streamlined) forms A & B*. Bensenville, IL: Scholastic Testing Service.

Torrance, E. P. (2008). *The Torrance tests of creative thinking: Norms-technical manual figural (streamlined) forms A and B*. Bensenville, IL: Scholastic Testing Service.

Yamamoto, K. (1967). Creativity and unpredictability in school achievement. *The Journal of Educational Research, 60* (7), 321-325. doi.org/10.1080/00220671.1967.10883504

Zhang, W., Ren, P. & Deng, L. (2018). Gender differences in the creativity–academic achievement relationship: A study from China. *The Journal of Creative Behavior*. https://doi.org/10.1002/jocb.387

Acar-Erdol, T., & Ongoren, S. (2020). Structuring process and evaluation of group work by prospective pre-school teachers. *International Online Journal of Education and Teaching (IOJET), 7*(3). 722-742. https://iojet.org/index.php/IOJET/article/view/858

Received: 02.04.2020
Received in revised form: 18.05.2020
Accepted: 26.05.2020

STRUCTURING PROCESS AND EVALUATION OF GROUP WORK BY PROSPECTIVE PRE-SCHOOL TEACHERS

Research Article

Tuba Acar-Erdol

Ordu University

tubaacarerdol@gmail.com

Sema Ongoren

Nevsehir Hacı Bektas Veli University

ongorensema@gmail.com

Tuba Acar Erdol is currently Assistant Professor of Curriculum and Instruction at the Department of Educational Sciences, Faculty of Education, Ordu University, Turkey. Her research interests include gender education, curriculum development, program evaluation, educational philosophy and classroom assessment. She taught courses, such as principles and methods of teaching, gender education, educational philosophy and educational sociology.

Sema Ongoren is currently Assistant Professor in the Department of Pre-School Education, Faculty of Education, at Nevsehir Hacı Bektas Veli University, Turkey. She is going on her research about Early Childhood Education.

STRUCTURING PROCESS AND EVALUATION OF GROUP WORK BY PROSPECTIVE PRE-SCHOOL TEACHERS

Tuba Acar-Erdol

tubaacarerdol@gmail.com

Sema Ongoren

ongorensema@gmail.com

Abstract

In this study, it was aimed to examine the prospective teachers' preferences regarding group work, the process of structuring the group work, and assessment of their performance within the group. In the research, case study design was used. The participants of the study consisted of 62 prospective teachers studying in the Department of Early Childhood Education at a state university in 2017-2018 Spring Term. The data of the study were collected with the "Group Work Questionnaire". While frequency analysis of descriptive statistics was used in the analysis of the quantitative data obtained from the questionnaire, descriptive analysis was used in the analysis of the qualitative data. As a result of the research, it was seen that the internal reasons were determinant in deciding the groupmate and tasks were shared by taking equal distribution of responsibilities and skills of the members into consideration. During the group work, problems such as time management, disagreements among members and social loafing were encountered. As to assessment of the performance within the group, it was determined that the group members found themselves competent and that the majority could prefer group work in future studies.

Keywords: group work, ingroup performance, prospective teachers, social interaction, social loafing

1. Introduction

Creating an effective learning environment in the classroom is one of the most important educational policies (UNESCO, 2008). Social interaction in the classroom has become more important in the realization of effective learning, with the understanding of the importance of learner's constructing the knowledge rather than the direct lecturing of the teacher and spending time more on learning rather than teaching (Fung & Howe, 2014; Koç-Erdamar & Demirel, 2010). Most teachers include group work to create an interactive learning environment in the classroom and increase students' academic success and motivation (Adams & Hamm, 1994; Williams, Guy, & Shore, 2019).

In educational process, interest in group work is increasing gradually. One of the reasons for this increase is that business and projects in the business world in the 21st century require a complex skill set (Lavy, 2016) and therefore the business world demands people who can solve problems in harmony and cooperation by combining their own ideas and efforts with the ideas and efforts of other group members (Johnson & Johnson 2003; OECD, 2017). It is expected for individuals to gain effective group work skills in their educational life before they

start working life. The education model used in higher education aims to make individuals gain competencies they need so as to overcome their responsibilities in their future business lives effectively (Díaz Pareja, Cámara Estrella, Muñoz Galiano, & Ortega-Tudela, 2017). This situation reveals the need for higher education institutions to develop students' group work skills (Graen, Hui, & Taylor 2006) and leads to an increase in the use of group work (Mamas, 2017; Takeda & Homberg, 2014). Another reason is the criticism of educational processes based on individual work and rivalry, and conducting research that reveals the benefits of group work (Fung & Howe, 2014; Johnson & Johnson, 2009). In the studies conducted (Chang & Brickman, 2018; Çakmak, 2014; Forslund Frykedal & Hammar Chiriac, 2018; Koç-Erdamar & Demirel, 2010; Mamas, 2017; Volkov & Volkov 2015; Yanpar-Yelken, 2009; Yasul & Samancı, 2015) it was seen that the group work was effective in the development of cognitive skills, affective characteristics, social interaction, collaboration and communication skills and in the increase of academic success and meaningful learning. The increase in the importance given to group work in education brings along the problems experienced in group work. Not sharing responsibilities fairly among group members as a result of task dividing, poor task descriptions, not determining a work plan and group rules, giving the members the responsibility they do not want to take, failure in fulfilling responsibilities and showing social loafing, students' not sharing what they know with other group members, studying individually after dividing tasks, group members' getting the same performance score despite different efforts, ingroup communication problems, unsuitable personality traits of students for group work and some students' affecting others negatively to be in the forefront are the main reasons preventing group work (Arslan, Taşkın, & Kirman-Bilgin, 2015; Çakmak, 2014; Koç-Erdamar & Demirel, 2010; OECD, 2017; Takeda & Homberg, 2014). These problems cause group members to underperform, loss of time, decrease in their productivity; and lead students prefer to work individually in their next studies (Koç-Erdamar & Demirel, 2010; OECD, 2017; Piezon & Ferree, 2008). Turkey is located in the top rankings in students' preferences of working individually rather than in groups.

According to the results of PISA 2015 collaborative problem-solving tasks carried out by OECD, while Singapore ranked first with 561 scores, Turkey ranked last among OECD countries with 422 scores and ranked 48th among 51 countries whose performance results evaluated. Through group work only one-third of students in Turkey were able to overcome their individual performance. More than half of the students in only two of the countries included in PISA application stated that they preferred individual work over group work. Turkey was one of them. Every six of ten students in Turkey remained at the lowest level in collaborative problem-solving skills and more than 93 percent showed a poor performance in collaborative problem solving (OECD, 2017). According to the report published by OECD (2017), students' perception of group work is shaped significantly by teachers. It was emphasized that teachers could make a difference in group work and that they needed classroom environments that would support group work. In group work, teachers are expected to guide the formation of the work plan of the group, sharing responsibilities among the group members, peer evaluations, and ensuring effective communication among students (Chang & Brickman, 2018; Chiriac & Granström, 2012). In order for teachers to create a positive perception for students in group work, they need to have a positive perception about group work first. The positive perception and competence of prospective teachers who will raise the teachers of the future regarding group work is important in terms of both conducting effective group work and helping students to gain competencies for group work (Díaz Pareja et al., 2017). It is also crucial for the teacher to know the ease and difficulties in applying a method through his own experience in order to use it effectively in his class. The most important factor which plays a role in the emergence of this study is that the researchers desired to examine the situation in detail as a result of the fact that they observed that there were problems in the

application of methods based on group work in their classes and that the prospective teachers had different preferences for working in groups. Depending on these important points and observations of the researchers, the purpose of this study is to examine the prospective teachers' preferences for group work, the process of structuring the group work, and their assessment of their ingroup performances. Within the framework of this general purpose, answers to the following questions were sought:

1. What are the experiences and preferences of prospective teachers regarding group work?
2. What influences did prospective teachers have in the process of structuring group work?
3. What influences did prospective teachers have in the process of conducting group work?
4. What are the prospective teachers' evaluations for group work?

Examining the preferences and practices of prospective teachers for group work is important in determining their needs related to group work, providing a basis for the trainings to be conducted on this subject and helping to monitor the progress in this subject area. Additionally, the results of this study are expected to improve the group work processes conducted.

1.1. Theoretical Framework

Group work is a time-limited form of learning or working, consisting of two or more individuals who gather for a common purpose and interact with each other (Li & Campbell, 2008; Susskind & Borchgrevink, 1999). The main purpose of group work is to enable students to think together, generate ideas, discuss and solve problems (Demirel, 2011).

Social interdependence theory, developed by Johnson and Johnson (2009), helps form the theoretical framework of group work by explaining the five main variables that mediate the motivational, social and cognitive dimensions of interdependence required for group work. The first variable is positive interdependence. Positive interdependence occurs only when individuals believe that they can achieve their goals by working in cooperation with other individuals and support each other's efforts. The second variable is individual accountability. This responsibility means that the individual performs his duties in group work and facilitates the work of other members. The third variable is promotive interactions. Individuals carry out promotive interaction by sharing resources, helping each other, motivating others through bringing new perspectives to group members' ideas and facilitating their work. The fourth variable is the appropriate use of social skills. These skills include the ability of individuals to know and trust each other, to communicate, to support each other and to resolve conflicts that arise. Lastly, group work should provide a mechanism to manage the process. This mechanism involves students’ setting common goals, evaluating positive and negative group interactions, and providing feedback to group members. In situations where these five variables exist, effective group work can take place (Chang & Brickman, 2018; Forslund Frykedal & Hammar Chiriac, 2018; Johnson & Johnson, 2009).

1.2. Research on Group Work

Research on group work has been conducted with teachers and students at all educational levels (Çakmak, 2014). Whereas some studies have focused on the effect of group work on academic success and the development of critical thinking (Arslan, Taşkın, & Kirman-Bilgin, 2018; Fung & Howe, 2014); some studies have focused on inclusive processes in group work and the examination of students' cooperation (Forslund Frykedal & Hammar Chiriac, 2018). In studies carried out on university students, the preferences and expectations of students with high and low academic success towards group work (Chang & Brickman, 2018; Williams,

Guy, & Shore, 2019); the relations between group work and various variables (Mamas, 2018); the effect of personality traits on benefiting from group work (Lavy, 2016); group work dynamics of students from different cultures (Mittelmeier, Rienties, Tempelaar, & Whitelock, 2018); the effects of groups having differences depending on ethnicity, gender and culture and opinions of students about this difference (Moore & Hampton, 2015; Takeda & Homberg, 2014); important factors for effective group work (Butt, 2018); social loafing behaviors that students observe (Büyükgöze & Demirkasımoğlu, 2018) were examined. In the study of which the participants were consisted of teachers (Yasul & Samancı, 2015), the opinions of the classroom teachers about the group work and the problems they encountered were tried to be determined. In studies conducted on prospective teachers, the effect of group work on learning and performance (Akgün & Aydın, 2009; Delice & Taşova, 2011; Yanpar-Yelken, 2009); perceptions of prospective teachers regarding group work (Çakmak, 2014; Koç-Erdamar & Demirel, 2010) and the effect of group work on proficiency gain (Diaz-Pareja, et al., 2017) were examined.

Çakmak (2014) stated that it would be important to carry out research examining group studies in teacher training. In the literature, a study which includes prospective teachers' preferences for group work, structuring group work and evaluating their performance within the group could not be encountered. This study is significant in terms of eliminating this gap in the subject area with reference to the suggestions of previous research. The difference of this research from other studies is that the opinions of prospective teachers were received immediately after they experienced group work. For this reason, the answers given by prospective teachers are thought to be in line with their experiences rather than being ambiguous or directed towards group work conducted in any period. The other situations specific to this research are that group work proceeded over a course period and included both in-class and out-of-class practices.

2. Method

In this research, case study design was used. Case study is a holistic analysis and definition of a current phenomenon in its real-life environment, natural conditions (Yin, 2018) in a limited time period (Merriam, 2015). The case examined within the scope of this study is 'group work'. Prospective teachers participated in group work process during a course period and thus, the case was tried to be examined in its natural conditions, based on the real-life environment. The most important characteristic of case studies is that the factors regarding a situation (environment, individuals, events, process, etc.) focus on how they affect the related situation and how they are affected by the related situation (Yıldırım & Simsek, 2008). In this study, it was tried to examine how the preferences of the participants for group work affect the group work and the effect of the group work on the participants' performances and their preferences of whether to work in groups in future studies.

2.1. Study Group

The participants of the study consisted of 62 prospective teachers studying in the freshman year in the Faculty of Education, Department of Early Childhood Education at a state university in 2017-2018 Spring Term. Information regarding the study group was presented in Table 1.

Table 1. *Demographic information of the study group*

Variable	Level	%
Gender	Female	85.5
	Male	14.5
Age	18	6.9
	19	41.4
	20	32.8
	21	15.5
	22+	3.4
Graduated high school type	Anatolian High School	50.8
	Vocational High School	24.6
	Imam Hatip High School	13.1
	Basic High School	4.9
	Other (Anatolian Teacher Training High School, Science High School, Open Education High School)	6.4

When the characteristics of the working group are examined, it is seen that the majority of the participants are female. Most of prospective teachers in education faculties and preschool education consist of women (Çevik & Yiğit, 2009; Erkan, et al., 2002). Most of the participants are between the ages of 19-21 and approximately half of them are Anatolian High School graduates.

2.2. Process of Research

The study took place during the Instructional Technologies and Material Development course carried out by the first researcher. During this course, prospective teachers were asked to develop concrete teaching materials for the determined outcomes and it was stated that the material development process would be performed through group work. It was also stated that the materials prepared by the groups would be presented in a preschool education institution through an instructional design was among the requirements of the course. Information about the course process and features for the materials to be developed were described in detail.

When students choose their own groups, student satisfaction for group work is higher (Chapman, Meuter, Toy & Wright, 2006). Therefore, participants were not intervened during the process of forming their groups; who and how many students would be in the groups and planning for group work were left to the preferences of the participants.

The group work process started with the creation of the groups in the third week of the Spring semester and continued until the end of the semester for 11 weeks. Group work was conducted in the classroom as well as outside the classroom. The researchers followed up the studies of the groups every week regularly and gave feedback. The groups presented the materials they prepared in a pre-determined preschool educational environment where students and teachers existed through the instructional design.

2.3. Data Collection and Data Collection Tool

At the beginning of the research, it was planned to conduct individual interviews with some students who participated in group work and accordingly, a semi-structured interview form was prepared. However, since it was thought that it would be more meaningful for this research to get the opinions of all students participating in the group study based on their experiences, it was decided to collect the data through a questionnaire. Questionnaires are data collection tools that provide relative speed and economy in reaching a large number of views with different perspectives (Hohmann & Mamas, 2015).

The data of the research were collected through the "Group Work Questionnaire" prepared by the researchers. The data collection tool consisted of four parts. There were questions about the personal information in the first part; the experience, preference and structuring process of group work in the second part; the conduct of group work in the third part; and the evaluation of group work in the fourth part. In studies where case study design is used, data collection generally requires the use of a wide variety of sources of questions, which can include both quantitative and qualitative data (Teddlie & Tashakkori, 2015). The questionnaire included two-choice questions (e.g., "Did you participate in a group work before the Instructional Technologies and Material Design course?"), short-answer questions (e.g., "How many people did you integrate in groups, including yourself?"), multiple-choice questions (e.g., "How did group work affect your success in the course of Instructional Technologies and Material Design?" A) I think group work led to a decrease in my pass mark. B) I think group work did not lead to any change in my pass mark. C) I think group work led to an increase my pass mark.), open-ended questions (e.g., "What were the determinants when selecting your groupmates?"), and graded questions (e.g., "Evaluate your rapport within the group (Very low-1, 2, 3, 4, 5- Very high).

The opinions of three experts working in the Faculty of Education were received to ensure the content validity of the prepared questionnaire. In accordance with the expert opinion, questions and options for some questions were re-grouped and the questionnaire consisting of 30 questions was finalized. The Group Work Questionnaire was organized on Google Forms and sent to the e-mail addresses of prospective teachers after the course process was over and students were given grades for the course. The questionnaire was responded with the voluntary participation of the student, and there was no information to introduce the student in the questionnaire.

2.4. Data Analysis

Frequency analysis of descriptive statistics was used in the analysis of the quantitative data obtained from the questionnaire. Qualitative data were analyzed using descriptive analysis. In the descriptive analysis, open-ended questions included in the questionnaire were evaluated as themes. During the descriptive analysis, the two researchers came together and coded the first fifteen questionnaires together. In this process, categories and sub-categories were written under the themes determined. The researchers coded the remaining questionnaires individually, considering the categories and subcategories they wrote together, and then examined each other's codes. Fourteen codes were changed and clarified as a result of the researchers' negotiations. In the study, 11 categories and 75 sub-categories emerged. The analyzed data were presented in tables. The views of the participants regarding the most repeated or remarkable sub-categories in each category were stated through direct quotations. Interrater reliability (Miles & Huberman, 1994) was calculated as 90.35. Miles and Huberman (1994) recommend an agreement of 80% to ensure consensus among coders. It can be said that the research is consistent according to the interrater reliability score obtained.

3. Results

In this section, findings regarding the prospective teachers' experiences, preferences, structuring, conducting and evaluation of group work were presented with frequency values; and the opinions of prospective teachers were supported with direct quotations.

3.1. Experiences and Preferences of Prospective Teachers Regarding Group Work

Under this heading, information about prospective teachers' participation in group work, the number of people in the groups formed within the scope of the research and the gender distribution of the groups are presented.

Table 2. *Experiences and preferences for group work*

Variables	f
Participation in group work before	
Yes	48
No	14
Number of people in the group	
3	37
2	17
4	8
Gender distribution of the group	
Females	48
Both females and males	8
Males	6

When Table 2 is examined, it is seen that 48 of the prospective teachers participated in the group work before; and 14 of them did not participate in the group work before. When the number of people in the groups that the prospective teachers participated in is examined, it is determined that 37 people were in the groups of 3 people; 17 people were in the groups of 2 people; and 8 people were in the groups of 4 people. When the gender distribution of the groups is examined, it is seen that the group in which 48 people participated consisted of only females; the group in which 8 people participated consisted of both females and males; and the group in which 6 people participated consisted of only males.

3.2. Prospective Teachers' Structuring Process of Group Work

Under this heading, information about the reasons that are decisive in the selection of the groupmate, the planning and division of tasks related to group work, the determining factors in sharing tasks and the frequency of group members coming together are presented.

Table 3. *Decisive reasons in the selection of group mate*

Reasons	f	Opinions of Prospective Teachers
Internal	47	
Being close friends	21	*"His/her being my close friend."*
Getting along well	17	
Sincerity	9	
External	15	
Seeing out of school	3	*"Probability of meeting outside of school. The closeness of the dormitories we stay in."*
Being responsible	2	
Hand skills	2	
Rapport	2	

Working style	1
Cooperation	1
Practical Intelligence	1
Trust	1

When Table 3 is examined, the reasons that were decisive in the prospective teachers' selection of the groupmate were considered internally and externally; and it was determined that internal reasons (*f*=47) were more effective in choosing groupmates. The internal reasons that were effective in the selection of prospective teachers' group mates were respectively being close friends (*f*=21), getting along well (*f*=17) and sincerity (*f*=9). The external reasons that were effective in the selection of prospective teachers' group mates were respectively seeing out of school (*f*=3), being responsible (*f*=2), hand skills (*f*=2), rapport (*f*=2), working style (*f*=1), cooperation (*f*=1), practical intelligence (*f*=1) and trust (1).

Table 4. *Planning and division of tasks before group work*

Variables	f
Planning	
Yes	53
No	9
Division of tasks	
Yes	52
No	9

When prospective teachers' planning and division of tasks before group work are examined in Table 4, it is seen that 53 of the prospective teachers stated that they planned before the group work, while 9 of them stated that they did not. As to the division of tasks, 52 of the prospective teachers stated that they divided the tasks, while 9 of them stated they did not.

Table 5. *Factors determining the division of tasks before group work*

Factors	f	Opinions of Prospective Teachers
Individual interests, skills and abilities	38	*"Everyone worked on the areas that they were talented. 3 materials were prepared, everyone completed the main features of one material individually and finally we finished them together."*
Equality	22	
Not done	2	

When prospective teachers' opinions regarding the factors determining the division of tasks before group work in Table 5 are examined, it is seen that individual interests, skills and abilities (*f*=38) came first, followed by equality (*f*=22); and 2 prospective teachers stated that they did not divide the tasks.

Table 6. *Frequency of group members coming together*

Weekly time	f
1 day	9
2-3 days	31
4-5 days	3
7 days	13

When the frequency of group members coming together in Table 6 is examined, it is seen that 9 of the prospective teachers stated they came together once a week; 31 of them stated two or three days a week; 3 of them stated four or five days a week and 13 of them stated 7 days a week.

3.3. Prospective Teachers' Conducting Process of Group Work

Under this heading, information about the problems faced by prospective teachers in the group work process and the solutions generated for these problems, the effects of the unsolved problems on the group members and the work are presented.

Table 7. *Problems encountered during group work*

Problems	f	Opinions of Prospective Teachers
Inability to make a mutual decision	17	*"We couldn't decide what kind of material to create."*
Inability to find a common time	11	
Disagreement among group members	9	*"Since we two were closer, we had some problems with our other friend. She changed the decisions we made together at the beginning, without asking us."*
Social loafing	4	

When Table 7 is examined, it is determined that 17 of the prospective teachers evaluated having problems in making mutual decisions during the group work, 11 of them evaluated having problems in finding common time, 9 of them evaluated having disagreements within the group and 4 of them evaluated social loafing as the problems encountered.

Table 8. *Solutions generated for the problems encountered*

Solutions	f	Opinions of Prospective Teachers
Doing research	13	*"We did a lot of research. We got help from the internet and teachers, and we brainstormed."*
Talking, exchanging ideas	11	
Spending more time	7	
Inability to find a solution	6	
Cooperation and task division	5	

When prospective teachers' solutions to the problems they encountered in Table 8 are examined, it is seen that 13 of the prospective teachers stated they did a lot research, 11 of them talked and exchanged ideas, 7 of them spent more time and 5 of them cooperated and shared tasks in order to generate solutions. 6 of the prospective teachers stated that they could not find a solution.

Table 9. *Effects of unsolved problems on group members and work*

Evaluations	f	Opinions of Prospective Teachers
Experiencing negative emotions	5	*"There were quarrels and I took line with the least resistance. It affected me negatively."*
Decrease in working efficiency	2	
Dissatisfaction with the work done	2	

When effects of unsolved problems on group members and work in Table 9 are examined, it is seen that 5 of the prospective teachers experienced negative emotions; 2 of them experienced a decrease in their working efficiency; and 2 of them were dissatisfied with the work they had done.

3.4. Prospective Evaluations of Prospective Teachers Regarding Group Work

Under this heading, information about the prospective teachers' opinions regarding the advantages and disadvantages of group work, preference and reasons for choosing group work in the future, evaluations about their friends after group work, opinions about getting the same pass mark with group members, their self-evaluations about pass marks, the feelings caused by group work and their group performance evaluations are presented.

Table 10. *Advantages of group work*

Advantages	f	Opinions of Prospective Teachers
The emergence of different ideas	22	
Collaboration	18	*"It teaches us to collaborate and helps us get to know each other better. We learn to say 'we' rather than 'I'; and I think we get a better result thanks to mutual interaction."*
Cooperation and sharing	12	
Saving time	10	
Creative and pleasant products	9	
Gaining awareness of responsibility	7	*"It enabled us to behave in accordance with the awareness of the responsibility given to us."*
Better understanding and knowing of friends	7	
Less workload	4	
Learning new things from your friends	4	*"Thanks to group work, we learned not only from homework but also from our friends."*
Socializing	2	

When prospective teachers' opinions about the advantages of group work in Table 9 are examined, it is seen that 22 of the prospective teachers considered the emergence of different ideas, 18 of them considered collaboration, 12 of them considered cooperation and sharing, 10 of them considered saving time, 9 of them considered creative and pleasant products, 7 of them considered responsibility, 7 of them considered better understanding and knowing of friends, 4 of them considered less workload, 4 of them considered learning new things from friends, and 2 of them considered socializing as the advantages of group work.

Table 11. *Disadvantages of group work*

Disadvantages	f	Opinions of Prospective Teachers
Social loafing	15	*"Not everyone works with the same workload, someone gets more work. Responsibility is imposed on the person who is slightly better than others."*
Difficulty in coming together	15	
Emergence of disagreements	14	
Experiencing conflicts	7	
Unfair task division	7	
Decrease in group performance	2	
Common assessment	2	
Being tiring and wearing	1	

When prospective teachers' opinions about the disadvantages of group work in Table 11 are examined, it is seen that 15 of the prospective teachers considered social loafing, 15 of them considered difficulty in coming together, 14 of them considered emergence of disagreements, 7 of them considered experiencing conflicts, 7 of them considered unfair task division, 2 of them considered decrease in group performance, 2 of them considered common assessment and 1 of them considered being tiring and wearing as the disadvantages of group work.

Table 12. *The way of studying to be preferred in the next processes and its reasons*

The way of studying	f	Opinions of Prospective Teachers
Group work	33	
More efficient studies	17	*"Group work, because I believe working with the group instead of doing something alone will bring better results."*
More cooperation	5	
More fun	4	
Less workload	3	
Improving friendship relationships	3	
Individual work	25	
Applying your own ideas	14	*"My preference is individuality because I think I can easily reflect my own ideas to my work."*
Irresponsible behaviors of group members	5	
More comfortable studying	5	
More effective use of time	4	
Individual assessment	2	*"I do it myself, and I get my own assessment in return for my effort. I do not prefer anybody to be assessed with my individual effort."*
Both	2	
Depends on the assignment or the project	2	*"I prefer both, because we cannot do every activity with groups."*

When the ways of studying which prospective teachers will prefer in the next process in Table 12 are examined, it is indicated that 33 of the prospective teachers would prefer group work and 25 of them would prefer to study individually. It was seen that 17 of the prospective teachers stated they would prefer group work in the next process because it was more efficient;

5 of them would prefer it because there was more cooperation; 4 of them would prefer it because it was more fun; 3 of them would prefer it because there was less workload; and 3 of them would prefer it because it helped improve friendship relationships. It was seen that 14 of the prospective teachers stated they would prefer studying individually in the next process because of applying their own ideas; 5 of them would prefer it because of irresponsible behaviors of group members; 5 of them would prefer it because of studying more comfortably; 4 of them would prefer it because of using time more effectively; and 2 of them would prefer it because of getting assessed individually. 2 of the prospective teachers stated that they could prefer both ways of studying, depending on the assignment or project.

Table 13. *Evaluations about friends after group work*

Evaluations	f	Opinions of Prospective Teachers
Not changed	22	*"There was no change because we were intimate friends before."*
Changed	12	
Thinking differently about them	5	*"My opinion about only one person changed. It is because he/she took individual decisions though we were a group; thus I got a negative impression."*
Getting to know your friends better	4	
Thinking that responsibilities are not discharged	3	
Deciding not to be in the same group with some people	2	
No more talking to some people	2	
Enjoying working together	1	

When prospective teachers' evaluations about their friends after group work in Table 13 are examined, it is seen that 22 of the prospective teachers stated that there were no changes in their friendship and 12 of them stated there were changes. 5 of the prospective teachers who thought that they had a change in their friendship stated that they thought differently about their friends; 4 of them stated that they knew their friends better; 3 of them stated that they did not discharge their responsibilities; 2 of them stated that they decided not to be in the same group with some people; 2 of them stated that they did not prefer to talk to some people anymore; and 1 of them stated that they enjoyed working together.

Table 14. *Opinions about group members' getting the same pass mark*

Evaluations	f	Opinions of Prospective Teachers
Appropriate	39	
Fair	25	*"I think it's fair because we're all making the same material and making the same effort."*
Equal	10	
Logical	4	
Not appropriate	25	
Unfair	20	*"I think it's unfair because everyone doesn't make the same effort."*
Unjust	5	

When Table 14 is examined, it is seen that 39 of the prospective teachers thought that it was appropriate for the group members to get the same pass mark; and 30 of the prospective teachers thought that it was not appropriate. 25 of the prospective teachers who thought that it was appropriate for the group members to get the same pass mark stated that this was fair; 10 of them stated it was equal; and 4 of them stated it was logical. 20 of the prospective teachers who thought that it was not appropriate for the group members to get the same pass mark stated that it was unfair and 5 of them stated it was unjust.

Table 15. *Self-evaluation on the pass mark*

Opinions	f
I think group work led to an increase in my pass mark	30
I think group work did not lead to any change in my pass mark.	20
I think group work led to a decrease in my pass mark.	12

When Table 15 is examined, it is determined that 30 of the prospective teachers thought that group work led to an increase in their pass mark; 20 of the prospective teachers thought that the group work did not lead to any change in their pass mark; and 10 of the prospective teachers thought that the group work led to a decrease in their pass mark.

Table 16. *The emotions caused by group work*

Emotions	f	Opinions of Prospective Teachers
Positive	73	
Happiness	25	*"In some moments, I got my group friends' ideas and help, which made me happy."*
Belief in collaboration	21	
Self-reliance	14	
Excitement	10	
Pride	2	
Sincerity	1	
Negative	10	
Sadness	5	*"Group work is always tiring. It is very exhausting that people do not spare the time you do and judge what you do by finding excuses."*
Anger	3	
Anxiety	2	

When Table 16 is examined, it is determined that prospective teachers felt more positive emotions (*f*=73) in group work; while 10 of the prospective teachers stated that they felt negative emotions. Happiness (*f*=25) took the first place among positive emotions, followed respectively by belief in collaboration (*f*=21), self-reliance (*f*=14), excitement (*f*=10), pride (*f*=2) and sincerity (*f*=1). When negative emotions are examined, first sadness (*f*=5), then respectively anger (*f*=3) and anxiety (*f*=2) were among the emotions that prospective teachers felt in group work.

Table 17. *Evaluation on group performance*

Criteria	Very Low	Low	Medium	High	Very High
	f	f	f	f	f
Ingroup rapport	2	1	6	22	31
Ingroup creativity	1	4	9	25	23
Ingroup responsibility	3	4	4	10	41
Effective use of time	2	6	8	10	36
Ingroup communication	2	2	6	15	37

When the evaluations on group performance of prospective teachers are examined in Table 17, it is determined that as regards to ingroup rapport, majority of the prospective teachers considered themselves in a very high harmony; as to ingroup creativity, 25 of them defined their creativity was at a high level; as to ingroup responsibility, 41 of them considered themselves quite responsible; as to effective use of time, 36 of them considered themselves at a very high level; and as to ingroup communication, 37 of them stated that their communication in the group was very high.

4. Conclusion, Discussion and Suggestion

The majority of the participants preferred to work in groups of three people and only in groups consisted of people of the same gender. However, studies have revealed that mixed-gender groups perform better (Orlitzky & Benjamin, 2003) and exhibit enhanced collaboration compared to single-gender groups. Mixed gender groups can create different interactions and lead to mutual support and compatibility (Takeda & Homberg, 2014). For group work, it may be suggested to form heterogeneous groups in terms of gender.

Internal reasons such as sincerity, being close friend and getting along well were more effective determinants in the participants' selection of their groupmates. This result is in line with other research results (Kalaycı, 2008; Mamas, 2018; Williams, Guy, & Shore, 2019). In this regard, it can be said that leaving the choice of the groups to the preference of prospective teachers has a positive effect on the group work process.

At the beginning of the group work, the majority of the participants stated that they did planning regarding time and task division. In contrast to this result, in the study conducted by Kalaycı (2008), it was observed that the groups did not prepare a time schedule and did not immediately divide the tasks with the idea that they would not stick to the schedule.

While dividing tasks in group work, the skills and abilities of the group members and the equal and fair distribution of responsibilities were taken into account. In the study of Kalaycı (2008), the abilities of the group members, the desires of the members for the work and the closeness of the students who would perform the same task were effective in dividing the tasks. When the results of these studies are evaluated together, it can be said that group members adopt a task-oriented and equity-based strategy of task division.

The majority of the participants came together two or three days a week for group work. It is seen that timing is important in group formation and planning, and it is taken into consideration by prospective teachers in group work. In the study of Koç-Erdamar and Demirel (2010), it was revealed that the group members had difficulties in finding time to come together outside the class. Based on these results, it can be said that time management is crucial in group work and prospective teachers need to work more planned in this regard.

The main problems encountered during group work were decision-making problems, inability to manage time, disagreements between group members and social loafing. The main

problems encountered in the previous research carried out on group work were social loafing, the shy students' remaining in the background as a result of the fact that the students who were active affected the others negatively, in-group disputes and not sharing information within the group (Arslan, Taşkın & Kirman-Bilgin, 2015; Büyükgöze & Demirkasımoğlu, 2018; Koç-Erdamar & Demirel, 2010; Mello, 1993). Failure to solve such problems causes the group to perform less efficient (Piezon & Ferree, 2008). Although the members of the group considered the factors such as researching, exchanging ideas, and helping each other in the solution of the problems encountered, some problems remained unsolved. That the problems encountered in the group work process are solved by the students enables them to improve their ability to cope with the problems; however, it is also important that educators should not be out of the process. So as to reduce the likelihood of problems occurring in group work, it can be recommended that educators guide the formation of groups and group rules, planning for time and division of tasks, effective communication, decision making in a democratic way and problem solving, discussing ideas rather than individuals, and evidence-based reasoning.

Cooperation, emergence of different ideas, saving time, decreased workload, emergence of creative products, learning from each other, development of group consciousness and increased interaction were seen as the benefits of group work by participants. The cognitive and affective positive effects of group work on students are similarly emphasized by many studies (Butt, 2018; Çakmak, 2014; Delice & Taşova, 2011; Diaz-Pareja, et al., 2017; Fung & Howe, 2012; Koç-Erdamar & Demirel, 2010 Volkov & Volkov 2015; Yanpar-Yelken, 2009; Yasul & Samancı, 2015). The development of such features / skills is crucial in terms of preparing prospective teachers for their professional lives.

Social loafing, disagreements, not fulfilling responsibilities, slow downing each other, disputes among group members, decreased group performance, and the inability of the members to get the scores they deserve were evaluated as the negative sides of the group work. Failures experienced in group work are often caused by social loafing behaviors (Takeda & Homberg, 2014). In the research of McCorkle, Reardon, Alexander, Kling, Harris, and Iyer (1999), more than 65 percent of students stated that they experienced social loafing in their groups. As the group size increases, individual productivity may decrease and students' indifference may trigger social loafing (Chidambaram & Tung, 2005). Additionally, the self-perception and experiences of a group member can cause social loafing behavior and have a negative effect on the performance of the other group members (Büyükgöze & Demirkasımoğlu, 2018). As the number of people in a group increases, one can think that the effect of him will not be noticeable and he can make less effort. In the experiment of rope pulling carried out by Max Ringelmann in 1883, it was observed that the performance of the group members decreased as the number of people in the group increased. Assuming that the performance of individuals was 100% when they were alone, their performance decreased to 93% when there were two people, to 85% when there were three people, and to 49% when there were 8 people. The fact that as the number of people in the group increases, the performance of group members decreases is called the Ringelmann effect today (Ingham, Levinger, Graves, & Peckham, 1974). Peer assessment is suggested by studies (Baker, 2008; Cheng & Warren, 2000) to deal with social loafing behavior in group work and it is shown to be effective in group work (Brooks & Ammons, 2003; Chapman & van Auken, 2001; Cheng & Warren , 2000). In addition to this suggestion, it can be offered for the educator to conduct individual interviews with students for formal evaluation during the group work process.

Most of the participants stated that they would prefer group work in their future studies; whereas, nearly half of the participants stated that they would prefer studying individually. The fact that participants have negative group work experience is effective in their preference of individual studying rather than group work in their future lives (Chapman & van Auken, 2001;

Koç-Erdamar & Demirel, 2010; OECD, 2017; Piezon & Ferree, 2008). There are also cases where group work may not be suitable for all students. Personality traits (introversion, extraversion) and attachment styles play a role in individuals' group work preferences and the effectiveness of group work (Lavy, 2017; Rom & Mikulincer, 2003). People experiencing anxious attachment can feel themselves worthless, helpless and vulnerable in group work and have problems in effectively demonstrating their performance in group work, and even see group work as a source of stress (Rom & Mikulincer, 2003). Therefore, although students should be encouraged to participate in group work, it can be suggested that students should not be forced and group work should not be shown as the only option in education. Sander, Stevenson, King & Coates (2000) stated that students' expectations and preferences will provide a basis for evaluating the results of the next lesson or study and that students should be provided with the opportunity to do so.

After group work, problems occurred in friendship relationships of about one-fifth of the participants due to group work. In the study of Koç-Erdamar and Demirel (2010), it was stated that there were conflicts among the group members and that situation caused problems in the group. Disagreements between group members and problems in friend relations cause their desire of studying to decrease and this situation reflects unqualifiedly on the resulting products. When the problems in friendship relations are not resolved, prospective teachers move away from each other emotionally and feel that they are not understood. According to the result of the study conducted by Spalding, Ferguson, Garrigan & Stewart (1999), one of the important problems in group work was the social integrity of the groups; it was emphasized that where this worked, students developed learning experiences without being deprived of an effective learning experience. According to the result of the study carried out by Makewa, Gitonga, Ngussa, Njoroge & Kuboja (2014), many problems occurred because of the attitudes of the students towards learning and previous experience; it was revealed that students who were independent and expected to work at their own pace had difficulties in collaborating with their friends who had different priorities and working habits, and they experienced disappointment. The necessary sense of group integrity can be gained by successfully negotiating these conflicts between group members and bringing them under control for further development. It is important that the individual reaches a point where he experiences himself as a unique entity within the group, he can contribute to the group without having to be proponent or opponent and does not feel threatened (Cartney & Rouse, 2006). Preparing the student for collaboration through the teaching and development of the social and group skills necessary to work effectively in a group will positively affect group work. Therefore, educators may be advised to take time to motivate group members to interact with each other during group work.

While most of the prospective teachers thought that getting the same pass mark with the group members as a result of the group work was fair, some of them stated that it was not fair. Parsons & Drew (2006) stated in their study that shifting the balance of power to students in determining the structure and organization of the groups and controlling the assessment affected the group performance. In the study of Salomon and Globerson's (1989), it was revealed that some students who did not contribute to the group in any way received a good grade because they were found to be successful in the group; and that successful students did not want to continue their group studies. Similarly, in the study conducted by Koç-Erdamar and Demirel (2010), it was determined that prospective teachers considered getting the same grade with the group members as one of the important problems of group work; and they were not satisfied with getting the same score with the whole group. In this regard, it seems very crucial to make the group members feel better and to appreciate the knowledge and skills they possess and acquire in the process through different evaluation methods. However, more

studies can be carried out to understand the impact of ingroup evaluations on group members' work on individualization and how they can affect the distrust that occurs during the process.

Group work can help students achieve specific learning and social interaction goals in structured groups when used properly as a teaching strategy. It can also promote social interaction to facilitate knowledge building (Makewa et al., 2014). Research shows that social contact among students is important for learning experiences (Longhurst, 1999; Sander, Stevenson, King & Coates, 2000). When group work is carefully and appropriately designed and monitored, learning within the group is a valuable experience; and collaboration of students can increase their achievements more than traditional learning methods (Livingstone & Lynch, 2002; Makewa et al., 2014). Therefore, it is recommended to include group work in different classes in order for the correct use of group works, which contribute to the development of solidarity, responsibility, interaction, social skills and the ability to manage the process, by the prospective teachers who will be the future teachers.

5. Conflict of Interest

The authors declare that there is no conflict of interest.

6. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Adams, D. M., & Hamm, M. (1994). *New designs for teaching and learning*. San Francisco, CA: Jossey-Bass.

Akgün, A., & Aydın, M. (2009). Erime ve çözünme konusundaki kavram yanılgılarının ve bilgi eksikliklerinin giderilmesinde yapılandırmacı öğrenme yaklaşımına dayalı grup çalışmalarının kullanılması. *Elektronik Sosyal Bilimler Dergisi*, 8(27), 190-201.

Arslan, S., Taşkın, D., & Kirman-Bilgin, A. (2015). Adidaktik öğrenme ortamlarında bireysel ve grup çalışması uygulamalarının öğrenci başarısına etkisi. *Türk Bilgisayar ve Matematik Eğitimi Dergisi,* 6(1), 47-67.

Baker, D. F. (2008). Peer assessment in small groups: A comparison of methods. *Journal of Management Education, 32*(2), 183-209.

Brooks, C. M. & Ammons, J. L. (2003) Free riding in group projects and the effects of timing, frequency,and specificity of criteria in peer assessments. *Journal of Education for Business*, 78(5), 268–272.

Butt, A. (2018). Quantification of influences on student perceptions of group work. *Journal of University Teaching & Learning Practice*, 15(5), 1-15.

Büyükgöze, H., & Demirkasımoğlu, N. (2018). Üniversite öğrencilerinin grup çalışmalarında sosyal kaytarma davranışlarına ilişkin görüşleri: Nedenler ve olası çözümler. *Yükseköğretim Dergisi,* 8(2), 172–187.

Cartney, P. & Rouse, A. (2006). The emotional impact of learning in small groups: highlighting the impact on student progression and retention. *Teaching in Higher Education*, 11(1), 79-91. https://doi.org/10.1080/13562510500400180.

Chang, Y., & Brickman, P. (2018). When group work doesn't work: Insights from students. *CBE—Life Sciences Education*, *17*(52), 1-17.

Chapman, K. J. & Van Auken, S. (2001) Creating positive group project experiences: An examination of the role of the instructor on students' perceptions of group projects. *Journal of Marketing Education, 23*(2), 117–127.

Chapman, K. J., Meuter, M., Toy, D., & Wright, L. (2006). Can't we pick our own groups? The influence of group selection method on group dynamics and outcomes. *Journal of Management Education, 30*(4), 557-569.

Cheng, W. & Warren, M. (2000) Making a difference: Using peers to assess individual students' contributions to a group project. *Teaching in Higher Education, 5*(2), 243–255.

Chidambaram, L., & Tung, L. L. (2005). Is out of sight, out of mind? An empirical study of social loafing in technology-supported groups. *Information Systems Research*, *16*(2), 149-168.

Chiriac, E. H., & Granström, K. (2012) Teachers' leadership and students' experience of group work. *Teachers and Teaching: Theory and Practice, 18*(3), 345-363.

Çakmak, M. (2014). Grup çalışmasına yönelik yansımalar: Öğretmen adaylarının düşünceleri. *Eğitim ve Bilim*, *39*(174), 338-347.

Çevik, O. & Yiğit, S. (2009). Eğitim fakültesi öğrencilerinin profillerinin belirlenmesi: Amasya üniversitesi örneği. *C.Ü. Sosyal Bilimler Dergisi*, 33(1), 89-106.

Delice, A., & Taşova, H. (2011). Bireysel ve grup çalışmasının modelleme etkinliklerindeki sürece ve performansa etkisi. *Marmara Üniversitesi Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi*, *34*(34), 71-97.

Demirel, Ö. (2011). *Öğretim ilke ve yöntemleri: Öğretme sanatı.* Ankara: Pegem Akademi.

Díaz Pareja, E. M., Cámara Estrella, Á. M., Muñoz Galiano, I. M., & Ortega-Tudela, J. M. (2018). Group work: Prospective teachers' acquisition of transversal competences. *Educational Studies*, *44*(1), 45-56.

Erkan, S., Tugrul, B., Üstün, E. Akman, B., Şendoğdu, M., Kargı, E., Boz, M. & Güler, T. (2002). Okulöncesi öğretmenliği öğrencilerine ait Türkiye profil araştırması. *Hacettepe Üniversitesi, Eğitim Fakültesi Dergisi*, 23, 108-116.

Forslund Frykedal, K., & Hammar Chiriac, E. (2018). Student collaboration in group work: Inclusion as participation. *International Journal of Disability, Development and Education*, *65*(2), 183-198.

Fung, D., & Howe, C. (2014). Group work and the learning of critical thinking in the Hong Kong secondary liberal studies curriculum. *Cambridge Journal of Education*, *44*(2), 245-270.

Graen, G. B., Hui, C., & Taylor, E. A. (2006) Experience-based learning about LMX leadership and fairness in project teams: A dyadic directional approach. *Academy of Management Learning & Education, 5*(4), 448–460.

Hohmann, U., & Mamas.C. (2015). Research projects in early childhood studies (R. Parker-Rees and C. Leeson, Eds.). In *Early childhood studies: An introduction to the study of children's worlds and children's lives* (pp. 264–278). London: Sage.

Ingham, A. G., Levinger, G., Graves, J., & Peckham, V. (1974). The Ringelmann effect: Studies of group size and group performance. *Journal of Experimental Social Psychology*, *10*(4), 371-384.

Johnson, D. W., & Johnson, R. (2003). Training for cooperative group work. In M. West, D. Tjosvold, & K. Smith. *International handbook of organizational teamwork and cooperative working* (pp. 167–183). London: Wiley.

Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational researcher*, *38*(5), 365-379.

Kalaycı, N. (2008). Yükseköğretimde proje tabanlı öğrenmeye ilişkin bir uygulama projeyi yöneten öğrenciler açısından analiz. *Eğitim ve Bilim*, *33*(147), 85-105.

Koç Erdamar, G., & Demirel, H. (2010). Öğretmen adaylarının grup çalışmalarına ilişkin algıları. *Journal of Kırsehir Education Faculty*, *11*(3), 205-223.

Lavy, S. (2017). Who benefits from group work in higher education? An attachment theory perspective. *Higher Education*, *73*(2), 175-187.

Li, M., & Campbell, J. (2008) Asian students' perceptions of group work and group assignments in a New Zealand tertiary institution. *Intercultural Education*, *19*(3), 203–216.

Livingstone, D. & Lynch, K. (2002) Group project work and studentcentred active learning: two different experiences. *Journal of Geography in Higher Education*, 26 (2), 217-237. https://doi.org/10.1080/03098260220144748.

Longhurst, R. (1999) Why aren't they here? Student absenteeism in a further education college. *Journal of Further and Higher Education*, 23(1), 61-80.

Makewa, L. N., Gitonga, D., Ngussa, B., Njoroge, S. & Kuboja, J. (2014). Frustration factor in group collaborative learning experiences. *American Journal of Educational Research*, 2 (11), 16-22. http://pubs.sciepub.com/education/2/11A/3.

Mamas, C. (2018). Exploring peer relationships, friendships and group work dynamics in higher education: Applying social network analysis. *Journal of Further and Higher Education*, *42*(5), 662-677.

McCorkle, D. E., Reardon, J., Alexander, J. F., Kling, N. D., Harris, R. C., & Iyer, R. V. (1999). Undergraduate marketing students, group projects, and teamwork: The good, the bad, and the ugly? *Journal of Marketing Education 21*, 106-117.

Mello, J. A. (1993). Improving individual member accountability in small work group settings. *Journal of Management Education*, *17*(2), 253-259.

Merriam, S. B. (2015). *Nitel araştırma desen ve uygulama için bir rehber* (S. Turan, Çev. Ed.). Ankara: Nobel Akademik Yayıncılık

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded Sourcebook*. Thousand Oaks, CA: Sage.

Mittelmeier, J., Rienties, B., Tempelaar, D., & Whitelock, D. (2018). Overcoming cross-cultural group work tensions: Mixed student perspectives on the role of social relationships. *Higher Education*, *75*(1), 149-166.

Moore, P., & Hampton, G. (2015). 'It's a bit of a generalisation, but...': Participant perspectives on intercultural group assessment in higher education. *Assessment & Evaluation in Higher Education*, *40*(3), 390–406.

OECD. (2017). PISA 2015 results collaborative problem solving. Retrieved from https://read.oecd-ilibrary.org/education/pisa-2015-results-volume-v_9789264285521-en#page1

Orlitzky, M., & Benjamin, J. D. (2003). The effects of sex composition on small-group performance in a business school case competition. *Academy of Management Learning & Education*, *2*(2), 128-138.

Parsons D. E. & Drew S. K. (2006). Designing group project work to enhance learning: key elements. *Teaching in Higher Education*, 1(1), 65-80. https://doi.org/10.1080/1356251960010106.

Piezon, S. L., & Ferree, W. D. (2008). Perceptions of social loafing in online learning groups: A study of public university and U.S. Naval War College students. *The International Review of Research in Open and Distance Learning*, *9*(2), 1-17.

Rom, E., & Mikulincer, M. (2003). Attachment theory and group processes: The association between attachment style and group-related representations, goals, memories, and functioning. *Journal of Personality and Social Psychology*, 84(6), 1220–1235.

Salomon, G., & Globerson, T. (1989). When teams do not function the way they ought to international. *Journal of Educational Research*, 13, 89–99.

Sander, P., Stevenson, K., King, M. & Coates, D. (2000) University students' expectations of teaching. *Studies in Higher Education*, 25(3), 309-323. https://doi.org/10.1080/03075070050193433.

Susskind, A. M., & Borchgrevink, C. P. (1999). Team-based interaction in the foodservice instructional laboratory: An exploratory model of team composition, team-member interaction, and performance. *Journal of Hospitality &Tourism Education*, 10(4), 22–29.

Spalding, B., Ferguson, S., Garrigan, P. & Stewart, R. (1999) How effective is group work in enhancing work-based learning? An evaluation of an education studies course. *Journal of Further and Higher Education*, 23 (1), 109-115. https://doi.org/10.1080/0309877990230109.

Takeda, S., & Homberg, F. (2014). The effects of gender on group work process and achievement: an analysis through self-and peer-assessment. *British Educational Research Journal*, *40*(2), 373-396.

Teddlie, C., & Tashakkori, A. (2015). *Karma yöntem araştırmalarının temelleri* (Y. Dede ve S. B. Demir, Trans. Eds.). Ankara: Anı Yayıncılık.

UNESCO. (2008). ICT competency standards for teachers: Competency standards modules. Paris, France: United Nations Educational, Scientific, and Cultural Organization. Retrieved from http://unesdoc.unesco.org/images/0015/001562/156207e.pdf

Volkov, A., & Volkov, M. (2015). Teamwork benefits in tertiary education: Student perceptions that lead to best practice assessment design. *Education + Training*, *57*(3), 262-278.

Williams, J. M., Cera Guy, J. N., & Shore, B. M. (2019). High-achieving students' expectations about what happens in classroom group work: A review of contributing research. *Roeper Review*, *41*(3), 156-165.

Yanpar-Yelken, T. (2009). Öğretmen adaylarının portfolyoları üzerinde grup olarak yaratıcılık temelli materyal geliştirmenin etkileri. *Eğitim ve Bilim*, *34*(153), 83-98.

Yasul, A. F., & Samancı, O. (2015). Sınıf öğretmenlerinin grup çalışmalarına ilişkin görüşlerinin incelenmesi. *Iğdır University Journal of Social Sciences*, *7*, 131-156.

Yıldırım, A., & Şimşek, H. (2008). *Sosyal bilimlerde nitel araştırma yöntemleri*. Ankara: Seçkin Yayıncılık

Yin, R. K. (2018). *Case study research and applications design and methods*. California: SAGE Publications.

Qasrawi, R., & BeniAndelrahman, A. (2020). The higher and lower-order thinking skills (HOTS and LOTS) in Unlock English textbooks (1st and 2nd editions) based on Bloom's Taxonomy: An analysis study. *International Online Journal of Education and Teaching (IOJET), 7*(3). 744-758. https://iojet.org/index.php/IOJET/article/view/866

Received: 15.04.2020
Received in revised form: 23.04.2020
Accepted: 02.06.2020

THE HIGHER AND LOWER-ORDER THINKING SKILLS (HOTS AND LOTS) IN UNLOCK ENGLISH TEXTBOOKS (1ST AND 2ND EDITIONS) BASED ON BLOOM'S TAXONOMY: AN ANALYSIS STUDY

Research article

Rania Qasrawi

Birzeit University

rqassrawi@birzeit.edu

Abdullah BeniAbdelrahman

Yarmouk University

baniabdelrahman@gmail.com

Rania Qasrawi is an instructor of English language at Birzeit University- Palestine.

Abdullah BeniAbdelrahman is professor in the department of Teaching English as a Foreign Language at Yarmouk University.

THE HIGHER AND LOWER-ORDER THINKING SKILLS (HOTS AND LOTS) IN UNLOCK ENGLISH TEXTBOOKS (1ST AND 2ND EDITIONS) BASED ON BLOOM'S TAXONOMY: AN ANALYSIS STUDY

Rania Qasrawi
rqassrawi@birzeit.edu

Abdullah BeniAbdelrahman
baniabdelrahman@gmail.com

Abstract

This study aims at analyzing *Unlock English Reading, Writing and Critical Thinking Skills* Textbooks (First and Second editions) in terms of the inclusion of the lower and the higher order thinking skills. The current study is a descriptive content analysis paper that followed a checklist containing the cognitive levels of Bloom's Taxonomy as well as a checklist of the possible verbs by OPAR (2012) that combined the Revised Taxonomy as well. The finding in this study indicated that majority of the cognitive objectives in the second edition belong to both LOTS (Comprehension) and HOTS (Analysis and Synthesis) whereas the focus of the first edition was mainly on Comprehension and Analysis. Some objectives, also, were paraphrased to reflect the cognitive objectives where they were more related to reading comprehension sub-skills (skimming, scanning, previewing, etc.). Based on the findings, some recommendations were listed.
Keywords: higher and lower order thinking, Unlock English textbooks, Bloom's Taxonomy

1. Introduction

The recent trends in education have been poured on developing the individuals' potentiality and skills in different subjects and disciplines. Thinking skills can be considered one of the demanded skills that are highly required to facilitate learner's life with the explosion of information, where their memories are not be able to bear the tremendous amount of knowledge and digits. Although knowledge tends to be the utmost outcome of education, that supports students to deal with the changes in the 21st century, there are other cognitive skills and competences that need to be enhanced in different levels, particularly the higher order thinking skills.

Nowadays, education is required to move students further than recalling information and memorization. That is because the information and facts are increasing dramatically, thus students will not be able to compete in this world if they are not able to understand, analyze, apply, evaluate and create (Crossland,2015). These different levels of the cognitive skills are divided into two levels; the lower level thinking skills (LOTS) and the higher order thinking skills based on Bloom's Taxonomy (1965), which was named after Benjamin Bloom, who had suggested the different levels of the cognitive skills as educational objectives in the teaching learning process.

Based on the different levels of the cognitive skills, the educational reformers are calling for enhancing the higher order thinking skills. This enhancement is meant for leading students to be more critical and creative; in a way they can use the content of knowledge in a thorough comprehension which may assist them to research information, analyze, evaluate and to be critical and creative in responding to questions and in solving their problems (Rahman & Manaf, 2017). Therefore, the inclusion of the higher order thinking skills (HOTS) in education

has become one the reforms steps that has been conducted to develop students critical and creative thinking (Shaheen,2010). One of the educational instruments and factors that needs to be adapted and reviewed accordingly is textbooks as they are the vehicle that should reflect the philosophy of education in different disciplines and subjects, such as English language (Assaly & Samadi,2015).

English textbooks, for example, which are designed on skills, are considered to be rich source of materials and content that may reflect the HOTS and LOTS, as they tend to be rich of the reading passages and writing tasks. Thus, teachers and practitioners need to address the different cognitive thinking skills particularly the HOTS, since students are in need not just for recalling information, rather than being able to apply, analyze, synthesize and evaluate (Case,2013). As long as most English textbooks are published by English native countries, like Britain, these textbooks could be established based on criteria that may not fit students' level who learn English as a foreign language in other countries.

Therefore, conducting a review and analysis of the content of English textbooks and syllabi may be an essential step that practitioners and teachers should be aware of. It is important to mention that content analysis is considered to be a research systematic and objective technique and method that can be used in analyzing the content quantitatively or qualitatively. In this analysis, the researcher determines the frequency of specific themes, terms, and other characteristics in order to explain any form of communication messages explicitly or implicitly (Holsti,1969).

1.1 Statement of the Problem

Actually, Unlock English textbooks by Cambridge University Press are the official textbooks that are being used at BZU, in Palestine. This series of books have been adopted for teaching in the academic year 2016/2017. However, this year (2019/2020), Cambridge University Press has published the second edition of the Unlock English textbooks series with having some modifications. One of these changes that has been added is the title that it has become: "Unlock English, Reading, Writing and Critical Thinking". As long as this series of English textbooks is developed by English native countries, like Britain, conducting a review and an analysis of the content of these syllabi may be an essential step in order to evaluate these new textbooks and to compare them with the previous textbooks in terms of the enhancement of the critical thinking skills. As an instructor of English language at BZU, the researcher has conducted this study on one level of these series (Unlock English, Reading, Writing book 3) (B1) and compared it with the previous edition.

1.2 Purpose of the Study

This study aims at investigating to what extent Unlock English textbooks (reading and writing) can enhance the higher order thinking skills in the new and old editions, by analyzing the frequency of the lower and higher thinking learning objectives, based on Bloom's Taxonomy division of the cognitive skills.

1.3 Research Questions

This study is conducted to answer the following questions:

1. To what extent does *Unlock English textbook* enhance the higher and lower order thinking skills (HOTS and LOTS)?

2. What are the differences between the first and the second edition of Unlock English textbooks in terms of the cognitive level of the learning objectives (HOTS and LOTS)?

1.4 The Significance of the Study

This study is considered to be the first evaluation and review of the second edition of the Unlock English series by one of the practitioners at Birzeit University (the researcher) who is working as an instructor of English. This step tends to beneficial for all stakeholders, since this study may resemble a compass to guide other efforts to evaluate other aspects of this textbook. This study is also essential for instructors of English since it will be an acknowledgment of the importance of the different levels of cognitive skills, especially HOTS. Besides, the current study, in cooperation with other research effort, may provide decision makers at Birzeit University with data that they may rely on in their future decision.

1.5 Delimitations

The scope of the content analysis of this study will be the intermediate Unlock English Reading, Writing and Critical Thinking Skills, Book3. This second version was published at the beginning of the academic year 2019/2020. The analysis will include also the previous version of the same intermediate English book, which was entitled Unlock English Reading and Writing Book 3.

1.6 The Definitions of Terminologies

- **Blooms' Taxonomy:** Operationally, the bloom's taxonomy, that this analysis was built on, refers to merging the cognitive thinking skills that was listed by Bloom (1965) and the modified taxonomy by Krathwohl (2002), which were summarized in OPAR (2012). This combination was used as a checklist in this analysis (see Appendix).

- **Higher Order Thinking Skills:** In this study, the higher order thinking skills that were adopted, based on Bloom's taxonomy, are evaluation, analysis, and synthesis.

- **Lower Order Thinking Skills:** the lower thinking skills were defined in this study as the knowledge (memorization), comprehension, and application.

- **Unlock English Textbooks:** This study targets Unlock English Reading, Writing and Critical Thinking, book 3. This book is classified as an intermediate level, where students at this level should be having a good base in English language.

2.Literature Review

2.1 Bloom's Taxonomy

Bloom's Taxonomy was devised by Benjamin Bloom and group of educators in 1965. This taxonomy, since after, has been adopted as the backbone of the teaching process; particularly the learning objectives, the lesson plans and the assessment. In Blooms Taxonomy, the educational objectives were divided into three main categories; cognitive, affective and psychomotor skills. As for the cognitive skills, there are six levels of Bloom's Taxonomy which

are: knowledge, comprehension, application, analysis, synthesis, and evaluation. From the first level, learners can move to a more high and complex level than the other (Bloom,1965). It is worth mentioning that this taxonomy has been revised later by Krathwohl (2002), which was entitle a Taxonomy for Teaching, Learning, and Assessment. In this revised version, the categories of the cognitive skills have become remembering, understanding, applying, analyzing, evaluating and creating.

As for the six levels of Bloom's taxonomy, there are certain characteristics for each level, Knowledge, for example, is the level of thinking that may elicit gaining and memorizing information. Comprehension level, however, involves understating the information and interpret facts. As for the Application level, students are being asked to apply and use the information they gained. Besides, at the Analysis phase learners are supposed to analyze, investigate and infer. At Synthesis level, moreover, learners are required to induct theories, predictions, and evaluation. That is why, learners at this level can come up with conclusions and become more critical and creative (Bloom,1965). These different levels where divided in two levels; LOTS and HOTS.

2.2 The Importance of Teaching Higher Order Thinking Skills (HOTS).

The reform in education involves being updated to the skills that learners are in need to cope with the demands of the 21st century. These demands include innovation, life and career skills and technology skills. Importantly, such demands require learners to have an acceptable level of communication, collaboration critical thinking and creativity besides other skills. Thus, Rentawati et al (2018) stated that that the 21st-century skills can be divided into two main categories; abstract and concrete skills. It is worth mentioning that higher order thinking skills belong to the abstract skills, whereas communication and collaboration are concrete. Moreover, creative thinking skills and critical thinking skills are tied up with enhancement of the higher-order thinking skills (HOTS).

It is important to mention that Bloom's different levels of skills were divided by researchers into higher (HOTS) and lower thinking skills (LOTS). The commitment towards HOTS came in line with the development of information and technology, where learners are in need for different competences to cope with the huge amount of information, such as analysis, synthesis and evaluation (Halili,2015). Some researchers also believe that HOTS tend to be essential in developing lifelong learning, that enables learners to respond effectively to the 21st century demands (Rentawati et al, 2018). Although much of research effort is in favor improving teaching and learning HOTS, there are challenges that confront this goal starting from the curriculum, moving to the classroom practices and ending up with assessment (Zohar, 2003).

2.3 HOTS and LOTS in English Textbooks

The textbooks in general are set to be a fundamental part in the teaching and learning process. Richards (2001), for example, has listed 7 advantages of the English textbooks. These benefits were summarized as they provide a thorough description of the structure and the program. They also suggest standardized instruction, as well as they can improve and enhance the quality of the learning process, with offering learning resources. Moreover, English textbooks can facilitate second language learning, and they also submit effective language model and input, and can be considered as initial training for teachers.

Therefore, content analysis of textbooks and curriculum are so vital in order to provide basis for policy decisions and the implementation. This means that textbooks are an important

component in any ESL/EFL course, so the careful selection of English textbooks is a key element in any successful teaching and learning program. In other words, the content of the textbook should meet the desired skills and expectation that are suitable for the context of learning. In a sense, the selection of any ESL/EFL textbook should be followed by a review of the content to analyze the main domains, since they are considered to be a learning teaching instrument, that support teaching (Gul, Shah &Sultan, 2015).

A number of studies have been conducted to investigate the type and the cognitive level of the textbooks' questions in different subjects and different countries around the world using Bloom's taxonomy as a guide for categorizing the questions. Razmjoo and Kazempourfard (2012) have analyzed the activities and the exercises of three units of four books of the *Interchange series* using the six levels of Bloom's Revised Taxonomy. The researchers employed a coding scheme to code, classify and analyze the exercises and activities of these books. The findings of this study revealed that the lower order cognitive skills were dominant in Interchange *textbooks*, that remembering was the most frequent category followed by applying in the four books.

In the same context, Shafeei et al (2017) have conducted a study that aimed at investigating the questions types used by teachers of English. It aimed also at examining the challenges that are faced by teachers in incorporating HOTS elements in their teaching. The study concluded that ESL teachers tended to address questions that arouse LOTS compared to HOTS. The researcher further referred this result to the lack of knowledge regarding HOTS questions, thus this is reflected by the students' English low proficiency level.

In a study conducted by Nachiappan et al (2018), the researchers aimed at documenting the application of Higher Order Thinking Skills (HOTS) in teaching and learning through component in preschool. The study concluded that there are only three levels of Higher Order thinking skills which are the application, analysis and evaluation in teaching and learning.

3. Methodology and Procedures

The current study is a quantitative and qualitative content analysis research that was established to answer the research main questions; To what extent does *Unlock English textbook* enhance the Higher order thinking skills (LOTS)?; and what are the differences between the first and the second edition of *Unlock English textbooks* in terms of the cognitive level of the learning objectives (HOTS and LOTS)?

3.1 Sampling

This study was established to document the cognitive level of the learning objectives of Unlock English Reading, Writing and Critical Thinking book 3, (First and Second Edition) by Cambridge University Press. Choosing this book was purposefully since the majority of students at BZU are usually supposed to cover this course and pass this level.

3.2 Instrument of the Study

In order to analyze the cognitive level of the learning objectives of the target textbook, the researcher has used a checklist designed based on Bloom's Taxonomy (1965) and the Revised Taxonomy by Krathwohl (2002). The content of the checklist contains all the possible verbs that may locate under the different levels of the cognitive skills prepared by OPAR (2012) (see

Appendix 2).

3.2.1 Validity of the Checklist

Bloom's Taxonomy has been validated in many studies, it was also used to determine the educational objectives, activities, and assessment. Thus, following the levels and the categories suggested by Bloom (1965) was validated in several research papers (Assaly & Smadi,2015). As for the validity of the checklist used in the current study, the checklist has specified all Bloom's Taxonomy levels based on words and certain verbs for each level (OPAR,2012). Thus, the researcher has analyzed the level of each learning objective of the all activities based on a ready-made checklist that was validated by being exposed to 4 experts who confirmed its validity.

3.2.2 Reliability of the Checklist

As for the reliability, the instrument or the collecting data checklist was quantitative-based, which means that it depends on recording the units' activities and learning objectives in a quantitative procedure to determine the frequencies of the cognitive level of learning objectives. In order to confirm the reliable results, the inter-rater reliability was conducted by asking two raters to analyze four units and compared it with the researchers' results, to measure the consistency in the results.

3.3 Data Collection

The researcher analyzed Unlock English Reading, Writing and Critical Thinking, book 3 (Intermediate Level) (First and Second Editions) by dividing each unit into five main parts, the video, reading1, reading2, critical thinking and writing, then the researcher counted the number of the learning objectives of each activity that were listed in the margin of each page. After that, such objectives were coded and categorized according to Bloom's levels to document the presence of the thinking skills levels (HOTS and LOTS) in both books.

3.4 Data Analysis

In analyzing the Unlock Reading, Writing and Critical Thinking textbooks (1st and 2nd Editions), the activities in videos, reading passages, critical thinking and writing tasks sections were used. The activities and tasks were divided into subskills, which were categorized based on their cognitive level according to Bloom's Taxonomy. After that, the frequencies of each cognitive skill were calculated in the whole book (eight/ten units of each book), to rank them later into higher order thinking skills (HOTS) and lower order thinking skills (LOTS) to answer the research main question (Cresswell,2014). Besides, a comparison between the HOTS and LOTS in the first and second editions was held.

4. Results and Analysis

To answer the main questions, the first and the second editions of Unlock Reading, Writing and Critical Thinking Skill book 3 were analyzed. This analysis included 10 units in the first edition and 8 units in the new textbook. The analysis was conducted based on the activities and the learning objectives of the five main sections: the videos, reading1, reading 2, critical thinking and writing task. The units in these textbooks can be categorized as shows in table 1 and 2:

Table 1: *The Included Units and the Number of learning objectives in Unlock Reading, Writing and Critical Thinking Skill book3, Second Edition*.

Unit	Title	Number of cognitive learning objectives
1	Animals	14
2	Environment	12
3	Transport	13
4	Customs and Traditions	13
5	Health and Fitness	14
6	Discovery and Inventions	12
7	Fashion	13
8	Economics	14
Total	8 units	105

In other words, Unlock English textbook 3, second edition, consists of (8) thematic units, where it implies (105) learning objectives divided into units, each unit has between 12-14 learning objective. On the other hand, Unlock English textbook 3, first edition consisted of 10 thematic units, which means that two units (3 and 10) were crossed out from the new edition. The cognitive objectives ranged between 9-11 objective as has been shown in Table 2 below.

Table 2*: The Included Units and the Number of learning objectives in Unlock Reading, Writing and Critical Thinking Skill book3, First Edition.*

Unit	Title	Number of cognitive learning objectives
1	Animals	10
2	Transport	11
3	History	…..
4	Customs and Traditions	10
5	Environment	10
6	Health and Fitness	11
7	Discovery and Inventions	9
8	Fashion	9
9	Economics	10
10	Brain	…..
Total	10 units	80

4.1 The Results Related to the First Question

To what extent does *Unlock English textbook* enhance the Higher order thinking skills (LOTS)? Upon a close analysis, the analyzed cognitive objectives were divided into units and sections as displayed in table3.

Table 3: *The level and Frequencies of the Cognitive Learning Objectives in Unlock Textbook, book 3, Second Edition.*

Units	Videos	Reading 1	Reading 2	Critical Thinking	Writing Task
Animals (Unit 1)	2: Comprehension (Predict, Understanding main ideas)	1: Comprehension (Understanding Vocabulary) 1: Application (Using your Knowledge) 1: Analysis (Working out meaning from context)	2: Comprehension (Understanding Vocabulary, predict,) 1: Analysis (summarize) 2: Synthesis (making inferences)	1: Analysis (analyze) 1: Application (apply)	1: Application (plan) 1: Synthesis (write)
Environment (Unit 2)	2: Comprehension (Predict, Understanding main ideas)	2: Comprehension (Understanding Vocabulary. Predict) 1: Analysis (Identify)	1: Comprehension (understanding) 3: Synthesis (summarize, making inferences, discuss)	1: Analysis (analyze)	1: Application (plan) 1: Synthesis (write)
Transport (Unit 3)	2: Comprehension (Predict, Understanding main ideas)	2: Comprehension (Understanding Vocabulary, predict) 1: Analysis (making inferences)	2 : Comprehension (understand, predict) 2: Analysis (making inferences, discuss)	1: Evaluation (evaluate) 1: Analysis (analyze)	1: Application (plan) 1: Synthesis (write)
Customs and Traditions (Unit 4)	2: Comprehension (Predict, Understanding main ideas)	2: Comprehension (Understanding Vocabulary, predict) 1: Analysis (making inferences)	2: Comprehension 1: Analysis 1: Synthesis	1: Synthesis (summarize) 1: Evaluation (evaluate)	1: Application (plan) 1: Synthesis (write)
Health and Fitness (Unit 5)	2: Comprehension (Predict, Understanding main ideas)	2: Comprehension (Understanding Vocabulary, predict) 1: Analysis (making inferences)	1: Comprehension (understanding) 3:Synthesis (annotating, making inferences, discuss).	2: Knowledge (remember) 1: Comprehension (understand) 1: Analysis (analyze)	1: Application (plan) 1: Synthesis (write)

Discovery and Inventions (Unit 6)	2: Comprehension (Predict, Understanding main ideas)	1: Comprehension (Understanding Vocabulary) 1: Synthesis (annotating) 1: Analysis (making inferences)	1: Comprehension (Understanding Vocabulary) 2: Analysis (summarize, making inferences) 1: Synthesis (discuss).	1: Analysis (analyze)	1: Application (plan) 1: Synthesis (write)
Fashion (Unit 7)	2: Comprehension (Predict, Understanding main ideas)	1: Comprehension (Understanding Vocabulary) 1: Synthesis (annotating) 1: Analysis (making inferences)	3: Comprehension (understanding vocabulary, predict, distinguish) 1: Synthesis (discuss)	1: comprehension (identify) 1: Evaluation (evaluate)	1: Application (plan) 1: Synthesis (write)
Economics (Unit 8)	2: Comprehension (Predict, Understanding main ideas)	2: Comprehension (Understanding Vocabulary, predict) 1: Analysis (making inferences)	2: comprehension ((understanding vocabulary, predict) 1: analysis (making inferences) 2: Synthesis (annotating, discuss).	1: Comprehension (understanding) 1: Analysis (analyze)	1: Application (plan) 1: Synthesis (write)

In Table 4, the number of cognitive objectives in Unlock English textbook, second edition, were counted and analyzed, then divided between units. It is worth mentioning that these objectives were also categorized based on Bloom's Taxonomy using OPAR (2012) classification of verbs. The Percentages of the cognitive objectives were also listed in table 4 below.

Table 4: *The percentages of the Cognitive Level of the Learning Objectives in Unlock Textbook, book 3.*

Cognitive Level	**Unit 1**	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Unit 6**	**Unit 7**	**Unit 8**	**Percentage (105)**
Knowledge	0	0	0	0	1	0	0	0	1%
Comprehension	5	5	6	6	6	4	7	7	43.8 %
Application	3	1	1	1	1	1	1	1	9.5 %

Analysis	3	2	4	2	2	4	1	3	20 %
Synthesis	3	4	1	3	4	3	3	3	22.8%
Evaluation	0	0	1	1	0	0	1	0	2.8 %
Total	14	12	13	13	13	12	13	14	105

As it shows in Table 4, the percentages of the cognitive objectives division are presented. This table displays that the majority of the learning objectives belongs to the "Comprehension" level, where 48.3% of the activities were categorized under "Comprehension" level. However, almost the quarter of the learning objectives (23 %) are from "Synthesis " level and almost same percentage (20%) was for the Analysis level. 10% of the learning objectives were only for application (writing), and 3 % was for evaluation.

4.2 The Results Related to the Second Question

As for the second question, "What are the differences between the first and the second edition of Unlock English textbooks in terms of the cognitive level of the learning objectives (HOTS and LOTS)?", Table 5 shows the percentages of the cognitive skills in the first edition in *Unlock English textbook 3* were also classified using the same checklist, as shown below.

Table 5: *The Percentages of the Cognitive Level of the Learning Objectives in Unlock Textbook, book 3, First Edition*.

Cognitive Level	**Unit 1**	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Unit 6**	**Unit 7**	**Unit 8**	**Unit 9**	**Unit 10**	**Percentage (105)**
Knowledge	0	0	….	0	0	0	1	0	0	…..	1 %
Comprehension	4	5	….	4	5	5	5	5	5	….	45.2 %
Application	1	2	…	2	2	2	1	1	1	….	14.2%
Analysis	4	3	…	4	3	4	2	3	4	….	32 %
Synthesis	0	1	…	0	0	0	0	3	0	….	4.7%
Evaluation	1	0	…	0	0	0	1	0	0	….	2.3%
Total	10	11	…	10	10	11	10	12	10		84

Based on Table 5, the results reveal that almost half of the cognitive objectives (45.2%) belong to the " Comprehension" level. The third of these analyzed objectives (32%) belong to the "Analysis" rank. The presentence of the "Application" objectives comes next (14%), whereas the least of these objectives are categorized under Synthesis (5%) Knowledge, (1%), and Evaluation (1%).

5. Discussion

During this investigation, the importance of addressing higher order thinking skills in teaching English language was demonstrated in literature. This importance was reflected by the interest in testing and analyzing different contents and textbooks based on Bloom's Taxonomy, to evaluate and induct some principles that may help stakeholders and policy makers in making decisions. Based on the inquiry that was held from the early beginning in the current study, the two questions that have guided this study need to be discussed.

As for the first question, it addressed the presence, frequencies and percentages of HOTS and LOTS in Unlock English Textbook3, second edition. The results revealed that half of the cognitive objectives belong to "Comprehension", which can be categorized as a lower order thinking skill. This result is justified since this was explained by Bloom (1965), who insisted on addressing both LOTS and HOTS, since this is a foreign language, and the content of the instructional materials should address some basic elements that students need in order to be scaffold in their language learning process. It is important to mention that almost the second half of analyzed cognitive objectives was ranked under "Analysis" and "Synthesis" which are two higher order thinking skills. This may lead to a conclusion that majority of the cognitive objectives belong to both LOTS (Comprehension) and HOTS (Analysis and Synthesis).

In terms of the second Question, a comparison between the levels of the cognitive objectives was conducted. It is worth mentioning that the two Unlock English textbooks contain different numbers of units and different numbers of cognitive objectives. As it has been shown previously, the second edition contains 8 thematic units, where the first edition contained 10 units. Therefore, in this analysis, the researcher has excluded the two units that were crossed out from the second edition. In other words, the number of the cognitive objectives in the two editions varied, that they were 84 objectives in the first edition, but they are 105 in the second edition.

Related to the similarities and differences between the two textbooks in terms of HOTS and LOTS, the results revealed that the majority of the cognitive objectives were ranked in comprehension and analysis only. Whereas, this division was different in the second edition, that the synthesis level of cognitive objectives has increased, besides the comprehension level of cognitive objectives has not changed. This result indicates that in the second edition another higher order thinking skill was enhanced "Synthesis" to form with the "Analysis" level almost half of these cognitive objectives.

Moreover, in the context of comparing the first and the second edition, the results have shown that some objectives have been modified to fit the "Critical Thinking" title. In other words, some objectives were mainly language objectives, such as Previewing, Skimming and understanding the main ideas. However, in the second edition, these objectives have been changed into other forms, such as Predicting the Content Using Visuals. This means that some objectives were paraphrased to reflect the cognitive objectives, where they were more related to reading comprehension sub-skills (skimming, scanning, previewing…etc).

6. Conclusion and Recommendation

This investigation was content analysis research effort that aimed at measuring to what extent *Unlock English textbooks* (first and second editions) do enhance higher and lower order thinking skills. Besides, it aimed at listing the differences between the second and the first edition of the same textbooks as an ongoing evaluation so as to spot the differences between the two versions. The checklist, that has been used as an instrument in this process, was built on Bloom's taxonomy, in which the frequency of the cognitive learning objectives were counted, coded and analyzed. Accordingly, some conclusions were listed that the majority of the cognitive learning objectives, in the *Unlock English textbooks* second edition, belong to comprehension, analysis and synthesis. However, the majority of the same objectives in the first edition were mainly comprehension and analysis. This means that the new version has been supported with more objectives that enhance synthesis in comparison with the previous one. In addition to this, other differences were spotted and listed between the two versions, to lead to some recommendations. Although this paper can conclude that Unlock textbooks do enhance both HOTS and LOTS, it is recommended to conduct a further research to cover the whole series of Unlock textbooks for all levels. Moreover, analyzing textbooks are supposed to be followed with ongoing evaluative studies of the teachers' and practitioners' practices in their teaching in order to measure to what extent these skills are being addressed inside classrooms.

7. Conflict of Interests

The authors declare that there is no conflict of interest.

8. Ethics Committee Approval

The authors confirm that ethics committee approval was obtained from Yarmouk University (March, 2020).

References

Anderson L. W. and Krathwohl, D. R. ed. (2000) *A taxonomy for learning, teaching, and assessing – a revision of Bloom's Taxonomy of educational objectives*. London: Pearson.

Assaly, I., & Smadi, O., (2015). Using Bloom's Taxonomy to Evaluate the Cognitive Levels of Master Class Textbook's Questions. *Canadian Center of Science and Education*, 8 (5).

Bloom, B., Englehart, M., Furst, E., Hill, W., & Krathwohl, D. (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals*. Handbook I: Cognitive domain. New York: Longman.

Case, R., (2013).The Unfortunate Consequences of Bloom's Taxonomy. *Social Education* 77(4), 196–200.

Creswell, J. W. (2014). *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research* (4th ed.). Harlow: Pearson.

Crossland, J., (2015). Thinking Skills and Bloom's Taxonomy. *Primary Science, 32-34.*

Gul, F., Shah, S., Sultan, H., (2015). Textbook Analysis and Evaluation of 7th and 8th Grade in Pakistani Context. *International Journal of English Language Teaching*, 3 (4), 79-97.

Krathwohl, D. R. (2002). A Revision of Bloom's Taxonomy: An overview. Theory into Practice, 41(4), 212-219 .

Nachiappan, S., Damahuri, A. A., Ganaprakasam, C., & Suffian, S. (2018). "Application Of Higher Order Thinking Skills (Hots) In Teaching And Learning Through Communication Component And Spiritual , Attitudes And Values Component In Preschool". Faculty of Human Development , Sultan Idris Education University.

Holsti, O.R. (1969). Content Analysis for the Social Sciences and Humanities. Reading, MA: Addison-Wesley.

Rahman, Sh., & Manaf, F., (2017). A Critical Analysis of Bloom's Taxonomy in Teaching Creative and Critical Thinking Skills in Malaysia through English Literature. *English Language Teaching*, 10 (9). pp. 245-256.

Razmjoo, S., & Kazempourfard, E. (2012). On the representation of Bloom's Revised Taxonomy in Interchange Coursebooks. The Journal of Teaching Language Skills (JTLS), 4(1), 171-204.

Rentawati, H., Djidu, H., Apino, K., Anazifa, R., (2018). Teachers' Knowledge About Higher-Order Thinking Skills and Its Learning Strategy. *Problems of Education in 21st Century,* 76 (2).

Richards, J.C. (2001). Curriculum development in language teaching. Cambridge: Cambridge University Press.

Shafeei, KH., Hasan, Ismali, F., Aziz, A., (2017). Incorporating Higher Order Thinking Skill (HOTS) Questions in ESL Classroom Contexts. *International Journal,* 4 (1), pp: 101–116.

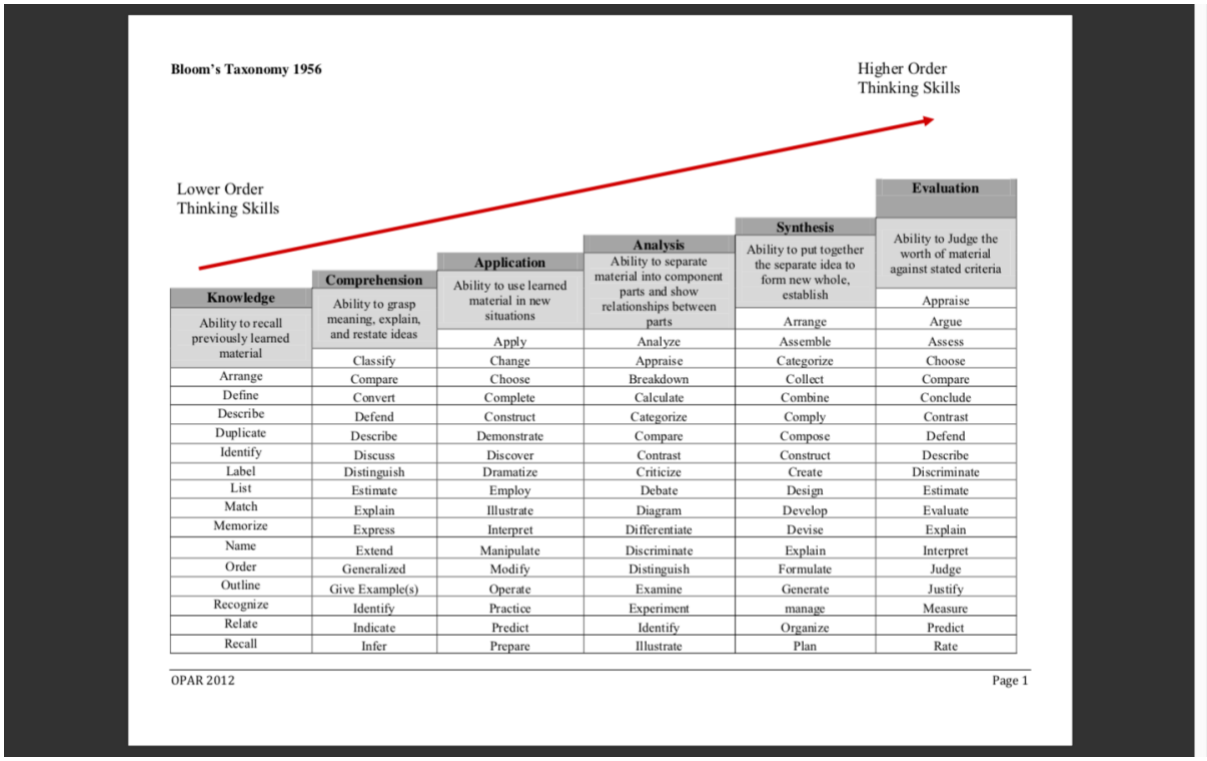
Shaheen, R., (2010). Creative Education. School of Education. *Creative Education*. 2.1, (3), 166-169.

Yen, T. S., & Halili, S. H. (2015). Effective Teaching of Higher Order Thinking (HOT) in Education. *The Online Journal of Distance Education and e-Learning*, 3, 41-47.

Zohar, A., & Dori, Y. J. (2003). Higher order thinking skills and low-achieving students: Are they mutually exclusive? The Journal of the Learning Sciences, 12(2), 145-181.

Appendices

Appendix A: Bloom's Taxonomy by OPAR (2012) tables.



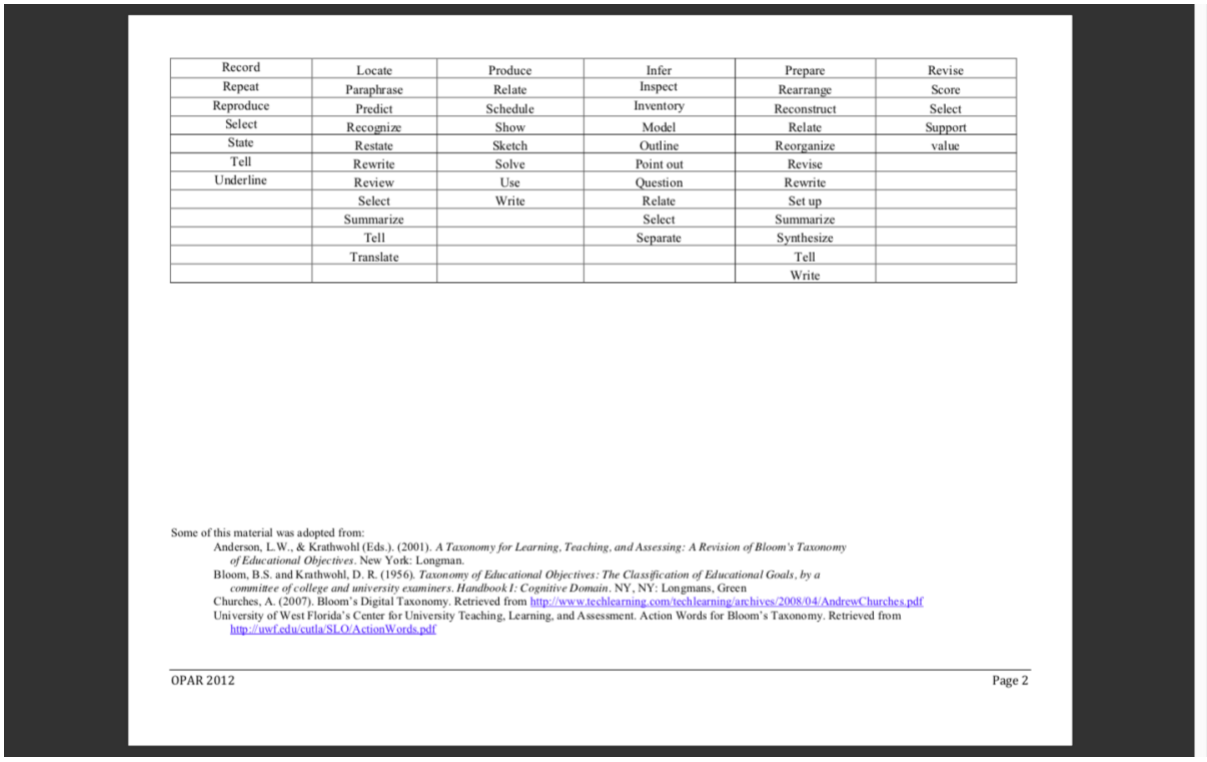
Bloom's Taxonomy 1956

Higher Order Thinking Skills

Lower Order Thinking Skills

Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Ability to recall previously learned material	Ability to grasp meaning, explain, and restate ideas	Ability to use learned material in new situations	Ability to separate material into component parts and show relationships between parts	Ability to put together the separate idea to form new whole, establish	Ability to Judge the worth of material against stated criteria
					Appraise
		Apply	Analyze	Arrange	Argue
	Classify	Change	Appraise	Assemble	Assess
Arrange	Compare	Choose	Breakdown	Categorize	Choose
Define	Convert	Complete	Calculate	Collect	Compare
Describe	Defend	Construct	Categorize	Combine	Conclude
Duplicate	Describe	Demonstrate	Compare	Comply	Contrast
Identify	Discuss	Discover	Contrast	Compose	Defend
Label	Distinguish	Dramatize	Criticize	Construct	Describe
List	Estimate	Employ	Debate	Create	Discriminate
Match	Explain	Illustrate	Diagram	Design	Estimate
Memorize	Express	Interpret	Differentiate	Develop	Evaluate
Name	Extend	Manipulate	Discriminate	Devise	Explain
Order	Generalized	Modify	Distinguish	Explain	Interpret
Outline	Give Example(s)	Operate	Examine	Formulate	Judge
Recognize	Identify	Practice	Experiment	Generate	Justify
Relate	Indicate	Predict	Identify	manage	Measure
Recall	Infer	Prepare	Illustrate	Organize	Predict
				Plan	Rate

OPAR 2012 Page 1



Record	Locate	Produce	Infer	Prepare	Revise
Repeat	Paraphrase	Relate	Inspect	Rearrange	Score
Reproduce	Predict	Schedule	Inventory	Reconstruct	Select
Select	Recognize	Show	Model	Relate	Support
State	Restate	Sketch	Outline	Reorganize	value
Tell	Rewrite	Solve	Point out	Revise	
Underline	Review	Use	Question	Rewrite	
	Select	Write	Relate	Set up	
	Summarize		Select	Summarize	
	Tell		Separate	Synthesize	
	Translate			Tell	
				Write	

Some of this material was adopted from:

Anderson, L.W., & Krathwohl (Eds.). (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.

Bloom, B.S. and Krathwohl, D. R. (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals, by a committee of college and university examiners. Handbook I: Cognitive Domain*. NY, NY: Longmans, Green

Churches, A. (2007). Bloom's Digital Taxonomy. Retrieved from http://www.techlearning.com/techlearning/archives/2008/04/AndrewChurches.pdf

University of West Florida's Center for University Teaching, Learning, and Assessment. Action Words for Bloom's Taxonomy. Retrieved from http://uwf.edu/cutla/SLO/ActionWords.pdf

OPAR 2012 Page 2

Seçer, Ş.Y. E., Yücel-Toy, B. (2020). Impact of writing course design based on 5E Learning Model on writing skill instruction and development. *International Online Journal of Education and Teaching (IOJET)*, 7(3). 760-783. https://iojet.org/index.php/IOJET/article/view/841

Received: 03.05.2020
Received in revised form: 13.05.2020
Accepted: 06.05.2020

IMPACT OF WRITING COURSE DESIGN BASED ON 5E LEARNING MODEL ON WRITING SKILL INSTRUCTION AND DEVELOPMENT

Research article

Şule Yüksel Ertuğrul Seçer

Air Force Academy, National Defense University, Istanbul

suleyuksel77@gmail.com

Banu Yücel-Toy

Faculty of Educational Sciences, Yıldız Technical University, Istanbul

byuceltoy@gmail.com

Şule Yüksel Ertuğrul Seçer is a researcher in Air Force Academy at National Defense University. She is a PhD candidate in Curriculum and Instruction at Yıldız Technical University. Her research interests are English language teaching, teacher education, and aviation English.

Banu Yücel-Toy is an associated professor in the Department of Educational Sciences at Yildiz Technical University. She received her PhD in Curriculum and Instruction. Her research interests are curriculum development, instructional design, research methods, measurement and evaluation.

IMPACT OF WRITING COURSE DESIGN BASED ON 5E LEARNING MODEL ON WRITING SKILL INSTRUCTION AND DEVELOPMENT

Şule Yüksel Ertuğrul Seçer
suleyuksel77@gmail.com
Banu Yücel-Toy
byuceltoy@gmail.com

Abstract

This study aims to investigate the effect of 5E Learning Model-based Essay Writing course design and implementation on the achievement level of 12th grade high school students in Essay Writing Course. The teaching and development of writing skills in foreign language education is very important, but it is a known fact that our foreign language education presents problems even in the level of middle and higher education in the foreign language education system. In this respect, the development of writing skills and the improvement of the lessons are very important. The study is a case study with mixed method in which both qualitative and quantitative data collection procedures and instruments such as achievement tests, peer feedback form, students' progress check form, and teacher performance observation form are employed together. In the present study, qualitative data, collected by means of peer evaluation, student progress check and teacher performance observation, is subjected to descriptive analysis whereas quantitative data, collected by means of Essay Writing achievement tests which are applied to twenty-two 12th grade students before and after the instruction and implementation of 5E Learning Model-based Essay Writing Course as pre- and post-test, is analyzed by paired sample t-test. According to the results of the analysis, it can be said that the implementation of 5E Learning Model-based Essay Writing course has a positive effect on the achievement level of students in Essay Writing Course.

Keywords: writing skill development, design-based research, 5E learning model

1. Introduction

It is an unquestionable fact that learning English as a foreign language is the key to universal values that must be attained on the way to modernization. Besides, the effective instruction of knowledge and learner's own expression of the learned knowledge are the essentials of learning English as a Foreign Language. Basically, writing ability is defined as "the ability of a person to express his or her main purpose and thoughts in the second or foreign language, in the most accurate and most consistent way" (Murcia, 1991: 223). The ability of written expression is one of the most important components of language learning throughout the education process of the person as well as the human life (İnal, 2006). However, many researchers in our country and in the world point out that writing skill acquisition, development and instruction is a problematic and difficult process (Gökalp, 2001). In parallel to this, Deniz (2000) reveals that the problems related to learning and teaching foreign language skills that should be solved in the primary school period unfortunately continue during and after the university period.

The present study is carried out in a special purpose boarding high school which provides secondary level education in aeronautical field for the students who will continue their education at university level. The competence of the students, who will become future aviators, in oral and written expression in both education and professional life after-graduation has a great significance. In this respect, all the studies that aim to improve the writing skill of the students in general, to increase the student achievement levels in the Composition and Essay Writing courses within the foreign language education programs at high school level, to improve students' attitudes towards writing courses, and to find out and to cope with the challenges encountered in writing skill instruction are of great importance.

The main concern of this study is to improve the success of high school students in Essay Writing course by designing the course based on the constructivist learning model; 5-E learning model. Therefore, the main research question related to this central concern is "What is the impact of this designed course?". Within the scope of this study, first of all, a comprehensive needs' analysis is conducted to determine the characteristics and needs of the learners and the learning environment, related to the Essay Writing course. Secondly, in accordance with the findings obtained from the needs analysis, 3-hour Responsive Essay lesson is redesigned and implemented according to the principles of 5E learning model within the Essay Writing course, given in the 12th grade, in the second term of 2015-2016 academic year. Lastly, the design and the implementation of Responsive Essay lesson is evaluated in various terms such as achievement tests, peer evaluation, student progress check and teacher performance observation.

1.1. 5E Learning Model

The 5E learning model is one of the frequently mentioned models under the constructivist approach. This model identifies the processing steps of the course in cycler form for both the teacher and the student. This model was developed by Rodger Bybee in 1989 (Sarı, 2011). The 5E Model consists of activities that increase the students' curiosity for further research on the subject matter, fulfill their expectations about the topic, and involve active use of the knowledge and skills they possess. In this model, the students are supposed to discover new concepts and integrate them with their previous knowledge (Ekici, 2007). Educational activities are organized in such a way that students can create their own knowledge in case of challenges (Türker, 2009). The 5E model is an assistant and regulatory model for the teacher. It is a general framework for the teacher. Each E in 5E model symbolizes separate stages in the model (Kanli, 2007) such as "Engage", "Explore", "Explain", "Elaborate" and "Evaluate" (Figure 1).

Figure 1. 5E Learning Framework

In the "Engage" phase, also the first phase of 5E learning model, the students are provided with a learning activity. The presented activity which may be a problem, a situation or an event should raise interest and curiosity. In addition, the activity presented should be relevant not only to the topics that they are subjected to in the future, but also to their former knowledge in mind. In the “Engage” phase which aims to grab students’ attention, the students are helped to relate the subject matter to the phenomena they encountered in real life, and to present similar examples (Sarı, 2009).

In the second phase, named as "Explore", activities are organized in order for the students to explore concepts related to subject matter. These activities are the same for all students and designed to reveal students’ knowledge, skills, and possible misconceptions. These steps should be concrete and practical activities. The teacher should be a mentor who encourages group work and discussion, advises students, encourages students to work together without direct instruction, and observes students during their interaction.

In the third phase, "Explain", concepts, processes and skills are made clear and understandable. First, a description is expected from the students, then the teacher draws the attention of the students and presents the concepts in a clear, simple and direct way with scientific explanations. At this stage, teacher’s role is very important because he or she will make a direct expression. A variety of materials such as oral presentation, videos, films, educational software can be preferred.

In the fourth stage, “Deepening” (Elaborate), while the new terms, concepts and skills acquired by the students are adapted and applied to the new situation, the concepts, processes and skills, acquired in the previous three steps are generalized, expanded, and elaborated. In addition, printed materials, electronic databases, and experiments should be used at this stage so that students can get feedback from each other. The elaboration of information, the processing of technical information, and the transfer of information to other fields are among the other important issues for this phase.

In the final stage of the 5E learning model, the "Evaluate" phase, students have the opportunity to assess what they understand in the previous steps. Students return to the points they are missing at this stage. In this phase, open-ended questions and performance-based questions should be preferred rather than conventional multiple-choice questions. In addition, students should be given time to evaluate their own progress (Şentürk, 2010). At this stage, the level of learning must be tested, and the entire teaching process assessed. Measurement and evaluation is not an independent and extracurricular activity. In addition, not only what the students do, but also how they do should be measured and evaluated, as well. In the evaluation of students with different interests, skills, and intelligence types, and learning styles; besides the classical exam and test types; open-ended questions, observation forms, interviews, evaluation scales, diaries, portfolios, projects and other tools and methods should be used (Sarı, 2011).

2. Method

In the scope of the study, case study design was implemented with mixed methods. Quantitative and qualitative data obtained in order to determine the effectiveness of the 5E learning model were collected, analyzed, and interpreted together in accordance with the mixed methodology. Mixed method research is defined as a combination of qualitative and quantitative research approaches, methods and techniques for solving a problem and provide more effective suggestions for solving the problem (Johnson and Onwuegbuzie 2004, Creswell 2006, Baki and Gökçek 2012). One of the researchers also works in this high school

as an instructor of English, and actively participates in the design, implementation and evaluation of the course.

2.1. Participants

This study was carried out in a private state boarding school in Bursa. The official name of the high school is hidden in the study on the grounds of information security in accordance with the institutional guidelines. It is a state residential high school, providing aeronautical education at secondary level for students who will go on their education in the same field at university degree after graduation. In the present study, the process of needs analysis is carried out with the participation of all 12th graders, including 204 students in total. All the students who participate in the study are male students at the age of 17. After the need analysis, the course design, implementation and evaluation processes are carried out merely on a selected 12th grade class consisting of 21 students.

2.2. Design of the Course based on 5-E Learning Model

In the scope of the study, the design of the course begins with a comprehensive needs analysis which is performed not only on learners and but also on learning and teaching environment, as well. The basic aim of the needs analysis is to determine the characteristics of the learners and the learning environment and the needs of the learners related to Essay Writing course.

In the state high school, where the study is carried on, 12th graders receive 10-hour English lessons, including 6-hour skill-based lesson, 3-hour basic English lesson, and 1-hour native speaker lesson in each week. In 12th grade, the students receive two writing courses based on writing skill development which are Composition Writing course in the first term, and Essay Writing course in the second term.

Table 1. *Average Amount of Activities during Classes*

12th graders English Lessons		*10 class hours/week*
Basic English Lesson		*3*
Skill-based Lessons (total 6 hours)	*Reading-Writing*	*3*
	Listening-Speaking	*3*
Native Speaker Lesson		*1*

Within the Essay Writing course, 3-hour Responsive Essay Writing lesson is redesigned according to the theoretical principals of 5E learning model. In the course design, by taking the needs analysis results into consideration, firstly, Essay Writing course objectives are reviewed and revised. In accordance with the new objectives, 5E learning model phases are followed in sequence and both the process and the outcomes of the implementation are evaluated.

2.2.1. Needs Analysis

Before the design and the implementation of Essay Writing course, a detailed needs analysis is carried out to investigate the learning and teaching environment, and to determine the needs of the learners about the course. For needs analysis the instruments used to for data collection can be listed as Achievement Test, Learning Style Inventory, Interest and Awareness Questionnaire, Focus Group Interview, and Needs Assessment Questionnaire. Based on the findings, derived from this need analysis, the objectives, methods, techniques, materials, achievement tests and other writing skill evaluation tools, employed in the scope of the writing course are reviewed and revised.

According to the findings obtained from the achievement test, although the students can be said to be sufficient in the structural analysis of any given passage, they are found to have some significant deficiencies especially in the organization of essay writing in accordance with any given topic and thesis statement, and in writing well-structured essays in accordance with essay writing principles. For this reason, it would be appropriate to put the emphasis specifically on the activities such as writing thesis statement, brainstorming and arranging writing draft, which are all related to the stage of planning. In addition to this, after teacher presentation on the subject matter, it can be beneficial to devote more time for writing performance; writing in peer and group work, peer and teacher writing evaluation, and rewriting after writing review in order for the students to achieve writing proper and well-structured essays.

The findings obtained from the Learning Styles Inventory analysis indicate the fact that students mostly have “accommodating" learning style (44%), as well as “converging" learning style at a remarkable ratio (29.1%). In order to enable learners who learn by accommodating to learn more meaningfully through active experimentation and concrete experiences and learners who learn by converging by thinking and doing, it would be appropriate;

- to encourage students to do research on the essay type which will be the subject matter of the following lesson and to make analysis on the given sample essay,
- to spare more time for writing skill practice for the students to learn by doing in active experimentation,
- to conduct more peer evaluation-based activities so that students can learn by observing others' faults,
- to give group work and project assignments to lead the students learn in groups,
- to assign writing tasks to guide them to do structural analysis of sample essays,
- to give short-term feedbacks on students’ writing performance to have them recognize their mistakes.

In the light of the findings of the Interest and Awareness Questionnaire analysis, in order to provide more meaningful and permanent learning for students who feel competent in writing and find it easy to write an English essay, it would be appropriate;

- to give regular and timely feedback on their mistakes in essay writing,
- to encourage students to revise their writings and correct their mistakes according to teacher feedback, and to give additional duties and time to write the final drafts,

- to guide students, work in peer and groups to determine and learn from each other' s mistakes

In the light of the findings of the focus group interview conducted with the participation of five students who have the highest and lowest scores in the achievement test; it can be said to be more appropriate;

- to make the students analyze sample essays apart from the course book in order not to be too much bound to the book content,
- to select more interesting and enjoyable sample essays according to students,
- to devote more time to utilize technological aids such as smart board and internet in lesson presentation and structural analysis of sample essays, and to rearrange the course accordingly.

In the light of the findings of the Needs Assessment Questionnaire used in the analysis of the learning and teaching environment, at least half of the students can be said to find all the main objectives stated in the questionnaire and all the objectives related to Responsive Essay "very important" and "important" at a high ratio. In addition to that finding, at least half of the students consider themselves "very sufficient" and "sufficient". In this respect, the Essay Writing course does not have a significant lack in achieving the objectives in terms of students' views. In parallel, the Essay Writing course can be said to be sufficient and effective not only in terms of the determined objectives, but also in the methods and techniques employed in the scope of the course according to students' views since they find the activities, generally or frequently carried out in Essay Writing class "very effective" and "effective". According to the findings obtained from the analysis of the Teacher Presentation part of the Needs Assessment Questionnaire, the issues that should be more emphasized in the lessons are listed as follows:

- activities based on the analysis of sample essays related to the subject matter in the classroom environment,
- encouraging students to write essays on their own,
- regular and frequent feedback on students' writing performance,
- peer and group work to ensure interaction between and among students,
- active participation in the lesson in order to provide teacher and student interaction.

2.2.2. 5E Learning Model-based Design of Essay Writing Course

With the motive of the findings of the need analysis, as the Essay Writing course was designed with the 5E learning model. First, the general objectives of the Essay Writing Course and the specific objectives of the Responsive Essay lesson were revised in Table 2.

Table 2. Essay Writing Course Objectives

1. ESSAY WRITING COURSE GENERAL OBJECTIVES	
1.	Knowing the basic terms about Essay Writing
2.	Establishing relations between different essay types
3.	Using the learned knowledge in other writing lessons

4.	Using the learned knowledge outside the school
5.	Applying the principles of Essay Writing in professional business writing
2. OBJECTIVES RELATED TO RESPONSIVE ESSAY	
1.	Understanding the purpose of the Responsive Essay
2.	Brainstorming to compose pros and cons about the article read in the lesson
3.	Discussing the ideas about the essay in group work
4	Outlining the essay draft in accordance with the given thesis statement
5.	Finding a suitable title for the essay
6.	Composing a proper thesis statement appropriate for the type and the purpose of the essay
7.	Organizing the essay in accordance with its type and structure and organization
8	Writing the introduction, development and conclusion paragraphs according to the writing draft
9.	Using transitions and conjunctions properly and accurately in writing
10	Giving proper feedback in peers in terms of Peer Feedback Form
11	Revising the essay according to peer feedback
12.	Thinking critically to correct mistakes in the essay
13.	Making revision decisions to improve the essay
14.	Writing the final draft in accordance with peer feedback
15.	Recognizing the differences between the first and the final draft in accordance with Progress Check Form

2.2.2.1. Engage

In “Engage” stage, the first stage in the 5E Learning Model based lesson, to motivate the students to reach the objective of "using the learned knowledge outside the school and in professional business writing", which is found “very important” and “important” by more than 50% of the students according to the findings of the Needs Assessment Questionnaire, the teacher reminds her students of the fact that they need and use the knowledge and the skills they acquire in the scope of this writing course, not only in further writing classes at university level and in placement or proficiency exams they will undertake after graduation but also in their professional lives, as well. Later on, the teacher presents a writing activity that appeals to the students to break the ices. For this purpose, in order to attract students’ attention, she makes an introduction such as “We read many articles in everyday life, don’t we? Most of these are essays about the subjects we are doing researching on or about current and popular topics. When we read these essays, we often read not only to understand them but also to form our personal opinion which may be positive or negative about the views defended in the essay”. Such an introduction to the lesson can help students remember the essays they have recently read and the judgments they have developed. At this stage, the

teacher offers more than one sample of responsive essay apart from the course book, not to bore students by being too much restricted by the course book and uses smart board and internet to employ more computer technology in parallel to students' expectations and needs, determined by the findings obtained from the focus group interview conducted in the scope of the learners' needs analysis.

2.2.2.2. Explore

In parallel to the findings of the Learning Styles Inventory, in the second stage, the "Explore", the teacher assigns some tasks through which the students with "accommodating" learning style can learn by searching and discovering and the students with "converging" learning style can learn by thinking and doing on their own. In other words, the students are supposed to search for sample responsive essays to present in class and to discuss over with their classmates. In this stage, the teacher steps back and monitor students discussing over and analyzing the sample essays that they search and bring to the class on smart board via internet by providing them timely feedbacks. With this activity, the teacher aims to provide both "accommodating" and "converging" the students with a group work to brainstorm, to develop positive and negative ideas, to discuss positive and negative judgments about the article and to prepare a draft of the responsive essay about the article. Furthermore, the teacher can give her students the chance of learning by self-exploring, researching, thinking and doing within this activity. Additionally, the students have a more intensive study of the planning stage of writing which is found out to be a big challenge for the students according to the results of the achievement test.

2.2.2.3. Explain

The third stage, "Explain", is the only stage in which the teacher is actively involved. She openly, simply and directly explains the basic concepts of Essay Writing such as "Responsive Essay", "Making Reference", "Direct Reference", "Paraphrase", "Citation", and "Bibliography". While she is asking questions to students to check their knowledge on previous essay types, she also describes the structural characteristics and the rules of writing Responsive Essay, the techniques of quoting from any other essay, the rules of citing and writing citation in detail by using visual aids such as an outline on the board.

2.2.2.4. Elaborate

In the fourth stage "Elaborate", students have the opportunity to apply and to practice the structural features and the rules of writing Responsive Essay which are presented and taught in previous lesson. At this stage, the teacher asks students to write responsive essays on the articles they choose and encourages them to give their own products. As students create their own writings, the teacher frequently walks among them to give feedback and to provide interaction. Students exchange ideas with their classmates and form of introductory, supporting and concluding paragraphs. Thus, they have the opportunity to practice writing a well-organized essay in which they are observed to have difficulty in the achievement test, conducted in the scope of needs analysis. This writing task also enables the students who have "accommodating" learning style to learn by discovering and the students with "converging" learning style to learn inductively by forming their writings in gradual steps and more meaningfully through constant teacher guidance and frequent feedbacks.

2.2.2.5. Evaluate

During the fifth and final stage, "Evaluate", the students work in groups and share their essays with their friends. For this purpose, they fill in Peer Feedback Forms about their friends' writings. Moreover, the students are supposed to do critical thinking, correct their writing mistakes, and make revision decisions about their own writings. At this stage,

students can also be provided with a learning activity appropriate for peer and teacher's evaluation that they "frequently" claim to be useful, but "rarely" refer to in class, according to findings from the Interest and Awareness Questionnaire. The bilateral peer feedback activity carried out during the evaluation stage also allows "converging" students to learn from the mistakes of their peers in group work. In this stage, after revising their writings according to their peers' feedback and writing their final drafts, the students finally complete Student Progress Check form to reflect their ideas about their own writing progress and the instruction of the lesson. At the end of the evaluation stage, the teacher collects students' writings to evaluate them according to the Writing Assessment Rubric and to provide feedback in the next lesson.

Within the scope of Essay Writing course which consists of 3 lesson hours in 12th graders' weekly program, the Responsive Essay lesson is carried out in accordance to 3-hour lesson plan (Appendix 1).

2.3. Data Collection Instruments

In order to evaluate the design and implementation of Responsive Essay lesson, achievement tests, peer evaluation, teacher's evaluation, students' progress check, and teacher performance observation are carried out in the scope of Essay Writing course.

- Achievement Tests: 12th classes undertake the first and the second Essay Writing exams before and after the implementation of 5E Model-based Responsive Essay lesson as the pre- and post-tests. The first part of the exams consists of the questions related to the given topic such as brainstorming, outlining and writing the thesis statement whereas the students are expected to write a responsive essay in response to a given article in the second part. The achievement levels of the students in the first and the second Essay Writing exams as pre- and post-tests are compared, and the effect of the 5E learning model implementation on the students' writing performance and the success of Essay Writing course is investigated. (Appendix 1)

- Peer Feedback Form: Students read their peers' writings critically and reflect their ideas on each other's writing performance on Peer Feedback forms. The students also review their writings according to the feedback, they receive from their peers and revise and rewrite their essays in the final stage of the 5E learning model implementation. (Appendix 2)

- Teacher's Evaluation: The teacher evaluates the students' Responsive Essays in student portfolios and provides feedback in accordance with the Essay Writing Rubric. (Appendix 3)

- Progress Check: At the end of the course, the students fill out the progress check form and reflect their opinions about their own progress in writing and the instruction of the lesson. (Appendix 4)

- Teacher Performance Observation: The researcher observes her colleague's teaching performance during Responsive Essay lesson and completes the Teacher Performance Observation Form to convey her opinions about her performance in teaching Responsive Essay lesson and implementing 5E learning model. (Appendix 5)

Peer Feedback Form for peer evaluation, Essay Writing Rubric used by teacher to evaluate students' writings and Teacher Performance Observation Form, filled out by the researcher according to her observations on the teacher's performance during Responsive Essay

instruction are the data collection tools used to collect data in the scope of process evaluation (formative evaluation). For peer evaluation, students share their responsive essays with their class mates in peer-work groups. In addition, students fill out Peer Feedback Forms to evaluate their peers' writings and give feedback on their performances. In parallel, one of the researchers in the study who actively contributes to the design, implementation, and the evaluation of the course also monitors students' progress in writing by giving them timely feedback about their performance while they are doing writing practice according to the essay writing rules they learn.

In terms of summative evaluation, the tools used for data collection can be listed as teacher's evaluation of students' final drafts of writing, the 2nd Essay Writing exam used as the post-test, and students' progress check at the end of the lesson. After Responsive Essay lesson, the teacher evaluates students' responsive essays included in students' portfolios in accordance with the criteria stated in Essay Writing Rubric. In this way, the teacher can also evaluate the outputs of 5E learning model implementation. In addition to this, in order to determine the effect of 5E Learning Model implementation in Essay Writing Course on students' writing performance and achievement level, a comparative analysis is done in between the 1st writing exam as pre-test and the 2nd writing exam as post-test. Furthermore, for the purpose of the summative evaluation, the students additionally fill out the Progress Check Form in which they put forward their own progress and their personal opinions on the instruction of writing lesson.

2.4. Data Analysis

In order to evaluate the 5E learning model implementation, 2nd Essay Writing exam, applied to the 12th graders as post-test is analyzed in SPSS in terms of students' average scores from each part of the exam, students' achievement levels and exam's coefficient of difficulty. In addition to this, paired sample t test is applied to the 1st and 2nd Essay Writing exams as pre- and post-tests to compare the achievement levels of students before and after 5E Learning Model implementation and to determine the effect of 5E Learning Model implementation on students' achievement levels and essay writing performance. Apart from this, other qualitative data collection tools (peer and teacher's evaluation, students' progress check forms, and teacher performance evaluation) used to evaluate Responsive Essay lesson are all subjected to content analysis.

3. Findings and Discussion

In order to investigate the effect of the 5E Learning Model implementation on the achievement level of the students' in Essay Writing course, a 3-session 5E Learning Model-based Responsive Essay Writing lesson, which is 120 minutes long is conducted in 2nd section of 12th grade. Before and after the implementation, students undertake 1st and 2nd Essay Writing course exams as pre-test and post-test which are subjected to a comparative analysis via paired sample t-test as shown in Table 3:

Table 3. Paired Sample T-Test Results related to the Comparison between 1st and 2nd Essay Writing Exam Scores (Pre- and Post-tests)

Tests	N	X	sd	X_1- X_2	df	t	P	Significance
pre-test	23	68,42	18,57	-5,250	22	-3,928	0,0007	*
post-test	23	73,68	14,30					

• $p<0.05$

As it can be seen in Table 3, according to the results of paired sample t-test conducted in between the pre-test and post-test, the pre-test score on writing achievement is X1= 68,42 whereas the post-test score is X2= 73,68. The difference in between pre- and post-test scores X1- X2= -5,250 is found significant at a confidence level of $\propto$=0.05 [t (22) =-5,250; p<0.05]. This result, showing an increase in the writing scores of experimental group students can prove that the treatment, the Essay Writing Course based on 5E Learning Model implementation which is carried out in between pre- and post-tests leads to a significantly positive effect on writing skill development and achievement levels of the students. Moreover, in the Essay Writing exam applied as a post-test, the students are observed to have a significant improvement in the parts; brainstorming, writing drafts, and writing the thesis in the given topic when compared to their performance in the pre-test. In parallel, in the second part of the achievement test, in which they are supposed to write a responsive essay in response to a given article, the students can be said to write more precise and regular essays, and also make more appropriate and precise references to the given article in their essays.

According to peer feedback forms, most of the students can be said to consider that their peers are able to do more effective brainstorming and eventually write more impressive introductions for their essays after the implementation of the course design. They also report about their peers' writings that the planning part is well organized, and the content is composed of rich expressions, taken by real life situations. In addition, the students emphasize that they can also expand their own knowledge on the content matters as their peers express their thoughts and knowledge very well in their essays. On the other hand, they also criticize some of their peers and claim that they need to improve the content of their writings.

At the end of the course, the students also fill out the student progress forms and convey their opinions on their progress in essay writing and on the instruction of course. In progress check form, the students are required to write their opinions on their writing progress in four basic parts such as "Things I do well in writing responsive essay", "Things I need to improve in my further writing", "Ways to improve my writing", and "Things my teacher has better do to help me improve my writing". In the first part of the form, "Things I do well in responsive essay writing", students generally state that they can write better organized essays including introductory, development and concluding paragraphs within a detailed content. Additionally, they claim that they are more interested in writing essays and better at expressing their ideas. In addition to these, they think that they accomplish the brainstorming, outlining and planning parts of essay writing effectively. They also state that they determine the problem more easily during the planning part of essay writing. In particular, they point out that their texts are integral and that each part of the text is related to the other parts. In the second part, "Things I need to improve in my further writing", they state that they should be a bit more careful in writing the thesis statement. On the other hand, they emphasize the necessity of using transitional phrases more properly and frequently in further writing activity. Moreover, they emphasize the need to use richer expressions in content. In "Ways to improve my writing" part, they report that the receiving timely feedback from their teacher and peers is the most efficient way to improve their writing. In addition, they say that they develop their writing skill not only by writing practice, but also by reading books, as well. Furthermore, they point out the importance of teacher's teaching style, the effectiveness of the material used, the clues learned in lessons, and more writing practice in improving writing skill. In parallel, the students share the idea that planning has a crucial importance in Essay Writing class. They also think that it is easier and more impressive to write essays after a careful and rational planning. Additionally, they state that the technique employed by the teacher in the course has a great effect on their writing skill development. Related to the final part, "The

things my teacher has better do to help me improve my writing", they state that their teacher has better spare more time for the structural analysis of sample essays, and also use more varied and more interesting sample articles. It is also reported that she has better put the emphasis on writing thesis statement and assign more writing tasks to the students as they think they need more writing practice. On the other hand, they state that their teacher should give more frequent feedback on their essays.

In order to evaluate the writing performance of the students, the teacher collects the responsive essays, written and evaluated by the students at the end of the course. She evaluates the writings according to the criteria, stated in the Writing Assessment Rubric, in terms of form, content and organization. According to her evaluation, although the students can make references from the article, and write its citation accurately in form, they still have some difficulties in making meaningful references in accordance with the opinions, they defend in their essays. The students can also be said to be able to organize better introductions, developments, conclusions and use more appropriate and frequent transitions in their essays when compared to their performance in previous essay types.

The researcher completes the teacher performance observation form used in the institution to evaluate the performance of the Essay Writing course teacher who applies the 5E learning model. In this part, the teacher is evaluated according to an evaluation form consisting of 20 factors in total. To begin with, the teacher presents a reassuring, willing and vigorous appearance. Besides, she achieves to grab her students' attention with a good ice breaker, and effectively addresses the name and purpose of the subject matter. The preparation and the use of teaching tools, educational equipment, and other instructional technologies are satisfactorily evident. In addition, the lesson is properly designed in accordance with the instructional steps of 5E learning model which are all mentioned in detail in the course plan. The teacher's constant eye contact with her students, the effective use of voice and body language, accuracy in pronunciation, and in the knowledge of subject matter, and fluency in presentation are evident all throughout the lesson. The teacher can also provide satisfying answers to the students' questions and gives them clear and on time feedbacks. In particular, the teacher effectively employs 5E learning model in teaching essay writing in accordance with the timing and sequence of the lesson plan.

4. Results and Recommendations

In this research, it is aimed to increase the achievement level of 12th graders in Essay Writing course through 5E teaching model-based course design and implementation. Despite the fact that 5E Learning Model theoretically lacks a needs analysis part, a comprehensive needs analysis is done in the beginning of the present study in order for a better and a more effective course design and instruction. According to the results of this needs analysis, a design-based research is carried out in order to increase the achievement levels of the 12th grade students in essay writing. The objectives, the design, including methods, techniques, and materials, and the implementation and evaluation of the course are all re-determined in accordance with the qualitative and quantitative data, collected in the needs analysis section of the research. In the design section of the study, the course is redesigned on the basis of the instructional steps and principles of 5E learning model according to the results, driven from the needs analysis. The implementation of the redesigned course, consisting of 3 lesson hours lasts 120 minutes in total. The evaluation of the design is done via achievement tests, peer evaluation, students' progress check, teacher's evaluation of students' writings, and teacher performance observation. Through this detailed evaluation of the course design, the contribution of the 5E Learning Model-based Essay Writing Course implementation and instruction to 12th graders' achievement levels in Essay Writing lesson is determined.

When the results of the Essay Writing achievement tests applied before and after the 5E Learning Model implementation are taken into consideration, there can be said to be a significant increase in student achievement level in Essay Writing course. Likewise, according to the results, obtained from the descriptive analysis of the students' peer feedbacks in which the students evaluate their peers' writing performance and their own progress in writing, 5E Learning Model implementation can be said to contribute to the writing skill development of the students.

Determining the learning environment and student characteristics with the needs analysis, knowing the individual learning styles, and the needs, opinions and expectations of the students about the lesson and instruction, determining the students' weaknesses and the aspects of the lesson that should be more emphasized, identifying the needs, and realizing the new course design and implementation are all proven to contribute to this significant development in Essay Writing performance.

In this regard, in the light of the findings obtained from all the data collected and analyzed within the scope of the study, some factors can be put forward to be reasons for students' improvement in writing, especially in brainstorming, writing the first and final drafts, writing thesis statement, making accurate references, and writing citation related to the 5E Learning Model-based design and implementation of Essay Writing course. Teacher's presenting more responsive essay samples apart from the course book in the "Engage" part of the lesson, using smart board more effectively in the "Explore" part of the lesson, giving the students especially the ones with "accommodating" learning style the chance to explore features of responsive essay type on their own in "Explore" part of the lesson before teacher presentation, giving more time to students for planning and writing responsive essay in "Elaborate" part, and providing the students especially the "converging" type of learners with short-term teacher feedback can be stated as the main reasons for students' improvement which are based on teacher. In addition, the students' learning more permanently and meaningfully from their peers' mistakes and corrections in "Elaborate" part via peer feedback and constant interaction, reviewing and revising the first drafts in class, and timely and well-planned peer evaluation in "Evaluation" part of the lesson can be stated to be the reasons initiating from the students themselves for their improvement in essay writing.

Basically, in this study, the Essay Writing course is redesigned after identifying the expectations about the course through needs, learners, and learning environment analysis. Within this design, based on 5E Learning Model, it is concluded that students will transfer the knowledge and competences they acquire in English Essay Writing course to real life and their professions. For this reason, in order to increase the interest and the success of students in writing classes, to improve students' writing skill, and to make writing lessons more useful and productive, some suggestions can be made. Firstly, before the design and implementation of any writing course, a needs analysis should be carried out for learners' and learning environment analysis, and the findings should be taken into account during the course design, implementation and evaluation. Moreover, learners' individual learning styles should be identified via varied data collection instruments and appropriate methods, techniques, and activities, appealing to different learners should be employed in lessons. In addition to this, the students' views on their own performance and the instruction should be taken into consideration before and after the implementation, and the course design and implementation should be reshaped in accordance with students' expectations. Students should also be encouraged to write on their own as the practice of each essay type, learned in lesson. In parallel, peer and teacher feedback and evaluation should be given an important place in every writing lesson, and different feedback and evaluation forms should be developed. Furthermore, students should be provided with as many writing examples as possible from

different sources besides the basic course book in the writing lesson. Additionally, teacher presentation should be limited as much as possible, so writing lesson should mainly be focused on student performance, feedback and evaluation. Lastly, instructional technologies, such as smart board and internet should be used as frequently as possible in order to be compatible with the ever-evolving technology so that the constant interest of young learners can be provided.

5. Conflict of Interest

The authors declare that there is no conflict of interest.

6. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Aşkar, P ve Akkoyunlu, B. (1993). Kolb Öğrenme Stili Envanter. Eğitim ve Bilim, 87: 37-47.

Baki, A., & Gökçek, T. (2012). Karma Yöntem Araştırmalarına Genel Bir Bakış. Eletronik Sosyal Bilimler Dergisi, 11(42), 1-21.

Creswell, J. W. (2006). Understanding Mixed Methods Research, (Chapter 1). http://www.sagepub.com/upm-data/10981_Chapter_1.pdf

Deniz K, (2000). Yazılı Anlatım Becerileri Yönünden Köy ve Kent Beşinci Sınıf Öğrencilerinin Durumu. Basılmamış Yüksek Lisans Tezi, Çanakkale Onsekizmart Üniversitesi Sosyal Bilimler Enstitüsü, Çanakkale.

Ekici, G. (2003). Öğrenme Stiline Dayalı Öğretim ve Biyoloji Dersi Öğretimine Yönelik Ders Planı Örnekleri. Ankara: Gazi Kitabevi.

Ergür, D.O. (1998). H.Ü. Dört Yıllık Lisans Programlarında Öğrenci ve Öğretim Üyelerinin Öğrenme Stillerinin Karşılaştırılması. Yayınlanmamış Doktora Tezi, Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü, Ankara: Türkiye.

Gökalp G, Gonca A., (2001). Derslikten Günlük Yaşama Edebiyat Eğitimi. Türkbilig 2000/I-Türkoloji Araştırmaları. Ankara. ss: 185-202.

Guild, P.B. ve Garger, S. (1991). Marching to Different Drummers. USA: ASCD.

Hasırcı Ö.K. (2006). Sınıf Öğretmeliği Öğrencilerinin Öğrenme Stilleri: Çukurova Üniversitesi Örneği. Eğitimde Kuram ve Uygulama Dergisi, 2 (1): 15-25.

Herrington, J., McKenney, S., Reeves, T., & Oliver, R. (2007). Design-based research and doctoral students: Guidelines for preparing a dissertation proposal.

İnal S, (2006). İngilizce Yazılı Anlatım Dersinin Sorunları Üzerine Bir İnceleme, Journal of Language and Linguistic Studies Vol.2, No.2, October.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed Methods Research: A Research Paradigm Whose Time Has Come. Educational Researcher, 33(7), 14-26.

Kılıç, E. (2002). Baskın öğrenme stilinin öğrenme etkinlikleri tercihi ve akademik başarıya etkisi. Eğitim Bilimleri ve Uygulama, 1 (1): 1-15.

Kolb, D.A. (1984). Experiental Learning: Experience as the Source of Learning and Development. New Jersey: Prentice-Hall.

Kolb, D. A., Boyatzis, R.E., Mainemelis, C. (1999). Experiential learning theory: previous research and new directions. www.learningfromexperience.com

Kuzu, A., Çankaya, S., & Mısırlı, A. (2011). Tasarım tabanlı araştırma ve öğrenme ortamlarının tasarımı ve geliştirilmesinde kullanımı. Anadolu Journal of Educational Sciences International, 1(1), 19-35.

Murcia, C. (1991). Teaching English as a Second or Foreign Language, Heinle&Heinle Publishers, Massachusetts.

Reeves, T. C. (2000). Enhancing the worth of instructional technology research through "design experiments" and other development research strategies. International perspectives on instructional technology research for the 21st century, New Orleans, LA, USA.

Sarı, R. (2011) Eğitimde IAHL 11İ Modeli, Işıklar Askeri Hava Lisesi Burç Dergisi. Sayı:2.

Şentürk, C. (2010) Yapılandırmacı Yaklaşım ve 5E Öğrenme Döngüsü Modeli, Eğitime Bakış Dergisi. Sayı:17.

Appendix 1- Responsive Essay Lesson Plan

Course Title:	Essay Writing
Grade:	12th Grade-2nd Section
Name/Number of the Unit:	Responsive Essay / Unit 5
Subject:	How to Write a Responsive Essay
Suggested time:	120 minutes
PART 2	
Learning Outcomes:	1. Understanding the purpose of writing Responsive Essay 2. Brainstorming to create positive and negative ideas about the article, read. 3. Discussing the ideas about the essay in group work 4. Outlining the essay draft according to the thesis statement 5. Giving an appropriate title to the essay 6. Composing thesis statement suitable for the essay and its purpose 7. Organizing the essay in accordance with its type, purpose and structure 8. Writing the introduction, development and conclusion paragraphs in accordance with the writing draft 9. Using transitions and conjunctions properly and accurately while writing 10. Giving proper feedback in peers in terms of Peer Feedback Form 11. Revising the essay according to peer feedback 12. Thinking critically to correct mistakes in the essay 13. Making revision decisions to improve the essay 14. Writing the final draft in accordance with peer feedback 15. Recognizing the differences between the first and the final draft in accordance with the Progress Check Form
Basic Concepts:	Responsive Essay, Reference, Direct Reference, Paraphrase, Citation, Bibliography
Teaching Methods and Techniques:	Presentation, invention, question-answer, group work

Materials, Tools and Sources:	Smart Board, the articles compiled from the sites: www.nytimes.com www.educationnext.org www.newscience.com Writers at Work-The Essay 21st Century Reading-Reading Passages Peer Feedback Form Progress Check
PART 3	
Engage:	1. The teacher motivates the students by reminding them of that they would need and use the knowledge and the skills, they acquire in this course, in placement and proficiency exams after graduation, in writing courses at university level, and in professional writings in business life. 2. The teacher gets the students' attention: "We read many articles in our everyday life, don't we? Most of these are articles about the subject we are researching or about current and popular topics. When we read these articles, we often read not only for the meaning but also the positive or negative reading of the views defended in the article to create our own ideas". 3. The teachers provides more than one articles and samples of Responsive Essay using technological aids such as smart board. ***(Activity 1 Article / Sample Responsive Essay) -10'***
Explore:	The teacher steps back and observe the students discussing over and analyzing different articles, they bring to class, on the smart board by providing timely feedback. By means of this guided discussion, students perform a group activity in which they can brainstorm and develop positive and negative views about the articles, to analyze the structure of the sample essays, to write the first draft, and to find an appropriate topic for it. ***(Activity 2 Brainstorming-Outlining) -15 '***
Explain:	Teacher presents the basic concepts such as "Responsive Essay", "Making Reference", "Direct Reference", "Paraphrase", "Citation", and "Bibliography". Furthermore, she not only describes the structural features of Responsive Essay on a sample outline on board, but also explains the techniques of making references, the proper formats of making citations, and the rules of writing bibliography in

	APA or MLA styles, as well. ***-15'***
Elaborate:	Students are encouraged to write the first draft of responsive essay in order to reinforce and improve their knowledge and skills in writing. ***(Activity 3 Writing Responsive Essay)-30'***
Evaluate:	In order to review what they've learned throughout the lesson, the students: • read their peers' writing drafts critically, **-10'** • reflect their thoughts on their peers' writing by filling out the Peer Feedback Form, ***(Peer Feedback) -15'*** • revise their own writings in accordance with their peers' feedback, ***(Revision Decisions) -15'*** • evaluate their own writing progress and the instruction of the lesson by filling out the Progress Check Form. ***(Progress Check) -10'***

Appendix 2 - Peer Evaluation Sheet

PEER FEEDBACK FORM

Writer's name: _____ Date: _____

Reviewer's name: _____

1 Underline the thesis statement twice.

2 Answer these questions about the introduction. Mark each box ✓ or X.

- ☐ Does the introduction have an interesting hook?
- ☐ Does the introduction include background information?
- ☐ Does the thesis statement tell you the topic and the writer's opinion?
- ☐ Is there a sentence that shows the scope of the essay?

3 Underline the topic sentence of each body paragraph.

4 How many quotes did the writer use? _____

How many times did the writer paraphrase information? _____

Are citations included in parentheses? _____

5 How was the balance between the information from the article and the writer's own opinions? Mark each box ✓ or X.

- ☐ too little information from the article
- ☐ just enough information from the article
- ☐ too much information from the article
- ☐ too few of the writer's own opinions
- ☐ just enough of the writer's own opinions
- ☐ too many of the writer's own opinions

6 What do you think was the writer's strongest argument? What was the writer's best support for that argument?

_____

_____

7 Draw a star (★) in the margin by your favorite sentences. Write a question mark (?) in the margin next to any sentences you didn't understand.

8 Any other comments: _____

_____

_____

Appendix 3 - Essay Writing Rubric

	Excellent	Good	Fair	Poor
Introduction	Introduction refers specifically to the work(s), addresses the topic directly, and has a clear thesis statement.	Introduction refers specifically to the work(s), addresses the topic, and has a clear thesis statement.	Introduction makes some reference to the work(s), attempts to address the topic, and has a fairly clear thesis statement.	Introduction makes little reference to the work(s), poorly addresses the topic, and has an unclear thesis statement.
Body Paragraphs	Body paragraphs contain clear topic sentences, support the thesis, and are exceptionally well-organized.	Body paragraphs have topic sentences, support the thesis, and are fairly organized.	Body paragraphs support the thesis, attempt to address the topic, and are fairly organized.	Body paragraphs do not sufficiently support the thesis and are not organized.
Examples	Examples are specific, sufficient, and significant; they are clearly explained and connected directly to the thesis.	Examples are specific, sufficient, and reasonably well-explained; they support the thesis.	Examples and explanations are fair and/or insufficient; they provide some support to the thesis.	Examples and explanations are unclear and insufficient; they provide little support to the thesis.
Conclusion	Conclusion clearly restates the thesis, reinforces the major points and makes a broader statement about the topic.	Conclusion sums up the thesis and reinforces it well.	Conclusion does not fully sum up or reinforce the thesis.	Conclusion sums up the thesis poorly with little reinforcement.
Conventions (Spelling, Grammar and Punctuation)	Spelling, grammar, and punctuation are accurate and nearly perfect.	Spelling, grammar, and punctuation are mostly accurate with few errors.	Spelling, grammar, and punctuation are fair with some obvious errors.	Spelling, grammar, and punctuation are poor with frequent errors.
Word Choice	Language is precise and well-chosen; sentences are rich and varied.	Language is well-chosen; sentences are varied.	Language is fair; some sentence variety.	Language is poor, little sentence variety.
Audience and Purpose	Audience and purpose are clearly evident.	Audience and purpose are evident.	Audience and purpose are discernible.	Audience and purpose are not apparent.

Appendix 4 - Student Observation Form

PROGRESS CHECK
Date:
Essay Title:
Things I did well in this essay:
Thing I need to work on in my next essay:
How did you improve your writing in this essay?
Things your teacher needs to do to contribute your understanding of Essay Writing lesson and your writing improvement:

Activity 1. Article / Sample Responsive Essay

Article 1

The following article on the vulnerability of citizens' personal information is adapted from an article that first appeared in *Forbes* magazine on Novermber 29, 1999. It was accessed at <http://members.forbes.com/forbes/1999/1129/6413182a.html> on February 25, 2007.

The End of Privacy

Adam L. Penenberg

The phone rang and a stranger sang at the other end of the line: "Happy Birthday to you." That was spooky* – the next day I would turn 37. "Your full name is Adam Landis Penenberg," the caller continued. "Landis?" My mother's maiden name*. Then Daniel Cohn, Web detective, told me the rest of my "base identifiers" – my birth date, address in New York, Social Security number*. Just two days earlier I had issued Cohn a challenge: Starting with my byline*, find as much information about me as you can. "That didn't take long," I said.

"It took about five minutes," Cohn said. "I'll have the rest within a week." And the line went dead.

In all of six days, Dan Cohn and his Web detective agency, Docusearch.com, shattered* every notion I had about privacy in this country. Using only a keyboard and the phone, he was able to uncover the innermost details of my life – whom I call late at night; how much money I have in the bank; my salary and rent. He even got my unlisted phone numbers*, both of them.

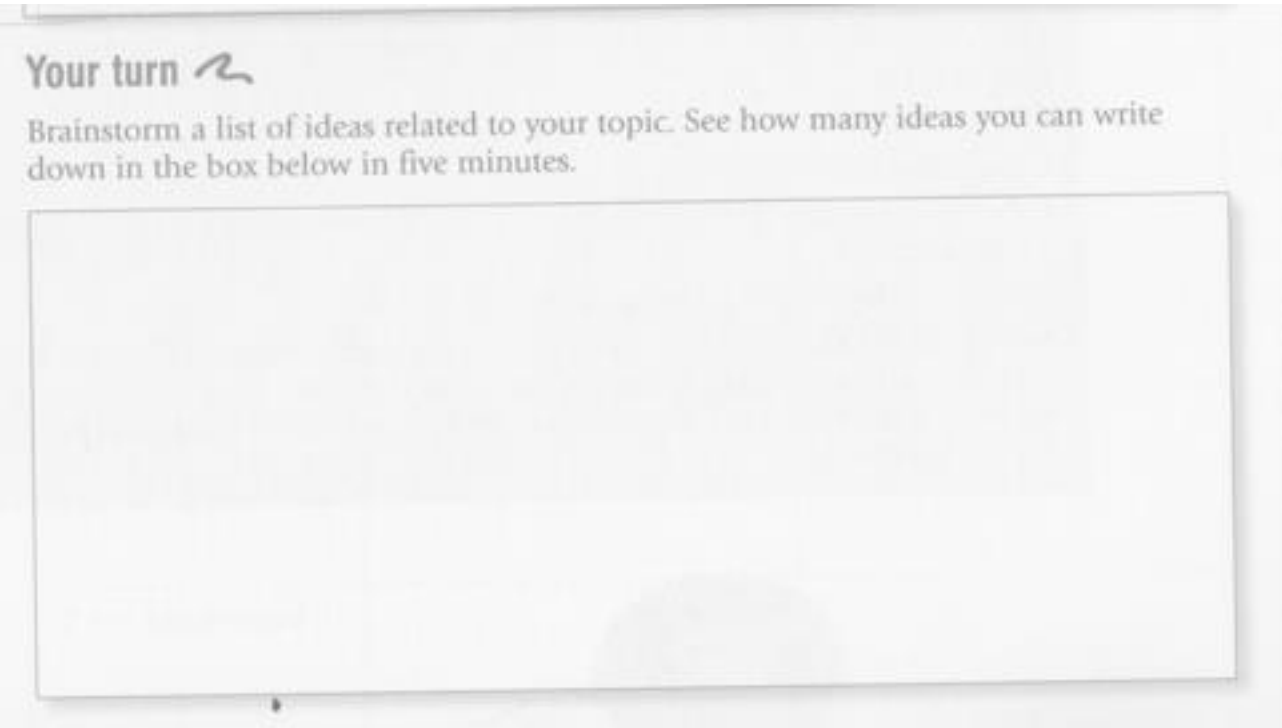
For decades, information like this was kept in large mainframe computers that were difficult to access. The move to desktop PCs and local servers in the 1990s distributed these data far and wide. Computers now hold half a billion bank accounts, half a billion credit card accounts, hundreds of millions of mortgages and retirement funds and medical claims, and more. The Web links it all together.

As e-commerce grows, marketers and busybodies* can access more consumer data than ever before. It's far worse than you think. Advances in search techniques and the rise of massive databases leave you vulnerable.* The spread of the Web is the final step. It will make most of the secrets you have more instantly available than ever before, ready to reveal* themselves in a few taps on the keyboard.

You may well ask: What's the big deal? We consumers are as much to blame as marketers for all these loose data. We have willingly given up some privacy in exchange for convenience; it is why we use a credit card to shop, even though it means we receive more junk mail. Why should we care if our personal information isn't so personal anymore?

continued

Activity 2: Brainstorming / Outlining



Activity 3: Writing Responsive Essay

TITLE

INTRODUCTION: Hook_____

_____

Thesis Statement_____

_____

_____

DEVELOPMENT: Topic Sentence I_____

_____

_____

Topic Sentence II_____

_____

_____

CONCLUSION: Tie back to thesis_____

_____

Closing Thought_____

Bülbül, B. Ö., Güler, M., Gürsoy, K., & Güven, B. (2020). For what purpose do the student teachers use DGS? A qualitative study on the case of continuity. *International Online Journal of Education and Teaching (IOJET), 7*(3). 785-801. https://iojet.org/index.php/IOJET/article/view/765

Received: 19.10.2019
Received in revised form: 10.04.2020
Accepted: 18.04.2020

FOR WHAT PURPOSE DO THE STUDENT TEACHERS USE DGS? A QUALITATIVE STUDY ON THE CASE OF CONTINUITY

Research Article

Buket Özüm Bülbül
Manisa Celal Bayar University, Faculty of Education, Department of Math. Edu., Turkey
buket.bulbul@cbu.edu.tr

Mustafa Güler
(Corresponding Author)
Trabzon University, Fatih Faculty of Education, Department of Math. Edu., Turkey
mustafaguler@trabzon.edu.tr

Kadir Gürsoy
Trabzon University, Fatih Faculty of Education, Department of Math. Edu., Turkey
kadirgursoy@trabzon.edu.tr

Bülent Güven
Trabzon University, Fatih Faculty of Education, Department of Math. Edu., Turkey
bguven@trabzon.edu.tr

Buket Özüm Bülbül is an assistant professor at Manisa Celal Bayar University, Faculty of Education. She teaches geometry, analytic geometry and geometry teaching.

Mustafa Güler is a PhD at Trabzon University, Fatih Faculty of Education. His research areas are teacher education, mathematics learning and teaching for elementary school students.

Kadir Gürsoy is a PhD at Trabzon University, Fatih Faculty of Education. His research areas are computer-aided problem solving and meta-analysis.

Bülent Güven is a professor at Trabzon University, Fatih Faculty of Education. In addition to elementary level, his research area includes secondary school mathematics teaching and learning as well as curriculum development.

FOR WHAT PURPOSE DO THE STUDENT TEACHERS USE DGS? A QUALITATIVE STUDY ON THE CASE OF CONTINUITY

Buket Özüm Bülbül
buket.bulbul@cbu.edu.tr

Mustafa Güler
mustafaguler@trabzon.edu.tr

Kadir Gürsoy
kadirgursoy@trabzon.edu.tr

Bülent Güven
bguven@trabzon.edu.tr

Abstract

Although numerous studies have investigated how technology affects academic achievement, very few have focused on the purpose of the use of technology in mathematics education. This current study examines how student teachers (STs) benefit from GeoGebra as one of the Dynamic Geometry Software (DGS) while solving continuity problems. In order to have deeper insights and a better understanding of the intended purposes, a case study research design was adopted for this study. Participants in the study were seven mathematics STs. Six open-ended problems were used to collect data. Three themes were found to be relevant for understanding how STs use DGS in a problem solving process: visualize, verify, and calculate. The paper also shows the potential misconceptions of the STs.

Keywords: Dynamic Geometry Software, GeoGebra, problem solving, aim of use, continuity

1. Introduction

In today's warp-speed world, the amount of information is rapidly increasing day by day. In the direction of this change, curricula are constantly revising. In new curricula and education policies, it is recommended to integrate the technology into real classrooms and teacher education institutions. On the other hand, integration of technology into mathematics classes is a key role in the success of education programs (Baki, 2002; Lee & Hollebrands, 2008). The idea of technology can transform students' classrooms into mathematical labs where they can discover mathematical relations and make assumptions, generalizations, and experimental corrections lies behind the integration of technology into mathematics classes. According to the National Council of Teachers of Mathematics [NCTM] (2000) standards, students can develop deeper understanding of mathematics in a technology-enriched classroom environment.

Similarly, various mathematics education researchers have pointed out that technology-enriched learning environments have positive effects on students' mathematical abilities (e.g., Choi, 2010; Tall, 2002; Wenglinsky, 2000). Especially the developments and changes experienced in the field of information technologies for the last two decades have brought

important opportunities for this learning culture. The emergence of DGS in mathematics education can be considered as one of the milestones. Research has shown that DGS plays an important role in problem solving, logical assumption-making, and improving generalization skills (Baki, 2006; Camargo, Samper, & Perry, 2007; Healy & Hoyles, & Laborde, 2001; Mariotti, 2000; Marrades & Guitierrez, 2000). DGS contributes to the problem-solving strategies by making geometric measurements, establishing dynamic constructions, examining different situations with the dragging option, and reaching generalities (Fey, Hollenbeck, & Wray, 2010; Olive et al., 2010). For this reason, the integration of DGS into classes helps students in the discovery of relationships among mathematical concepts and solving mathematical problems. Some researchers highlighted that, besides the development of these skills, DGS can make important contributions to students' transition from experimental evidences to formal proofs (Camargo, Samper, & Perry, 2007; Marrades & Gutiérrez, 2000). Hoyles and Jones (1998) have examined the influence of the Cabri Geometry software on the proof skills of students who were using DGS. As a result of the study, it has been determined that students can draw conclusions about the characteristics of geometric shapes after they have drawn the required geometrical figures, and made connections among them. In addition, students were able to explain the accuracy of these relationships with the help of the DGS. In similar studies, the potential of DGS has been revealed by how it increases proof ability through the opportunity to test and validate students' ideas by giving immediate feedback (Camargo et al., 2007; Mariotti, 2000; Marrades & Guitierrez, 2000).

Hohenwarter and Fuchs (2004), encoders of GeoGebra software, indicated that the DGS presents opportunities to the students, such as in establishing assumptions, making calculations, testing hypotheses, and making generalizations, or of using it as an instructional tool by allowing them to experience the abstraction process. Güven (2006) stated that the function of DGS is not only to justify a mathematical situation's relevance, but also to establish a bridge between the trial and error strategy and finding formal proofs. Similarly, Baki (2006) emphasized that the DGS makes a contribution to students' understanding of a particular situation and discovery of different features, and through giving opposite examples and ideas of how to prove by using its features such as dragging, creating tables, and providing feedback. Considering all of these claims, we can conclude that the DGS is a tool which contributes to understanding mathematical ideas, making a plan and implementing it, creating solutions and reaching generalization as well as providing problem solving.

1.1. Technology and Problem Solving

Technology in general, and the DGS in particular, affect students' problem solving process and directs them to use different problem solving strategies (Healy et al., 2001). This can be explained in the context of Schoenfeld's factors affecting problem solving as follow. Schoenfeld (1992) identified the factors that affect problem-solving skills in four components: resources, heuristics, control, and belief systems. Resources are the mathematical knowledge that the individual has (phenomena, data, facts and definitions). Heuristics are the strategies that an individual uses to solve the problem, such as examining special cases. Control is the process of deciding whether or not these solutions are correct when obtaining intermediate solutions while solving problems. Belief system is the attitudes and beliefs that the individual has toward a given problem. Although each of these steps, as described by Schoenfeld (1992), has a separate design, the heuristics step is becoming more prominent in the problem solving process. This stage offers students the opportunity to apply different problem solving strategies by enriching the learning environment via DGS features such as calculation, processing, guessing, and graphic drawing.

Although Schoenfeld (1992) expressed these four components when the use of technology in education was not as widespread as it is today, it can be said that the heuristics have developed and changed by means of the use of technology in the problem solving process. Particularly the use of visual and experimental approaches in problem solving can be seen as an opportunity based on mathematical discussions. Technological tools also help students to observe, manipulate, predict, test and explain an observed expression, and measure geometric shapes. It also provides opportunities such as experimenting, observing mathematical relationships, controlling predictions, proving, correlating the results of paper-pencil-solved problems, visualizing, providing effective feedback, and makes learners feel the need to prove mathematical inferences. In this context, DGS has a considerable prominence in developing students' problem-solving strategies in teaching mathematics and geometry (Barrera-Mora & Reyes-Rodriguez, 2013; Kuzle, 2012).

1.2. Continuity

The axiomatic structure of mathematics suggests that continuity is an important concept for topology that forms a large part of advanced mathematics, and helps us to understand the basics of mathematics, such as derivative and integration (Cornu, 1991). In addition to formal descriptions of this concept, there are concept images (Çekmez, 2013) that are originated informally within individuals' minds. These mental elements will not necessarily be in harmony with the nature of the concept (Tall & Vinner, 1981), since the degree of harmonisation will vary with time, with various variables such as experience, observations, and classroom practices (Rösken & Rolka, 2007). That is, the concept images possessed may be inconsistent with the concept itself (see Table 1). Informal descriptions which are far from the formal definition can provide the basis for misconceptions (Bezuidenhout, 2001; Tall & Vinner, 1981). One of the sources of informal descriptions stems from everyday uses of the given concept. According to Gough (2007), although mathematics is technically a language, it is not natural because it is a human product such as other languages. However, this unnatural language is always taught or learned via a natural language. In this regard, a daily life type of use of a concept can lead to issues in learning its mathematical form (Gough, 2007). One of these definitions is the concept of continuity we use both in daily life and in mathematics. In street/everyday? language, the term of continuity is mostly used instead of "without interruption" or "non-stop". The most common misconception about continuity in relation to this definition is that it is non-stop, with no gap, no fracture, or no disconnection. Students with this misconception say that the function is discontinuous by looking at the whole of the graph when a graphical form of a function is given and they are asked to determine continuity at any point (Baştürk & Dönmez, 2011; Tall & Vinner, 1981).

Table 1. *The formal definition of continuity (quoted in Tall, 2002, p.116)*

Given a statement which is a three-level quantification, such as the definition of continuity of F at x_0, $\forall \varepsilon > 0, \exists \delta > 0 \ni \forall x \in \text{domain}(F), \lvert x - x_0 \rvert \leq \delta \Rightarrow \lvert F(x) - F(x_0) \rvert \leq \varepsilon$

The belief that each equation should be perceived as a function or that there must be a rule for every function is often a misconception of the function (Aydın & Köğce, 2009; Breidenbach, Dubinsky, Hawks, & Nichols, 1992; Vinner & Dreyfus, 1989). Similar misconceptions have also been seen when continuity at the critical points of piece-wise functions are being questioned. Some studies have shown that students with this misconception expressed the continuity when the given piecewise functions were discontinuous at critical points (Bezuidenhout, 2001; Seldon, Seldon & Mason, 1994). Besides this, some studies revealed that the students' difficulties in understanding continuity

concept reason from a failure of making connections between continuity and limit concepts (Açıkyıldız, 2013; Bezuidenhout, 2001).

A number of teaching practices and materials are used to solve the misconceptions encountered by individuals. Among them, the use of DGS is seen as very useful for geometry and some calculus concepts due to its potential to give individuals experiences and visualizations of these concepts, and it has the added benefit of being easy to access and free. DGS, which is generally used in teaching geometry, can also be used for the calculus concepts that can be represented geometrically (Biza & Zachariades, 2007). When the relevant literature is examined, it is seen that many of these studies have investigated the effects of learning by means of DGS (e.g., Choi, 2010; Dikovic, 2009; Filiz, 2009; Karakuş & Peker, 2015; Kepçeoğlu, 2010). Among the studies related to computer-aided mathematics instruction, Doerr and Zangor (2000) examined the purpose for which teachers and students used graphic calculator to make mathematics meaningful in their lessons. Similarly, Goos et al. (2000), in their longitudinal studies to restructure the roles of teachers and students in technology-enriched classrooms with graphics calculators and overhead projection, revealed four roles of technology as master, servant, partner and extension of self. In another study, Maddux and Johnson's (2005) Type I and Type II classifications were remarked on. According to Maddux and Johnson (2005), the use of technology in class is either a direct result of a problem or an examination of the big ideas possessed. In other words, Type I focuses directly on the result and is about well-known problems. However, Type II is related to making conjectures and justification and using the mathematical idea behind the situation. Different from the studies given above, GeoGebra as one of the DGS was emphasized in the current study and the purposes of this software were examined in terms of continuity topic. One of the main reasons for focusing on GeoGebra software is that this software is widely used in computer-aided mathematics courses in teacher education programs (Çekmez, 2016; Çekmez & Güler, 2019) since its interface is plain and it is free software (Çekmez, 2013). First aim of conducting this research is that continuity is one of the subjects where challenges and misconceptions are common even among undergraduate students (e.g. Bezuidenhout, 2001). Second aim is to reveal the purpose of the use of GeoGebra which has the potential to be effective in addressing student challenges. Although different studies in the literature have examined the purposes of using different technological tools, some of them summarized above, it can be said that these technological tools, for example graphic calculator, are not now widely used in the second decade of 21th century. Besides, the idea that the purposes of using different technological tools will be different has been one of the basic assumptions of the current study. Briefly, this paper aims to illustrate how mathematics STs benefit from DGS in solving the problems of continuity, which is one of the concepts of calculus.

2. Method

The case study method was used to systematically examine how mathematics STs benefitted from DGS in continuity-based problem solving. Thus, it was aimed to examine STs' intentions to use the DGS in the problem-solving process in-depth. According to Yin (2009), a case study is a research method that is used when there is more than one piece of evidence or data source and the boundaries between the case and the environment in which the investigated entity resides and the environment in which it resides are not clear. An in-depth answer to the question of why and how to deal with special case studies is sought (Rowley, 2002).

STs who were involved in the study had already been taught GeoGebra before the implementation. In the context of this study, the STs were reminded of the use of GeoGebra by making some practices for 2 hours during the course, and they were shown how to create

different type of functions, such as piece-wise, trigonometric, quadratics before the clinical interviews were conducted. Finally, clinical interviews were organized in such a way as to be individualized on different dates for each person.

2.1. Research Design

The design of the research was composed of three stages, as given in Figure 1. First of all, the literature was reviewed in order to determine the students' misconceptions about the continuity. Considering the learning difficulties and misconceptions in the literature, we developed a data collection tool. On the other hand, the research group was determined in voluntary basis. In the next stage, the STs were reminded of the applications of the GeoGebra software for 2 hours, and they were presented some of its basics and applications (in a general sense) such as menus and algebraic functioning, piece-wise function, function defined in a certain interval, and how to construct trigonometric functions. In this context, first of all, clinical interviews were carried out individually by taking different interview dates. Finally, interview dates were appointed for each of the participants and then clinical interviews were conducted.

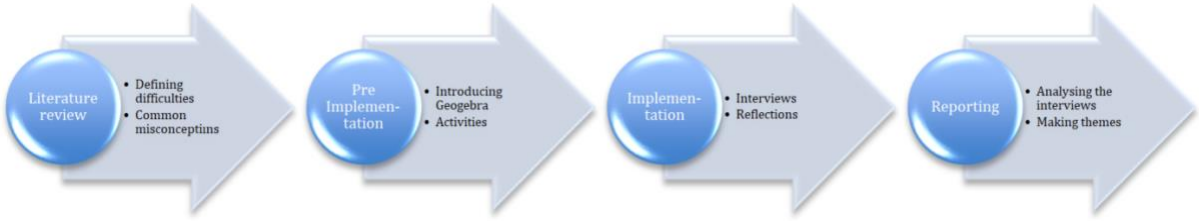


Figure 1. Steps leading to the current research design

2.2. Participants

The participants of the research are composed of seven middle school mathematics STs in their fourth school year term in a state university. STs were selected based on their GPAs, and specifically on their General Mathematics and Calculus course grades. The reason for categorizing them with respect to their grades was to ensure that the STs had the theoretical background to solve the problems they encountered about the continuity. Since, when the middle school mathematics teacher education curriculum is examined, it is seen that the concept of the continuity was discussed within the scope of "General Mathematics" and "Calculus I" courses. In addition, in the course they took during their first term, "Graphic analysis", they were introduced to GeoGebra software and the course was enriched with problem solving activities. This background that STs possessed influenced the selection of the working group. As a result, the GPAs of two STs were chosen to be CC and below, 3 students within the range of CC and BB inclusively, and 2 students over BB (In the Turkish higher education system, the grades from C to A go from lower to higher.)

2.3. Data Collection

In the scope of the study, six open ended problems were included to form a data collection tool. When these problems were being prepared, firstly, the students' misconceptions about the continuity were determined from the related literature, and then, the studies on these misconceptions were investigated in detail. These problems were covered under three misconceptions themes. While the first theme involves the idea that the functions are to be a single piece of a graph, the second is that the functions are expressed by a single formula, and the third is about the definition of the continuity. In this regard, questions 1, 3, and 4 are related to the first theme, questions 2 and 6 are related to the second theme, and question 5 concerns the third theme. When the questions are examined, the first question is intended to

determine what it means to be continuous in a given interval and how its representation is interpreted. In addition, we aimed to examine the steps of reaching the result with drawings using GeoGebra in this problem. In the second question, participants were required to interpret the graph of a function, and make connections between limit and limit-continuity, as well as continuity within a certain interval. The third one was prepared in a way to examine how participants identify the continuity at an undefined point. Different from the other problems, the drawing of the function at the given point includes a mistake when it's drawn with GeoGebra. Therefore, it was seen as important to investigate the views of STs toward DGS including this problem. Similar to the third one, the fourth problem was related to questioning the continuity at an undefined point. The purpose of preparing the fifth question was to investigate what STs think about the limit value of the function at a certain point and the continuity at the related point. The last question of the test was prepared so as to inquire about the piece-wise function. That question was about analyzing the limits of the function and of a given point, and the continuity at the same point. Here the problems provided opportunities for us to observe the role of GeoGebra in solving these problems. During the preparation phase of these six problems, one expert and three researchers were interviewed. In addition, some changes were made to the problems by applying them to different students before the main study.

During the collection of the data, hour-long individual interviews were conducted and recorded with the permission of the participants. In addition, field notes were taken by the researchers to picture how DGS affected their problem solving processes.

2.4. Data Analysis

When the data were analyzed, students' work- sheets were examined. In addition, the audio-recordings and observation notes taken during the interviews were also examined, and the stages of using the DGS for the solution of the questions were investigated by three researchers. Findings were presented under the themes established within the consensus of all of the researchers. The students' written responses were then translated from Turkish to English, while maintaining the essence of their meanings. In addition, the participants were coded as STX ("X" being a variable for a number assigned to each participant), and the interviewer researcher was coded as R to preserve their anonymity in observation of the ethical standards for research.

3. Results

In this study, we examined mathematics STs GeoGebra usage - GeoGebra is one of the DGS related to the continuity. In this context, it was observed that while STs did not use GeoGebra for the question that described the continuity theme; they used the software for the theme of the idea that the graphs of continuous functions are composed of a single part, and the idea that continuous functions are expressed by a single formula. STs using GeoGebra have generally been using it to *visualize*, *verify*, and *calculate* the given functions. The findings below are based on these usage patterns.

3.1. The Use for Visualization

In the questions 1, 3, and 4 which were prepared considering the misconception that the graphics of the continuous functions consist of a single part, it has been seen that STs used GeoGebra for visualization purposes. One of the participants who used the software for visualization purpose was the ST coded as ST5.

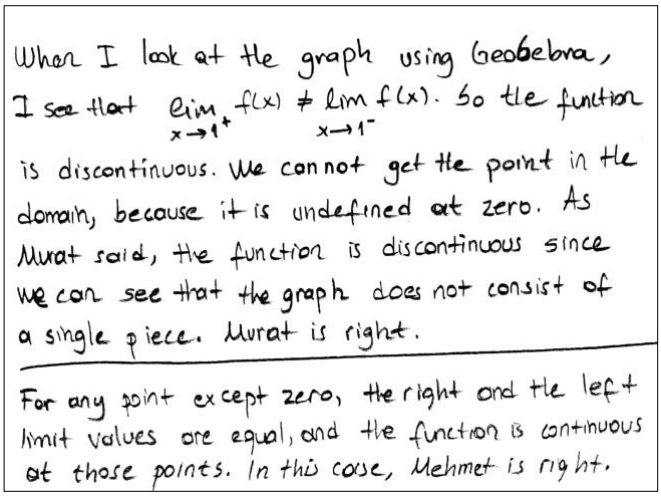


Figure 2. ST5's response to Question 1

Regarding Figure 2 (in which the answer to the first question is included and investigated), it is seen that the ST tried to reach the conclusion by looking at a graph of the function. A clinical interview was conducted during the implementation to examine it in order to understand in which stage the participant used GeoGebra,

ST5: I want to draw a graph before I solve the question. Can I draw?

R: Of course, as you wish.

(Participant drew the graph using GeoGebra.)

ST5: When I look at the graph [and] approach to 0 from the right or the left, 1 / x becomes infinite. In the meantime, the limit and continuity at a specific point are not mentioned, but the definition interval is. So, according to the graph, Mehmet's solution is correct.

As seen in the dialogue above, ST5 had benefitted from the graph drawing feature of the software when solving the question. ST5 first showed the right and left limits on the graph by hand, then took a point on the graph and calculated the limit value according to its motion. Therefore, it is to say that ST5 effectively used the dragging and other features of GeoGebra. In this context, the ST used GeoGebra for *visualization* purpose. Similarly, ST4 used it in the same way to solve the first problem, as drawn in Figure 3 and as in the dialogue given below.

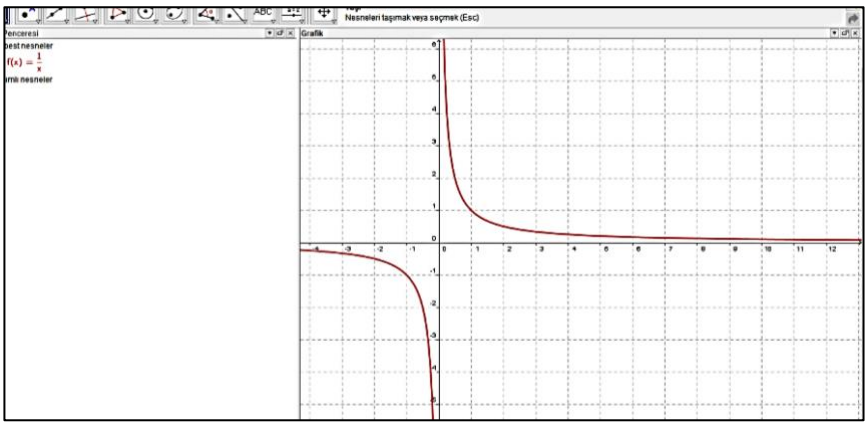


Figure 3. A screenshot of the software used by ST4 in Question 1

(ST5 draws the graph of the function as in Figure 3 and makes comments by dragging a point.)

ST4: It approaches to +∞ and -∞ at zero. It approaches to +∞ as x approaches from the right side and to -∞ from the left. So there is no limit of function at this point because the right and left limits do not have the same value.

R: You made a very nice comment for limit. How would you comment on the continuity?

ST4: If a function has a value equal to the limit at that point, we say it is continuous at that point. Now let's look for x = 2. Values are equal to each other. For example, when we look at the graph, we get the same value from the right and left for point three. Then it is continuous for R- {0}. So Mehmet is right.

As seen in the dialogue above, ST4 had drawn the graph of the function first, and then examined whether the function was continuous. When examining the continuity, ST5 selected a random point on the graph and moved it. In this way, the GeoGebra software was used for *visualization* purpose before talking about the limit of the function.

3.2. The Use for Verification

In the first question that aims to examine participants' attributed meaning of the continuity in a given interval and to investigate their interpretation, STs generally have difficulties in presenting their expressions algebraically. For example, ST1's interview script while solving the first problem before using the GeoGebra software was as follows:

ST1: Murat's view here is discontinuous in the definition interval. That's right. Murat's opinion is correct. Mehmet says that the definition is continuous in the definition interval. Mehmet thinks of it wrongly. Murat is right ... well… it is not defined for any x number in the domain ... I think I am confused ... Yes, yes, but can I have a look at the graph from the computer?

As we have seen in the above interview script, we can say that ST1 did not pay attention to the definition interval of the function at the beginning while examining the continuity. The ST, who realized the false inference, wanted to look at the graph of the given function in GeoGebra. After looking at the graph, ST1's conclusion shifted:

ST1: This function is not defined at the zero point, as we can see in the graph, but it is defined at any real number except the zero point. Now I see clearly that any real number except zero is absolutely continuous.

It is seen that ST1 explained the continuity while using GeoGebra for both the purposes of verification and visualization. Similarly, ST7 tried to interpret the continuity of the function in a given interval using GeoGebra. In Figure 4, ST7's response to the first question is presented.

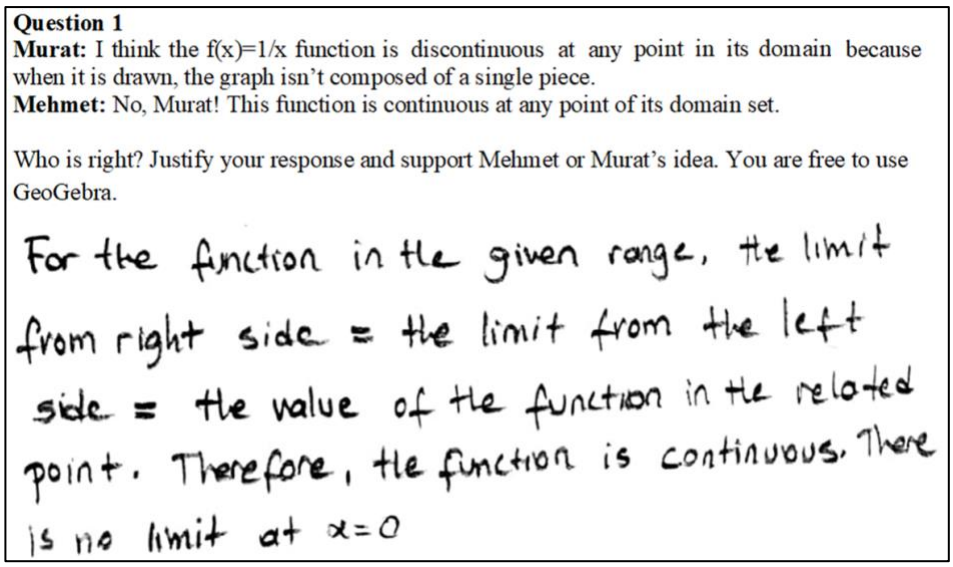


Figure 4. ST7's response to Question 1

During the interview, ST7 stated that he/she knew the graph of the function $f(x) = \frac{1}{x}$ before, but couldn't remember it. Afterwards, ST7 drew the graph of the function in GeoGebra and then defined the interval where the function is continuous. In this context, it is to say that the software used *visualization* and *control* purposes.

While some STs have used GeoGebra software for verification purposes, they have encountered a shortage of software:

When the "f(x) = $\frac{(x^2-25)}{(x-5)}$" function is drawn by GeoGebra, a linear line $y = x + 5$ is produced. As a result, since the graph of the function is also a linear graph, it becomes a continuous function in all intervals of the domain. Some STs were aware of the error when they were asked whether their solution or the software was correct, but some STs believed that the software was correct. One of the exemplary STs for this situation was ST3 (see Figure 5).

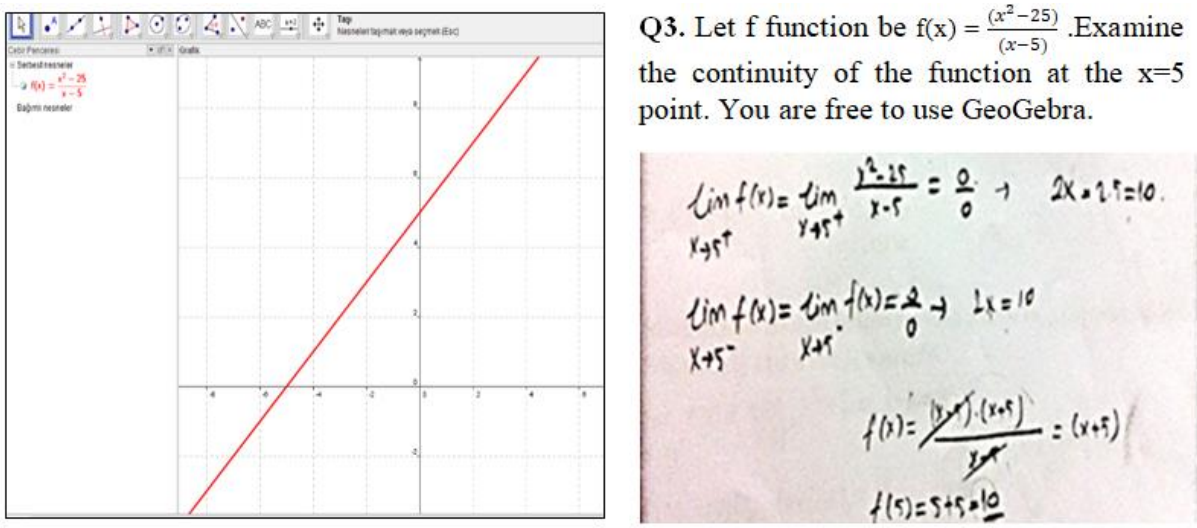


Figure 5. The image of the function in GeoGebra and ST3's answer

As seen in Figure 5, ST3 found a 0/0 uncertainty at the beginning, but afterwards they got the graph of the function in GeoGebra. The ST, who saw that the software drew a line on the graph, completed his solution shown on the right side of Figure 5. Therefore, ST3 used

GeoGebra for verification purposes. Although, unlike ST3, ST5 found the value and the limit of the function at five points without simplification and reached the correct result in this way. They stated that the graph is wrong in the software, and sometimes the DGS is wrong, and that the software may be mistaken.

3.2. The Use for Making Calculations

Some of the questions in the study were related to finding the value of the continuity. Some STs have tried to find the limits of the function directly by writing a function to GeoGebra because it is hard to find continuity by calculating directly. During this stage, they tended to use GeoGebra to make calculations. Figure 6 shows the response given by the participant, ST2.

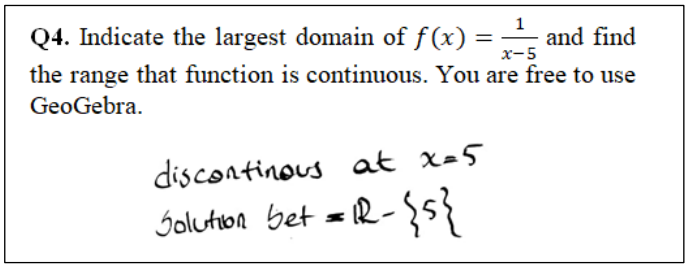


Figure 6. ST2's answer to the fourth question

In Figure 6, it is seen that the ST noted the interval that function is continuous by subtracting the value that made the function undefined. Here, ST2 first drew the graph using GeoGebra software and then determined the interval where the function was defined and continuous. Additionally, it can be said that ST2 had used the software effectively.

In some questions, the STs examined the continuity of the function without using the software. For example, the second question was to interpret the graph of a given function and to interpret the concepts of the continuity in a certain interval with the relation to the limit-continuity provided. In general, the STs had difficulties to comment on whether a given function would be continuous when the domain was not given. Some STs' responses were as follow:

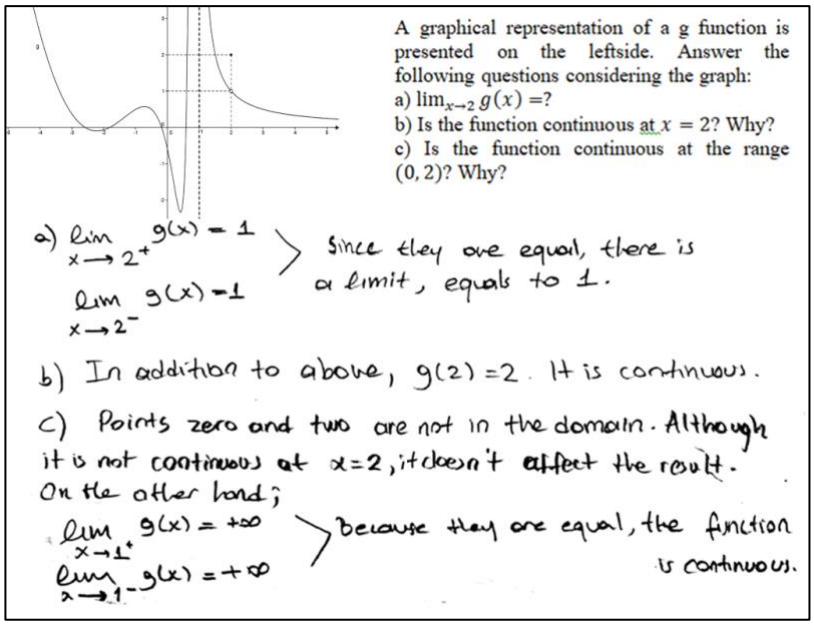


Figure 7. ST4's response to Question 2

Figure 7 shows ST4's answer to the second question. Here, the ST has expressed the relationship between the limit, continuity, and the value of the function at a given point clearly. In this context, ST4 seemed to construct the concept of the continuity quite well. On the other hand, ST6 had reached the same result. However, they reached the correct solution by looking at its neighboring reference point at x=2, and therefore, they used a different method than the other participants did. Similarly, the ST correctly solved the fifth question, as in Figure 7, without the need to use the software. ST4, on the other hand, answered the question incorrectly. When their response was analysed and detailed, it was seen that although the ST was good at interpreting the relation between the limit and the continuity, they were unsuccessful to make connection among the limit value and indefinability, as in Figure 7.

4. Discussion and Conclusion

This research was aimed to investigate the purpose of the use of GeoGebra software, which is a DGS for solving continuity problems - these are one of the calculus concepts of mathematics STs. The obtained results have showed some clues about the purpose of using the software, and at the same time it was found that the STs had some misconceptions about limit and continuity concepts.

In the first question of the data collection tool used within the scope of the research, the STs were given a function with domains and a set of rules, and they were asked to discuss the continuity of the function. When investigating their solution processes, it was remarkable that a large part of them wanted to draw a graph in GeoGebra instead of algebraically solving it. As Mastorides and Zachariades (2004) pointed out, since the concepts of limit and continuity are difficult concepts to understand, a direct algebraic inference method is complex for them, so they want to visually investigate the behavior of the function instead. This situation was interpreted that STs used the dynamic software for visualization purposes. Yet another finding was that some STs wanted to draw their chart during clinical interviews, especially before they solve the question. Another result in the study was similar to Alqahtani and Powell's (2006) approach to solving teachers' geometry problems, in the way of how teachers approach to the solution of the questions using the dragging feature of the technology. In other words, similar to their study, it was seen that some of the STs drew a graph of a given function when finding its continuity, and then they found an arbitrary point on the function and investigated the values of this point in different parts of the function. Therefore, the results obtained from STs using GeoGebra for the purpose of visualization were put into practice.

In the other question in the data collection tool, although the domain and the rule of the function were given, it was seen that the STs preferred to solve the question by drawing a graph on software instead of solving the question algebraically with another expression. In the literature, algebraically finding the limit and the continuity of the given functions are very common difficulties (Beery, 1975; Bridges, 2007; Clement, 2001; Keele, 2008; Nair, 2010; Williams, 1991). In this study, it was observed that STs who encountered similar situations benefited from the visualization function of the GeoGebra software by graphing the function. Thus, the STs found an opportunity of interpreting the given functions and the continuity by visualizing them through the software.

In this study, it was concluded that pre-service teachers used technology for visualization, verification and calculation purposes in solving questions related to continuity. Similarly, Doerr and Zangor (2000) found that teachers and students used graphic calculator for five purposes as computational tool, transformational tool, data collection and analysis tool, visualizing tool and controlling tool in order to make mathematics meaningful in their

lessons. It supports the results obtained from this study. Goos et al. (2000), in their study, aimed to restructure the roles of teachers and students in classes enriched with graphics calculators and overhead projection, found the roles of technology for teachers and students as “master, servant, partner and extension of self”. From this point of view, it can be said that different technological instructional materials are used for different purposes. It is thought that these purposes adopted by STs will guide researchers in the integration of technology into classes.

In the first question of the data collection tool used within the scope of the research, it was expressed that STs tended to draw graphs in a computer environment, since it was difficult to solve the problem algebraically. Although some participants were able to express the steps to be followed for the algebraic solution of the problem first, they did not reach the end by completing these steps with the paper-pencil method. For example, one of the STs expressed the steps to be taken in writing, but even though they tried to draw the graph on paper, they stated that they were unable to and that they were not sure about their result. They went on to check their answers by drawing a graph with the help of the GeoGebra software. Similar participatory behaviors had also been observed in Hollebrands and Okumuş's (2017) study investigating teacher candidates’ process of solving the minimum distance between two opposing corners (the object’s diagonal line) of a cube and of a rectangle prism with the help of the DGS. Here, STs first made some estimation for the desired point in the DGS, and then tested whether the inference was correct with the software’s help. Taking this into consideration, it can be said that the STs first hypothesized, tested their inferences, then, used DGS in the last step to verify/prove them. Similar examples are found in the literature. For example, Monaghan, Sun and Tall (1994) found that the use of the Derive Program from Computer Algebraic Systems in the experimental study of the effect of teaching the concept of limit is used by the students to control their program solutions. In another study, Açıkgül and Aslaner (2015) investigated geometric space problems solved by STs using the paper-pencil method and DGS, and at the end of the research when the two processes were compared, it was stated that the STs had hypothesized, tested and generalized differently using the paper-pencil method vs. using the software. Similar to these studies in the literature, the results obtained from the present study have shown that STs can be considered to typically use DGS deductions as evidence for verifying their answers to the questions.

Although there was no problem in the scope of the research, another finding of the study was that a ST was blind to the program. Even though the teacher verbally said that the function at the given point had $\frac{0}{0}$ uncertainty, after drawing the function in GeoGebra, they saw that the point of interest was included in the domain and range of the corresponding point because of openness of the software, and that the function was defined at that point. As a consequence of this situation, it can be said that software may also be mistaken. Another result obtained from investigated STs' answers was that they used the DGS as a means of calculation. Some of the questions in the study were also related to the existence of a continuity at a point in a function. Since some of the student teachers thought that continuity of a function was difficult to calculate, they typed the expression of the function into GeoGebra and directly calculated the limits of these functions by means of the software.

5. Limitations

Although the results obtained from this study contain conclusions for the purpose use of the GeoGebra software, there are important limitations to be considered. The most important limitation of the study is that it was carried out with a small number of participants. Although the study does not aim for a generalization of its results, it should be taken into consideration that different results can be obtained in the wider participant group. Second, the results are

limited to the continuity questions in the data collection tool. Various purposes can be achieved in different calculus subjects. Similar designs can be made for different topics and concepts in future research.

6. Conflict of Interest

The authors declare that there is no conflict of interest.

7. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Açıkgül, K., & Aslaner, R. (2015). Investigation of TPACK confidence perception of prospective elementary mathematics teachers. *Erzincan University Journal of Education Faculty, 17*(1), 118-152.

Açıkyıldız, G. (2013). *Mathematics candidate teachers' understanding of derivative concept and their mistakes* (Unpublished master's thesis). Karadeniz Technical University, Trabzon.

Alqahtani, M. M., & Powell, A. B. (2016). Instrumental appropriation of a collaborative, dynamic-geometry environment and geometrical understanding. *International Journal of Education in Mathematics, Science and Technology*, *4*(2), 72-83.

Aydın, M. & Köğce, D. (2008). Preservice teachers' perceptions of "equation and function" conceptions. *Yüzüncü Yıl University Eğitim Fakültesi Dergisi, 5*(1), 46-58.

Baki, A. (2002). *Öğrenen ve öğretenler için bilgisayar destekli matematik*. Trabzon: Ceren Yayın Dağıtım.

Baki, A. (2006). *Kuramdan uygulamaya matematik eğitimi* [Mathematics education from theory to practice]. Trabzon: Derya Kitabevi.

Barrera-Mora, F. & Reyes-Rodrigues, A. (2013). Cognitive processes developed by students when solving mathematical problems within technological environments. *The Mathematics Enthusiast*, *10*(1), 109-136.

Baştürk, S., & Dönmez, G. (2011). Investigating mathematics student teachers' pedagogical content knowledge in the context of knowledge of assessment. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, *12*(3), 17-37.

Beery, S. K. (1975). *The effect of teaching continuity via open intervals and of approaching the limit of a function as a generalization of continutiy*. Unpublished PhD Dissertation, The Florida State University.

Bezuidenhout, J. (2001). Limits and continuity: Some conceptions of first-year students. *International Journal of Mathematical Education in Science and Technology*, *32*(4), 487-500.

Biza, I., & Zachariades, T. (2007). Using dynamic geometry to introduce calculus concepts: CalGeo and the case of derivative. In *Proceedings of the Conference of the British Society for Research into the Learning of Mathematics.* (pp. 7-12). Sheffield, UK, BSLRM.

Breidenbach, D., Dubinsky, E., Hawks, J., & Nichols, D. (1992). Development of the process conception of function. *Educational Studies in Mathematics*, *23*(3), 247-285.

Bridgers, L. C. (2007). *Conceptions of continuity: an investigation of high school calculus teachers and their students*. (Unpublished doctoral dissertation). Syracuse University, Hamilton College.

Camargo, L., Samper, C., & Perry, P. (2007). Cabri's role in the task of proving within the activity of building part of an axiomatic system. In D. Pitta-Pantazi & G. Philippou (Eds.), *Proceedings of the fifth conference of the European Society for Research in Mathematics Education – CERME-5* (pp.571-580). Larnaca, Cyprus: CERME.

Choi, K. S. (2010). Motivating students in learning mathematics with GeoGebra. *Annals Computer Science Series*, *8*(2), 65-76.

Clement, L. (2001). What do students really know about functions? *Mathematics Teacher, 94*(9), 745-748.

Cornu, B. (1991). Limits. In D. Tall (Eds.), *Advanced mathematical thinking* (pp.153-166). Dordrect, The Netherlands: Kluwer Academic.

Çekmez, E. (2013). *The effect of using dynamic mathematics software on students understanding of the geometric meaning of the derivative concept* (Unpublished doctoral dissertation). Karadeniz Technical University, Trabzon.

Çekmez, E. (2016). The potential of dynamic geometry software in bridging the link between experimental verification and formal proof. *Turkish Journal of Computer and Mathematics Education, 7*(1), 24-34.

Çekmez, E. & Güler, M. (2019). One problem, multiple solutions: The contribution of DGS to heuristics in the problem-solving process. *Journal of Computers in Mathematics and Science Teaching, 38*(3), 231-247.

Diković, L. (2009). Applications GeoGebra into teaching some topics of mathematics at the college level. *Computer Science and Information Systems*, *6*(2), 191-203.

Doerr, H. M., & Zangor, R. (2000). Creating meaning for and with the graphing calculator. *Educational Studies in Mathematics*, *41*(2), 143-163.

Fey, J. T., Hollenbeck, R. M., & Wray, J. A. (2010). Technology and the mathematics curriculum. In B. J. Reys, R. E. Reys, & R. Rubenstein (Eds.), *Mathematics curriculum: Issues, trends, and future directions* (pp. 41–49). Reston, VA: National Council of Teachers of Mathematics.

Filiz, M. (2009). *The effect of using Geogebra and Cabri geometry II dynamic geometry softwares in a web-based setting on students' achievement.* Unpublished Master's Thesis, Karadeniz Technical University, Trabzon.

Goos, M., Galbraith, P., Renshaw, P., & Geiger, V. (2000). Reshaping teacher and student roles in technology-enriched classrooms. *Mathematics Education Research Journal*, 12(3), 303–320.

Gough, J. (2007). Conceptual complexity and apparent contradictions in mathematics language. *Australian Mathematics Teachers, 63*(2), 8-16.

Güven, B. (2006). *Characterizing student mathematics teachers' levels of understanding of spherical geometry* (Unpublished doctoral dissertation). Karadeniz Technical University, Trabzon.

Healy, L., Hoyles, C., & Laborde, J. M. (2001). Teaching and learning dynamic geometry. *Editorial in the special issue on the subject in the IJCML*, *6*(3).

Hohenwarter, M. & Fuchs, K. (2004). Combination of dynamic geometry, algebra and calculus in the software system GeoGebra. In: *Proceedings of Computer Algebra Systems and Dynamic Geometry Systems in Mathematics Teaching Conference.* Online at: https://archive.geogebra.org/static/publications/pecs_2004.pdf

Hollebrands, K., & Okumus, S. (2017). Prospective mathematics teachers' processes for solving optimization problems using Cabri 3D. *Digital Experiences in Mathematics Education, 3*(3), 206-232.

Hoyles, C. & Jones, K. (1998). Proof in dynamic geometry contexts. In: C. Mammana and V. Villani (Eds), *Perspectives on the Teaching of Geometry for the 21st Century*. (pp. 121-128). Dordrecht: Kluwer.

Karakuş, F., & Peker, M. (2015). The effects of dynamic geometry software and physical manipulatives on pre-service primary teachers' van Hiele levels and spatial abilities. *Turkish Journal of Computer and Mathematics Education*, *6*(3), 338-365.

Keele, L. (2008). *Theories of continuity and infitesimals four philosophers of the nineteenth century*, (Unpublished doctoral dissertation). Indiana University.

Kepçeoğlu, İ. (2010). *The effect of using geogebra in teaching limit and continuity on pre-service teachers' academic achievement and conceptual learning. (Unpublished master's thesis).* Marmara University, İstanbul..

Kuzle, A. (2012). Investigating and communicating technology mathematics problem solving experience of two preservice teachers. *Acta Didactica Napocensia*, *5*(1), 1-10.

Lee, H., & Hollebrands, K. (2008). Preparing to teach mathematics with technology: An integrated approach to developing technological pedagogical content knowledge. *Contemporary Issues in Technology and Teacher Education*, *8*(4), 326-341.

Maddux, C. D. & Johnson, D. L. (2005). C*lassroom Integration of Type II Uses of Technology in Education.* New York: The Haworth Press.

Mariotti, M. A. (2000). Introduction to proof: The mediation of a dynamic software environment. *Educational Studies in Mathematics*, *44*, 25-53.

Marrades, R., & Gutiérrez, Á. (2000). Proofs produced by secondary school students learning geometry in a dynamic computer environment. *Educational Studies in Mathematics, 44* (1-2), 87-125.

Mastorides, E. & Zachariades, T. (2004). Secondary Mathematics Teachers' Knowledge Concerning the Concept of Limit and Continuity. *Proceedings of the 28th Conference of the International Group for the Psychology of Mathematics Education.* Vol 4 pp 481–488.

Monaghan, J., Sun, S., & Tall, D. (1994). Construction of the Limit Concept with a Computer Algebra System, *Proceedings of the Eighteenth* 74 *Conference for the Psychology of Mathematics Education.* Lisbon: Program Committee of the 18th PME Conference.

Nair, G. S. (2010). *College students' concept images of asymptotes, limits, and continuity of rational functions* (Unpublished doctoral dissertation). The Ohio State University.

NCTM. (2000). *Principles and standards for school mathematics*. Alexandria, VA: National Council of Teachers of Mathematics.

Olive, J., Makar, K., Hoyos, V., Kor, L. K., Kosheleva, O., & Sträßer, R. (2010). Mathematical knowledge and practices resulting from access to digital technologies. In C. Hoyles & J.- B. Lagrange (Eds.), Mathematics Education and Technology-Rethinking the Terrain (pp. 133–177). Springer US. Retrieved from http://link.springer.com/chapter/10.1007/978-1- 4419-0146-0_8

Rowley, J. (2002). Using case studies in research. *Management research news*, *25*(1), 16-27.

Rösken, B., & Rolka, K. (2007). Integrating intuition: The role of concept image and concept definition for students' learning of integral calculus. *The Montana Mathematics Enthusiast, 3*, 181-204.

Schoenfeld, A. H. (1992). Learning to think mathematically: Problem solving, metacognition, and sense making in mathematics. *Handbook of research on mathematics teaching and learning.* NewYork:Macmilan.

Seldon, J., Seldon, A., & Mason, A. A. (1994). Even good calculus students can't solve nonroutine problems. In J. J. Kaput & E. Dubinsky (Eds.), *Research issues in undergraduate mathematics learning: Preliminary analyses and results*. MAA Notes Number 33 (pp. 19–26). Washington, DC: Mathematics Association of America.

Tall, D. (2002). The psychology of advanced mathematical thinking. In *Advanced mathematical thinking* (pp. 3-21). Springer, Dordrecht.

Tall, D., & Vinner, S. (1981). Concept image and concept definition in mathematics with particular reference to limits and continuity. *Educational studies in mathematics*, *12*(2), 151-169.

Vinner, S., & Dreyfus, T. (1989). Images and definitions for the concept of function. *Journal for research in mathematics education*, *20*(4), 356-366.

Wenglinsky, H. (1998). *Does it compute? The relationship between educational technology and student achievement in mathematics* [Adobe Digital Editions version]. Retrieved from https://www.ets.org/Media/Research/pdf/PICTECHNOLOG.pdf

Williams, S. (1991). Models of limit held by college calculus students. *Journal for Research in Mathematics Education, 22*(3), 219-236.

Yin, R. K. (2009). *Case study research: Design and methods (applied social research methods).* London and Singapore: Sage.

Khan, S. (2020). Why and how to use a poem in ELT classroom. *International Online Journal of Education and Teaching (IOJET), 7*(3). 803-809. https://iojet.org/index.php/IOJET/article/view/807

Received: 03.01.2020
Received in revised form: 20.05.2020
Accepted: 26.05.2020

WHY AND HOW TO USE A POEM IN ELT CLASSROOM

Review Study

Saima Khan

Aligarh Muslim University, India

saima12amu@gmail.com

Saima Khan holds a Master's degree in English Language Teaching from Aligarh Muslim University, India. Her areas of research interest include computer assisted language learning/teaching, learning disabilities, literature, and applied linguistics. She is a member of Elt@I (an associate of IATEFL, UK).

WHY AND HOW TO USE A POEM IN ELT CLASSROOM

Saima Khan

saima12amu@gmail.com

Abstract

Besides numerous positive transformations and unique opportunities in language pedagogy, the post-method era brought with itself several challenges for language teachers. After intensive research and empirical studies, the use of literature was welcomed in ELT classrooms. But the question arises as to what extent and in what ways does literature support language learning? In an attempt to answer these questions and fill this lacuna, the present paper highlights ways in which literature assist language teachers. Moreover, the paper presents resourceful strategies to frame exercises using poems for ELT classroom. Shakespeare's *Sonnet 65* is used to illustrate some vital themes explored in this paper. In spite of the observed difficulty level of the sonnet and the layers of meaning it encapsulates, dynamic and engaging activities can be crafted out of this poem. Since the elements discussed in this study are ubiquitous to the genre of poetry, therefore the use of the presented methodology would also be universal.

Keywords: Teaching methodologies, literature, sonnet, language teaching, ELT

1. Introduction

By nature, humans feel more affinity towards things that draw their attention and thus are likely to enjoy such things better. In a language teaching setting, literature is one of the means to lure the learners. To put it simply, literature make language more palatable. Different genres of literature serve this purpose, be it prose, verse or drama — fiction or non-fiction. Each of them has the tendency to engage and motivate students more profoundly and at the same time open avenues to improve multiple language constructs. They are a good source to provide supplementary materials for grammar, vocabulary as well as translation (Liaw, 2001 as cited in Khatib, Hossein, & Rahimi, 2012). Besides serving students, it also serves teachers in making their lessons holistic, thus, giving a better learning outcome. "Novels, short stories, fables, poems, and plays are to be used for language teaching, as a literary experience is also a language experience" (Arthur, 1968).

Language teaching classrooms have been indifferent towards the use of literature as a teaching methodology (Carter, 2007) since the downfall of the grammar-translation method. Early approaches focused on the contextual use of language and so the syllabi were functional/ notional in nature (Brumfit, 1985). Thus, there was no scope for creativity in language teaching.

The dawn of the communicative teaching approach marked the revised consideration of literature and its various use to integrate it into language curriculum (Bobkina & Dominguez, 2014). But still, it was often claimed that literary texts shift the focus from actual language teaching (Edmondson, 1997). As a result, this assimilation has been discouraged due to the complex nature of literary text having stylistic, lexical, structural as well as cultural density (McKay, 1982; Savvidou, 2004). For decades**,** the debate revolved around this issue of emphasizing the role of literature in language classroom. Eventually, its significance received consideration (Amer, 2003; Erkaya, 2005; Maley, 2001; McKay, 2001), but its praxis still needs substantial support (Lima, 2005).

1.1. Purpose of the Study

The reluctance of English language teachers to the use of literature in classroom teaching continues due to the lack of innovative ideas of incorporating literary texts effectively. Thus, the objective of this study is to recommend viable ways of using literature in English teaching classrooms. Along with providing a comprehensive rationale for teaching each language construct, the study aims to exemplify methods of using a poem in ELT classroom for stimulating teaching and learning process. For this purpose, the study uses Shakespeare's *Sonnet 65* as a model to craft exercises and suggestions for language skill development. A similar prototype can be applied for framing exercises from other texts, as the elements discusses in this paper are universal throughout the genre of poetry.

1.2. Research Questions

This paper addresses the following research questions:

- How to use poem in ELT classroom?
- What language constructs can be taught with a poem?
- What is the extent to which classic literary texts address language teaching needs?

1.3. Methodology

To answer these questions the present study adopts explanatory approach with descriptive research method.

2. Using Poetry for Language Teaching

More precisely, poetry has been abandoned by language teachers (Denman, 1988) as it is seen as a complex literary component and also due to the lack of methodologies to present it to language learners (Štulajterová, 2010). Although, "poetry is the genre most English teachers seem least comfortable with" (Lockward, 1994 p.65), but this genre when brought into a language classroom, becomes a massive repertoire of several intricate elements essential for any language course. Saraç (2003) elucidates a number of advantages for using poetry for language teaching. He explains that besides assisting the advancement of aesthetics among the learners, literature contribute to educational benefits as well by providing opportunities for considering novel usage of grammar, syntax, text organization as well as vocabulary. It also familiarizes learners with literary devises in a very casual manner (as cited in Hismanoglu, 2005). Moreover, a poem obliges learners to integrate language skills in order to make meaning of the text. It makes them adapt reading strategies and practice them to deal with peculiar features of verse, while broadening their intellect along with developing appreciation for foreign language (Nasr, 2001).

A key argument here is what Reeves (1963) points out – an interplay of four elements while teaching a poem – the learners, the poem to be taught, methods employed and importantly the role of the teacher (as cited in Khansir, 2012). Thus, teachers need to be sagacious enough while dealing with a poem. They must equip themselves with innovative methods and strategies to frame engaging tasks, parallel to the competence of the learners while keeping intact the true nature of the poem as well.

Following are the elements, some of which are exemplified through William Shakespeare's '*Sonnet 65*' – Since brass, nor stone, nor earth, nor boundless sea…, that can be implemented in ELT classroom. Such a framework could possibly facilitate the use of literature in a more feasible and motivating way.

2.1. Pronunciation

Phonemic awareness is necessary for correct pronunciation. Intelligibility massively relies on how words are pronounced. Since, a poem is meant to be 'read', this crucial aspect of language can be brought into focus. Making the students narrate a poem can act as an excellent platform to work on their articulation of different phonemes. It acts as a means to promote understanding of the "phonics of English" (Collins, 2008). In the poem words like 'Wrackful' /rækful/, 'battering' /ˈbatərɪŋ/, 'impregnable' /ɪmˈprɛgnəbl/ or 'siege' /siːdʒ/ could be challenging for students. Such words can be helpful in making them aware of silent letters, correct use of /ŋ/, the occurrence of syllabic consonants as well as in making a distinction between spelling and pronunciation. Also, students can be made to work on exercises of syllable division along with transcription and pronunciation.

2.2. Vocabulary

Teaching of vocabulary is a crucial aspect of language literacy as it makes up around 70% to 80% of comprehension (Nagy & Scott, 2000 and Pressley 2002). Moreover, teaching vocabulary efficiently is a significant aspect of developing successful readers. Greenwood (2004) pertinently states, "There is a great divide between what we know about vocabulary instruction and what we (often, still) do" (p. 28). But explicit vocabulary instruction in the CLT context is often not possible, especially with adult learners. Here, using poems can work as a means to enrich vocabulary. They are a great source for familiarizing students with an extensive vocabulary and its usage (Povey, 1972 as cited in McKay, 1982). Asking students to make out meaning of the words from the context or by using supplementary materials can help them to expand their knowledge of vocabulary. Words like – wrackful, battering, siege, impregnable, can help in building students' vocabulary as these words are rarely encountered in other texts that are used in ELT classrooms.

2.3. Promoting Language Skills

Poetry not only serves as a model of language, but also acts as a medium for improving language skills, viz. listening, speaking, reading, and writing because it engages students' both reception and expression, thus, serving as a catalyst in the development of students' language skills. As asserted by Hedge (2000), poems work as authentic material and can be used to enhance the receptive skill of reading. Sonnets can provide an excellent opportunity for developing intensive reading skills as well as other sub-skills, like inferencing, summarising, and so on. Moreover, poems can also be used to build writing skills by making students rewrite, report or translate the poem (Sheila, Hessler & Konrad, 2007). Even the use of nursery rhymes like, 'Humpty Dumpty' or 'Jack and Jill' and asking students to write a report of the incidents described in the poem could be an engaging task for them.

2.4. Prosody

A poem can be an effective way and a good resource for teaching rhythm, intonation, stress, and meter. The frequent repetition in a poem enables students to pick up such language patterns. 'At every reading of a poem, though it may have been familiar from early childhood, some hitherto hidden delicacy of rhythm and intonation may be revealed' (Hall 1989 p. 68). Shakespeare's sonnets are rich in meter and therefore, can be very helpful for teachers while preparing their lessons. They can familiarise students with rhyme scheme and meter and then ask them to identify in the following poem.

Example: *Rhyme Scheme-*

Since brass, nor stone, nor earth, nor boundless sea	a
But sad mortality o'er-sways their power,	b

How with this rage shall beauty hold a plea,	a
Whose action is no stronger than a flower?	b
O, how shall summer's honey breath hold out	c
Against the wrackful siege of batt'ring days,	d
When rocks impregnable are not so stout,	c
Nor gates of steel so strong, but time decays?	d
O fearful meditation! where, alack,	e
Shall Time's best jewel from Time's chest lie hid?	f
Or what strong hand can hold his swift foot back?	e
Or who his spoil of beauty can forbid?	f
O! none, unless this miracle have might,	g
That in black ink my love may still shine bright.	g

Stress and Intonation

For international intelligibility, correct placement of stress and appropriate intonation becomes prerequisite. Students in the EFL/ESL setting should be made to use accurate stress along with proper intonation while narrating poems. Teachers can act as a good role model for instilling vocal expertise in students. Students can also be made to work on exercises of syllable division and word stress placement of words like 'Wrackful' /rækful/, 'battering' /ˈbatərɪŋ/, 'impregnable' /ɪmˈprɛgnəbl/ or 'mediation' /miːdɪˈeɪʃ(ə)n/.

2.5. Deviant Language

Poems also provide learners an exposure to unique sentence structure, variety of forms and novel ways of linking ideas (Riverol, 1991). Since a poem often uses deviant language, students would get a chance to explore this distinctive aspect of language which otherwise is not possible. The use of poems for language learning in this sense is often questioned, as Lasar (1993) points out, "If poetry's deviant language, what's the point of using it with language learners?". The fact that 'deviance' of language is against the 'correct rules' of language, thus the knowledge of deviancy indirectly reinforces learning of correct language use (Zyngier, 1994). The knowledge and use of such language make students grow up as better writers in the future.

2.6. Figurative Language

A poem by its very nature is often full of many literary devices. So, using a poem in a language classroom can be a good way to introduce students to the figurative language. Such knowledge would make the learners proficient in language — spoken, written and in its comprehension. Although, the foremost reason for the exclusion of poetry from language curriculum is the use of figurative language in it, which is often considered as being vague and imprecise (Zelenkova, 2004). What is important here is the methodology through which it should be presented in the ELT classroom and the role assigned to the teacher and the students. An eclectic approach works best situations with known and unknown and where teachers have the freedom to employ different methods of teaching (Ali, 1981).

Example- With the help of the above-mentioned poem, ELT teacher can first explain the literary devices and then make students engage in interesting activities (as peer work or individual tasks) to locate those literary devices in the poem:

- Alliteration- ‘steel so strong’
- Personification- Beauty is personified by giving it the human attribute of ‘holding a plea’ and ‘action’.

  Time is personified by attributing it to the quality of having a 'foot' and using 'his' as its referential pronoun.
- Assonance- ‘hand can’
- Consonance- ‘hand hold his’
- Antithesis- ‘How with this rage shall beauty hold a plea,

  Whose action is no stronger than a flower?’

2.7. Intention and Expectation

Another important yet often ignored aspect is the notion of the author's intention and the reader's expectations. Though poetry encapsulates in itself cultural vagueness (Zelenkova, 2004) which is often challenging to adopt in language classrooms, it can do wonders in teaching students this knack of writing. The basis of any successfully written piece is the accuracy of meaning communicated through words. Students can be taught to be more profound in expressing their intended thoughts yet maintaining brevity and clarity, and who can better serve this purpose than Shakespeare’s sonnets.

3. Conclusion

Since the inception of the post-method era, there is an exceeding demand on language instructors to present novel methodologies and distinctive ways of using language learning materials in ELT classroom. The use of literature has indeed provided utmost support in this regard. As M.B. Willmott (1979) puts forth, “Literature demonstrate language at work…it also helps the pupils and stimulates linguistic responses of various kinds. English teachers not only present literature, they also exploit it, because it can generate language as well as exemplify it” (p.57). As highlighted above, poems especially sonnets could also be a catalyst to develop language skills resulting in advancement of competence as well as performance.

This paper suggests framework for using poem to teach various aspects of language development ranging from pronunciation, vocabulary to even the relation between author’s intention and reader’s expectation. Here, *Sonnet 65* is used for demonstrating pedagogically sound ways for ELT teachers to practice for classroom teaching. A similar framework could be applied for other poems especially sonnets for crafting innovative tasks. Thus, this paper attempts to facilitate the use of classic literary texts in ELT classroom. Every piece of literature that comes into ELT classroom should be closely analysed and made to use to the fullest as it encapsulates in itself immense nuances to work with, keeping learners motivated and engaged.

4. Conflict of Interest

The author declares that there is no conflict of interest.

5. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Alber-Morgan, S., Sheila R., Hessler, T., & Konrad, M. (2007). *Teaching writing for keeps.* West Virginia: West Virginia University Press.

Ali, A.M. (1981). *Teaching English to Arab students*. Jordan: Al-Falah House.

Amer, A. A. (2003). Teaching EFL/ESL literature. *The Reading Matrix 3*(2), 63-73.

Arthur, B. (1968) Reading literature and learning a second language. *Language Learning 18*(3-4), 199-210.

Bobkina, J. & Dominguez, E. (2014). The use of literature and literary texts in EFL classroom; between consensus and controversy. *International Journal of Applied Linguistics and English Literature, 3*(2), 248-260.

Brumfit, C. (1985). *Language and literature teaching: From practice to principle.* Oxford: Pergamon Press.

Carter, R. (2007). Literature and language teaching 1986-2006: A review. *International Journal of Applied Linguistics, 17*(1), 3-13.

Collins, R. (2008). Using writing activities with young EFL learners. In Proceedings from *International Conference on ELT in Primary Education*. Bratislava, SL: Comenius University.

Denman, G. (1988). *When you've made it your own: Teaching poetry to young people.* Portsmouth, NH: Heinemann.

Erkaya, O. R. (2005). Benefits of using short stories in the EFL context. *Asian EFL Journal, 8,* 1-13.

Greenwood, S (2004). Content matters: Building vocabulary and conceptual understanding in the subject areas. *Middle School Journal, 35*(3), 27-34.

Hall, L. (1989). *Poetry for life*. London: Cassell Education Ltd.

Hedge, T. (2000). *Teaching and Learning in the language Classroom*. Oxford: Oxford University Press.

Hismanoglu, M. (2005). Teaching English through literature. *Journal of Language and Linguistics Studies, 1*(1), 53-66.

Khansir, A. A. 2012. Teaching poetry in the ELT classroom. *International Review of Social Sciences and Humanities, 3*(1), 241-245.

Khatib, M., Hossein, A., & Rahimi (2012). Literature and language teaching, *Journal of Academic and Applied Studies*, *2*(6).

Lasar, G. (1993). *Literature and language teaching*. Cambridge: Cambridge University Press.

Lima, C. (2005). Is the rest silence...?, *IATEFL Voices, 186*, 4-5.

Lockward, D. (1994). Poets on teaching poetry. *English Journal, 83,* 65 -70.

Maley, A. (2001) Literature in the language classroom. In R. Carter & D. Nunan (Eds.), *The Cambridge Guide to Teaching English to Speakers of Other Languages.* Cambridge: Cambridge University Press.

McKay, S. (2001) Literature as Content for ESL/EFL. In M. Celce-Murcia (Ed,), *Teaching English as a Second or Foreign Language.* Heinle & Heinle.

McKay, S. (1982). Literature in the ESL Classroom. In C. Brumfit & R. Carter (Eds.), *Literature and Language Teaching* (pp. 191-198). Oxford: Oxford University Press.

Nagy, W. E., & Scott, J. A. (2000). Vocabulary processes. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (pp. 269-284). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Nasr, N. (2001). The use of poetry in TEFL: Literature in the new Lebanese curriculum. CAUCE, *Revista de Filologia y su Didactica, 24*, 345-363

Pressley, M. (2002). Effective beginning reading instructions. *Journal of Literacy Research*, *34*(2), 165-188.

Savvidou, C. (2004). An integrated approach to the teaching of literature in the EFL classroom. The Internet TESL Journal, *12*.

Štulajterová, A. (2010). Using creative writing in developing language proficiency. *Humanising Language Teaching, 5*.

Willmott, M. B. (1979). English literature and literature in English: A question of balance. In E. Ubahakwe (Ed.), *The teaching of English studies: Readings for colleges and universities*. Ibadan: Ibadan University Press.

Zelenkova, A. (2004). Creative approaches to developing cultural awareness in ELT. In *Is creativity the key to success in an EFL Classroom?* Conference proceedings (pp. 93-97). Banska Bystrica: Matej Bel University.

Zyngier, S. (1994). Literature in the EFL Classroom: Making a Comeback, PALA. *The Poetics and Linguistics Association*. Universidade Federal do Rio de Janeiro, Colgio Pedro, Occasional Papers No. 6

Çetin, A. (2020). Examining project-based STEM training in a primary school. *International Online Journal of Education and Teaching (IOJET), 7*(3). 811- 825. https://iojet.org/index.php/IOJET/article/view/761

Received: 11.10.2019
Received in revised form: 21.05.2020
Accepted: 21.05.2020

EXAMINING PROJECT-BASED STEM TRAINING IN A PRIMARY SCHOOL

Research Article

Abdullah Çetin

abdcetin46@gmail.com

Kahramanmaraş Sütçü İmam University

Dr. Abdullah ÇETİN currently works as an assistant professor at the Division of Curriculum and Instruction, Kahramanmaraş Sütçü İmam University, Turkey. He has published articles on teacher training, curriculum, science teaching and education of the gifted students. He has been lecturing graduate and undergraduate courses on these subjects.

EXAMINING PROJECT-BASED STEM TRAINING IN A PRIMARY SCHOOL

Abdullah Çetin

abdcetin46@gmail.com

Abstract

This research primarily aims to examine project-based STEM training implemented in a state primary school in Turkey regarding teachers' and students' views. The phenomenological design, which is one of the qualitative research designs, was exclusively adopted in the study. The research sampling consisted of 18 students and 2 teachers working at a state primary school located in an Anatolian province during the 2017-2018 academic year. The research data were collected through interviews some of which were voice-recorded and analyzed through content analysis. Research findings revealed that successful implementation of STEM practices necessitates a systematic working plan consisting of preparation, implementation and evaluation stages. Besides, it was revealed that STEM training practices facilitate unearthing students' talents and developing their critical thinking and problem-solving skills as well as manual dexterity. The research findings also suggested that these practices increase cooperation among students, help them develop a positive attitude towards the lesson and behave more carefully during the classes. Nonetheless, various problems such as inadequate space, teaching materials and group-work driven problems were observed during STEM practices. Based on the research findings, it is suggested that STEM training should be separately implemented without being included in a single discipline.

Keywords: STEM, Science, Technology, Engineering, Mathematics

1. Introduction

21st century individuals are expected to have well-developed thinking and problem solving skills, to know when, how and where to use their knowledge, to be technologically literate, to make quick and accurate decisions, to work in groups, to establish effective communication, to have lifelong learning skills and to come up with a product (Akgündüz et al., 2015; Duban & Ay, 2016; Ministry of National Education [MoNE], 2018; Ocak, 2010). It is well-documented that STEM (Science, Technology, Engineering and Math) training plays an important role in training of individuals equipped with these skills (Duban & Ay, 2016). Therefore, the countries aiming to raise a generation equipped with high level skills adopt STEM training (Bybee, 2010). The idea that STEM training will be a solution to the current problems of the world makes this concept very popular and important (Labov, Reid, & Yamamoto, 2010).

Although the history of STEM training dates back to the 1990s (Bybee, 2010), it has been extensively investigated since 2001 (Breiner, Harkness, Johnson & Koehler, 2012). Furthermore, it has become one of the most debated issues in the international area (Kennedy & Odell, 2014; Labov et al., 2010). This is attributed the increasing popularity of the belief that science and technology will make significant contributions to solving the current problems such as climate change, population growth and the problems related to energy, water, health,

agriculture and environment (Thomas & Watters, 2015). In addition, the fact that modern economic organizations need qualified researchers and technical staff is another factor that enables STEM training to be brought to the agenda in international context (Kennedy & Odell, 2014).

STEM education involves teaching the separate disciplines of science, mathematics, technology and engineering with an interdisciplinary approach and as one cohesive entity (Akgündüz et al., 2015; Breiner et. al., 2012; Gonzalez & Kuenzi, 2012). Instead of isolation of science, technology, engineering and mathematics from each other, STEM training emphasizes original production and learning activities by employing research, design, problem solving, teamwork and communication skills (Duban & Ay, 2016). It aims to realize learning from a holistic perspective by associating a unit or course with examples from real life problems (Bozkurt, 2014; Smith & Karr-Kidwell, 2000). It can be carried out in all educational processes from formal to informal learning environments, from kindergarten to doctorate (Altunel, 2018; Gonzalez & Kuenzi, 2012; MoNE, 2018). As a result, students can learn beyond memorization and put the acquired knowledge into real-life practices, improve their problem-solving skills, learn to work together, wonder and come up with products.

STEM education which is supported in many countries especially in the USA, Korea, China and the UK (Yıldırım, 2016) has gained significance in Turkey in recent years (Herdem & Ünal, 2018). Initial studies about STEM have been conducted by Hacettepe University and İstanbul Aydın University. Both universities founded their own STEM training centers (Akgündüz et al., 2015). Subsequently, many studies have been conducted with a focus on teacher training and program design related to STEM training at different universities (Kızılay, 2017). Besides, the MoNE General Directorate of Educational Innovation and Technology (YEĞİTEK) has been the representative of Scientix Project carried out by European Schoolnet (European Schoolnet) since 2014. Within the scope of the project, YEGITEK organizes STEM training workshops for teachers working in STEM branches in secondary and vocational and technical education schools to develop STEM projects and create an environment to share project ideas (MoNE, 2018). In addition to these initiatives, STEM centers have been established with the support of different universities and provincial directorates of MoNE. These centers provide the opportunity to extend STEM training and research in this field. At the same time, these centers can play an active role in teacher education, in-service teacher training and the integration of STEM subjects into the curriculum (Çepni, 2018).

Dugger (2010) advocates that STEM training is conducted in four ways. The first one involves teaching each discipline separately at school. This is defined as traditional STEM. In the second one, one or two disciplines are emphasized (SteM). The inability to meet the necessary standards for T and E of STEM has highlighted this method in STEM programs. Third, STEM is taught by integrating one STEM discipline into the other three (M; S-T-E). This is mostly in the form of integrating engineering into science, technology and mathematics courses with classroom engineering practices. In the fourth one, STEM training is conducted in an integrated manner by linking all four disciplines with an interdisciplinary approach. STEM schools established in the USA can be given as an example of this teaching method.

The review of the relevant literature indicates that STEM programs have been developed in different countries; however, it has resulted in diversity in practice since no consensus has been reached on the meaning of STEM (Akgündüz et al., 2015; Çepni, 2018). It is also seen that the studies have been mostly conducted on science and mathematics integration, and engineering practices and coding education (Çepni, 2018). In this context, the 2018 curriculum revision in Turkey has facilitated the integration of such new areas as coding and robotics into education (Ulutan, 2018). STEM issues were arranged as science, engineering and

entrepreneurship practices in the 2018 Science Curriculum in Turkey. Accordingly, a small number of outcomes that require STEM training were integrated into the units across the curriculum (Seren & Veli, 2018). According to the instructions in the section of Science, Engineering and Entrepreneurship Practices, students are expected to carry out practices throughout the year and to exhibit their products during the science festival to be held at the end of the year (Bahar, Yener, Yılmaz, Emen & Gürer, 2018; MoNE, 2018). Although the 2018 Science Curriculum contains some explanations and outcomes regarding STEM, there are still uncertainties about STEM training (Bahar et al. 2018).

STEM training is essential for countries to become leaders in science and technology, to develop economically and to increase their competitiveness (MoNE, 2018; Lacey & Wright, 2009). It is believed that STEM training will increase the quality of individuals and education and meet the expectations of the business world (MoNE, 2016). Moreover, it is assumed that the need for qualified workforce to meet the capacity of innovation in the future will be met by educated individuals in the field of STEM (Turkish Industrialists' and Businessmen's Association [TÜSİAD], 2017). Therefore, conducting research on STEM education is necessary for the quality of STEM training.

Even though the number of the studies conducted on STEM training have been recently increasing at a rapid pace in Turkey, there is no consensus on what STEM is, its importance in the curriculum, how to implement it in the classroom, and how STEM-aided learning environment can be designed in various disciplines (Çepni, 2018; Delen & Uzun, 2018; Yılmaz, Yiğit Koyunkaya, Güler & Güzey, 2017). In Turkey, there have been many misconceptions about STEM training and some of non-STEM practices are perceived as STEM practices (Yıldırım, 2018a). This situation is reflected in the explanatory and binding nature of the 2018 Science curriculum. It seems unlikely for science teachers, who have not received STEM training at the undergraduate level and who attempt to carry out STEM practices with the in-service training programs they attended, to understand the defined outcomes and to make their students attain these outcomes Turkey (Bahar et al., 2018; Yıldırım, 2018b). Furthermore, the relevant literature shows that teachers want to implement STEM activities in their courses but they do not know how to implement them and they need a document that can guide them (MoNE, 2018). Therefore, this particular research attempts to explain the methods and processes followed by STEM training in the light of the obtained results, the encountered problems and practical implications and to provide a general framework for researchers, program designers, teachers, administrators and other practitioners. Thus, it is expected to provide data for future studies to be conducted on STEM training at home and abroad and to make a significant contribution to the determination of educational policies. Hence, the general purpose of this research is to examine the project-based STEM training implemented in a primary school in terms of process, outcomes and problems. For this purpose, the following research questions were raised.

1. What teaching practices do teachers perform in STEM training?
2. What are the reflections of STEM training on students?
3. What are the problems encountered in STEM training?
4. What should be done to make STEM training much more effective?

2. Methodology

2.1. Research Design

This research was conducted within the framework of the phenomenology design, one of the qualitative research designs. In the studies carried out in the phenomenology design, it is

tried to reveal the experiences, perceptions and the meaning attributed by individuals to a case (Johnson & Christensen, 2004). In order to understand the examined phenomenon better, Patton (2014) emphasizes that the opinions of the primary and various individuals should be scrutinized in detail. Hence, the teachers and students' opinions were elicited and analyzed to gain a better insight into STEM in this research.

2.2. Participants

In phenomenological studies, the individuals who will explain the case should be directly related to the case and selected according to the purpose of the study (Creswell, 2016; Patton, 2014). In this research, the opinions of teachers and students who took part in the project were elicited in order to examine the STEM training in the context of process, results and encountered problems. The sampling consisted of 18 students and 2 teachers working in a state primary school located in an Anatolian province during the 2017-2018 academic year. The group in concern was formed based on the criteria of participation in the afore-mentioned project and voluntary participation in the research. For ethical consideration, codes were used instead of participants' names. While teachers (experts) were coded as "E1, E2", the students were coded as "S1….S18". E1 was a 40 year-old male teacher with 17 years of teaching experience who was teaching 4th graders at the time of data collection and who received STEM training before taking part in the project. E2 was a 49 year-old male teacher with 23 years of teaching experience who was teaching to 3rd graders at the time of the study and who received STEM training before participating in the project. 18 students also received STEM training within the scope of the project. Voluntary participation in the research was set as the first criterion to choose the students. Subsequently, a STEM test was administered to the volunteer students and a working group of 18 students was formed based on their achievement scores.

2.3. The Research Context

The research was carried out in the school where the project was implemented. The school in concern is located in the city center and in a neighborhood mostly settled by the parents with high socio-economic status. One classroom in the school was designed as STEM workshop room with the support of the Metropolitan Municipality. There were toy blocks, robotic materials, study desks and repair tools in the STEM room. There were also STEM activity sets for basic, advanced and expert levels, vehicles, blocks, preschool kit, STEM activity set-construction equipment, amusement park set, super cranes, mechanical and static systems, energy conversion systems, dynamic and power systems, cars and propulsion mechanisms, optics - observation and astronomy set in the room. Lastly, it contained energy conversion systems related to electrical and electronic engineering, compressed air systems, engineering set, robot competitions set, automation systems with robot arms, an introduction to robot set, robot txt discovery and type jumbo sets.

2.4. Data Collection and Analysis

The easiest and quickest way to learn about individuals' knowledge, emotions, attitudes and thoughts about an issue is to interview people about it. In social sciences, interview is a widely used technique to collect data (Creswell, 2016; Merriam, 2013; Patton, 2014). In this research, a chat-style interview was conducted in order to get participant teachers' opinions. Some parts of the interviews were recorded with the prior consent of the participants. Moreover, an interview form consisting of two parts developed by the researcher was used to collect data. The first part consists of questions to determine the demographic features of the participants (6 questions for teachers, 3 questions for students) and the second part consists of four open-ended questions to learn about the participants' opinions about STEM training. While preparing the interview form, the existing literature on STEM training was extensively reviewed and expert

opinions were elicited from two faculty members with in-depth specialization in curriculum and instruction. The research data were collected in December, 2018 and analyzed through content analysis which requires an in-depth analysis of the data and identifying themes and codes based on the results. In content analysis, similar data are compiled within the framework of certain concepts and presented in a way that the reader can easily understand (Yıldırım & Şimşek, 2011, p. 227). In qualitative research, all stages of the research should be reported in detail and how the results were obtained should be explained in order to ensure the validity and reliability of the research (Yıldırım & Şimşek, 2011 p. 257). In that regard, all stages of the research and the data analysis process were explained in detail. The researcher created codes and themes by analyzing the data collected through interviews with teachers and students. Merriam (2013) suggested that the research should be presented to an expert to increase the validity and reliability of the study. Hence, this study was presented to an expert working at a state university in Turkey by the researcher. The themes and codes were formed and discussed in collaboration with the expert to reach a consensus (Silverman, 2005).

In order to ensure the validity and reliability of the qualitative data, the research findings were tabulated, direct excerpts from teacher and student opinions were taken, the participant confirmation was taken, and all data and stages of the study were stored in computer and file for confirmation.

3. Findings

3.1. Findings regarding Implementation of STEM Training

The first question of the research was motivated to find out what kind of teaching practices the teachers perform during the STEM training. The findings obtained from teachers' opinions revealed that STEM training was performed in three stages, as displayed in Table 1.

Table 1. *Teachers' practices during STEM training*

Theme	**Codes**
Preparing Activities	STEM training for teachers
	Identifying activities to do
	Designing the activities
	Preparing a guide book of activities
	Setting up STEM workshop room
	Preparing materials for activities
	Choosing among the volunteer students
	Creating student groups
	Creating work schedule / plan
Doing Activities	Creating a problem statement
	Enabling students to discover the problem
	Enabling students to decide on the product to design
	Enabling students to design the product
	Handing out the guide books to students
	Giving students time to do activities
	Revealing the relationships among the STEM courses through the activities
	Presenting the product
Evaluating the activities	Making presentation
	Writing report
	Organizing a competition
	Grading

As indicated in Table 1, the teachers' STEM practices consist of three stages: (i) preparation STEM activities, (ii) implementation STEM activities and (iii) evaluation of STEM activities. STEM activities start with the training of teachers in the preparation stage and continue with identifying the activities to do, designing the activities, preparing the activity plan as a guide book, creating a STEM class, creating the materials related to the activities, choosing the participant students, forming student groups and creating a work schedule/ making a plan, respectively. E2 states his/her opinion about the subject "*Within the scope of the STEM project, we conduct a draft project with the teachers before performing the activities. Then, we turn it into a guide book to hand out the students. We do the activities in groups*". As for the second stage of STEM training, teachers reported that they created a problem, encouraged the students to discover that particular problem, guided them to find and design the product, handed the guide books to the students, gave them time to do the activities, revealed the relationship among the STEM courses in the activities and guide the students to present the product, respectively. The following was taken from the interview with the first participant teacher to illustrate their opinion about the phase in concern.

> First of all, a problem likely to be encountered in daily life is identified. For example, floods in the Black Sea Region cause streams to overflow. The students are given relevant instructions and asked to design a bridge resistant to this natural disaster. They are expected to decide on the materials to use in order to perform the task, to draw (engineering) and to calculate structure of the materials, gravity and so on (will be associated with science), the cost and measurement (mathematics and technology), and to use all these disciplines in an integrated manner to solve the problem." (E1).

Table 1 also suggests that the last phase of the training involves making presentations, writing reports, organizing a competition and scoring the students' task performance. E2 expressed his opinion about the subject "*At the end of the activity, we deliver a presentation, write a report and evaluate the activities performed during the training.*" When activities are examined in STEM education, it is observed that the activities are related to daily life. E2 stated that "*I perform such activities as designing bridges, cars and scales, making cars from recycled materials and building a hunter tower"*. Direct extracts of the students about the subject were given below.

> I drew a draft. We designed a barrier, a car, a jack, scales, an overhead bridge, cars from recycled materials and a hunter tower. We also made an oral presentation after performing these tasks (S13).
>
> Firstly, we drew a draft, STEM work, wrote a report paper and at the end we made presentation (S2).
>
> During the STEM training, I drew a draft, found the parts by looking through the book, assembled the parts, completed the project and presented it (S1).

3.2. Findings on the Reflections of STEM Education to Students

The second research question was intended to investigate the reflections of the STEM training on the students. In this context, the themes and codes obtained from the views of teachers and students are presented in Table 2.

Table 2. *Teachers and students' opinions about the reflections of STEM education on students*

Theme	Codes	Participants	
		Teacher	Student
Social contribution	Learning to work together	E1, E2	S1, S3, S6, S10, S11, S14, S15
	Improving friendships		S4, S7, S15
	Developing self-confidence	E1, E2	
	Being happy	E1	
Academic contribution	Increasing interest in the course		S12, S13, S16
	Gaining scientific knowledge		S4, S10
	Teaching learning by doing	E1	
	Bringing a different perspective to the lessons	E2	S12
	Increasing product creativity	E1	
Personal contribution	Developing manual skills	E2	S1, S2, S4, S7, S12, S13, S15, S17
	Discovering and developing the abilities	E2	S1, S4, S5, S7, S8, S9, S14, S18
	Gaining thinking skills	E2	S13, S17
	Developing problem-solving skills	E1	
	Learning to behave carefully		S3
	Improving the aesthetic aspect	E1	

As demonstrated in Table 2, the reflections of STEM training on students are classified into three groups as social contribution, academic contribution and personal contribution. It is observed that social contribution of STEM training covers enabling students to gain the habit of working together, to develop friendships, improving their self-confidence and making them happy. E1 stated that "*Team spirit was developed within the course of time*." *At first they had no idea about team work but they learned it during the activities…*" One of the interviewing students noted that they made new friends while performing the tasks together. Regarding self-esteem, E2 specified that "*We observed task sharing, improved self-confidence, and emergence and development of students' talents*". E1 expressed the students' happiness as " …*they obtain a kind of pleasure from creating their own design*".

The academic contribution of STEM training could be listed as increasing students' interest in the course, facilitating students' gaining scientific knowledge, teaching students learning by doing, bringing a different perspective to the courses and increasing students' product creativity. E1 remarks that "*It provides the students with the opportunity to learn by doing"* while one of the students highlights that he developed interest in engineering (S12).

Table 2 also shows that STEM training improves students' manual skills, unearths their talents, improves their thinking and problem-solving skills, teaches them to behave more carefully and improves their aesthetics taste. E1's states, "*Aesthetics and product are at the forefront, and most importantly such disciplines as science, engineering, mathematics and technology are employed together in the solution of a real-life problem. Students use mathematics to solve a problem they encounter in daily life rather than a mathematics class. This is the answer to the question of "How will we benefit from this knowledge in real life?* E2 mentioned his/her view

on the subject as "*we also see that their ability to relate all courses and their analytical thinking skills have improved thanks to the practical solutions they found*." It is obviously seen that students had similar views about the subject; namely, they reported that *it improved their manual skills* (S12), *uncovered their hidden skills (*S9) and *helped improving their imagination* (S13). Concerning that STEM training taught them to behave carefully, S3 expressed his/her opinion "*I improved myself, I experienced team spirit, and I learned to behave carefully*".

3.3. Findings Related to Problems in STEM Training

The third research question was raised to identify the problems encountered during the STEM training. In this regard, the findings obtained from the views of teachers and students are displayed in Table 3.

Table 3. *Teachers' and students' opinions on the problems encountered during the STEM training*

Theme	Codes	Participants	
		Teacher	Student
Team Work	Not knowing task sharing	E1, E2	S1, S2, S12, S15, S17
	Exclusion of some students		S6, S11
	Communication problems among the groups		S18
	Crowded groups	E1	
	High number of groups	E1	
Individual	Low level of manual skills	E2	S1, S3 ,S4, S7, S8, S9
	Failure to recognize the parts		S3, S9, S12, S13, S18
Facilities	Lack of materials	E2	S3, S4, S5, S7, S12, S13, S14, S15, S16, S18
	Material incompatibility		S7, S8, S13, S14, S15, S17
	Inadequate space	E1	

As illustrated in Table 3, the problems faced in STEM training are grouped under the themes of team work, individual and facilities. The problems under the team work category are listed as task sharing, exclusion of some students, communication problems among the groups, crowded groups and presence of high number of groups. E1 expressed his opinions about team work, "*While assigning tasks, we divided our students into groups. The success of the project was positively correlated with the collaboration and cooperation among the group members. Individuality was at the forefront in the initial process. That was a problem. In addition, the implementation of these activities with crowded groups (design, product, presentation, evaluation) process was very slow."* E2 stated, "*Initially there was a problem in team work. The students who acted individually at the beginning became accustomed to participating in group work over time."*

The students expressed their opinions about group work as "*There was a dispute in the group*" (S12), "*My friends excluded me from the group*" (S6), and "*We couldn't manage the group work*" (S18). About the problems in the group, S18 complained "*We didn't have some parts and some groups didn't want to share them with us.*" The participant students identified their low level of manual skills and failure to recognize the parts of training sets as the

individual problems they were faced with. E2 stated his opinion, "*We had problems about supply and function of the parts. The students became more familiar with the parts as the activities were performed and they began to do the activities faster*." The following extracts are intended to exemplify students' opinions about the issue.

"*Failure to find the parts at first and failure to assemble the parts were the problems we had as a group in task sharing."* (S1)

"*Assembling the parts was problematic for us.*" (S15)

"*Finding and fixing the parts were challenging."* (S14)

"*We had to ask our teacher for help since we had problems with assembling the parts."* (S4)

When the Table 3 is examined, it is also seen that there are problems with the infrastructure such as lack of materials, material incompatibility and inadequate space for STEM training. The following are the students' opinions about the problems in concern.

"*Some parts were missing and some parts didn't fit each other.*" (S7)

"*We had difficulty in finding and assembling the parts while performing some tasks*." (S13)

"*Many parts were missing.*" (S16)

"*The problems in team were missing parts and assembling them*." (S15)

3.4. Findings Related to Suggestions for Increasing Efficiency of STEM Training

The fourth research question scrutinized the suggestions to implement STEM training more effectively. In this scope, suggestions obtained from the opinions of teachers and students are provided in Table 4.

Table 4**.** *Suggestions of teachers and students to make STEM education more effective*

Theme	**Codes**	**Participants**	
		Teacher	**Student**
Suggestions for Administrators	Implementation in workshops rather than traditional classrooms	E1, E2	S2, S4, S7,S14, S13, S12
	Integrated into curriculum as a course		S1, S15, S13
	Exclusion from the course content	E1	
	Participation of all students	E2	
	Larger workshops	E1	
Suggestions for Practitioners	Product-oriented	E1	
	Associating with daily life	E1	
	Careful construction of the groups	E1	
	Presenting activities with OHP		S9, S14
	Organizing STEM courses		S5
	Equal distribution of tasks to students		S11

When Table 4 is examined, suggestions of teachers and students for the improvement of STEM training are gathered under two themes: (i) suggestions for administrators and (ii) suggestions for practitioners. The former includes implementation of STEM training in the workshops rather than classrooms. E2 stated, *"STEM workshop classrooms may be set up."* Students' opinions are "*Such workshop classes should be constructed in every school."* (S13), "…*STEM workshops should be set up on a corner in the classes*." (S4) S1 and S13 pointed out that STEM training should be integrated into the curriculum as a separate course rather than course content. S1 mentioned the necessity of implementation of STEM training independent from the other courses "*Course contents such as science, mathematics, engineering,*

technology, etc. should be associated with as much as possible. Besides, they should be functional, useful and independent of the textbooks and the classroom environment."

E2 stated that all students should participate in the activities. As seen in Table 4, teachers and students suggested STEM training practitioners to perform product-oriented activities, to associate these activities with daily life, to form groups carefully, to present activities by using OHP, to organize STEM courses and to assign equal workloads to students. E1's notes, "*Creating original products should be encouraged. Number of students should not be more than five and the ideal group number is 3*." S9 who wants the activities to be projected stated "*There can be a big workshop classroom in the school, and the activities in STEM training can be projected in the classes."* S11 highlighted the significance of equal task sharing in STEM training.

4. Discussion, Conclusion and Suggestions

This study indicated that the STEM training was applied in an integrated way by interrelating the four subjects in accordance with Dugger's (2010) four-disciplinary approach. Based on the research findings, it is concluded that a systematic study consisting of preparation, implementation and evaluation steps should be performed in order to realize STEM practices successfully. This situation was emphasized in the work of YEĞİTEK in support of the present findings. It was stated that the cycle containing the steps of questioning, designing the product, testing the product, drawing conclusions, evaluating the product, sharing and reusing it, developing the product by re-thinking invention and product development with new questions should be realized after the completion of the infrastructure for STEM training (preparation) (MoNE, 2018). In this study, it was observed that the activities carried out within the scope of STEM training were in large agreement with the stages of the design-based learning model proposed by Penner, Giles, Lehrer and Schauble (1997). The process of performing STEM training is similar to that of Yamak, Bulut and Dündar (2014), and it is observed that the process in concern was in compatible with the roadmap suggested for integrated STEM teaching in Yıldırım (2018b).

As a result of the research, the activities of STEM training improved students' thinking, problem solving and manual skills. It was also indicated that cooperation between the students increased, that the students developed a positive attitude towards the course, that their self-confidence was increased and that they learned to behave more carefully.

The current research has yielded similar findings reported in the existing literature such as that STEM education developed students' thinking and problem solving skills and increased their self-confidence (Altunel, 2018; Bakırcı & Kutlu, 2018; Honey, Pearson & Schweingruber, 2014; Morrison, 2006; Yıldırım & Altun, 2015). The findings reported in this research also overlap with Altunel (2018), Yıldırım and Altun (2015) who previously informed that STEM training allows students to experience interdisciplinary thinking, inquiry-based learning, learning by doing, life-based learning, critical and alternative thinking and problem-based learning processes. The finding that the STEM training increases cooperation among the students is in line with Yasak (2017). Another finding of the study is that STEM activities helped the students have a positive attitude towards the course and increased their course achievement. This finding also perfectly fits with the relevant literature (Altunel, 2018; Baran, Bilici & Mesutoğlu, 2015; Fortus et al., 2004; Gencer, 2015; Gülhan & Şahin, 2016; Honey et al., 2014; MoNE, 2018; Şahin, Ayar & Adıgüzel, 2014; Yamak et al., 2014; Yasak, 2017; Wendell et al., 2010). One of the noteworthy findings of the study, which has not been reported in previous research, is that STEM training improves students' manual skills and teaches them to behave more carefully. This might be attributed to assigning students with various activities that help them develop their manual skills and act carefully to come up with products. In

today's world, it is of great significance to educate cautious individuals with developed dexterity.

The study showed that the teachers and students encountered problems related to classrooms, lack of materials and students' working with the group during STEM training practices. This particular finding approves those reported in Yıldırım's (2018b) study with STEM teachers. However, Yıldırım (2018b) stated that students suffer from lack of interest in courses and fail to inter-relate the disciplines. The difference of the present finding might stem from the participation of a limited number of students in the project and the inclusion of volunteer students in the project through a test.

Wang, Moore, Roehring and Park (2011) emphasized that students should be interested in the activities in order to perform STEM training effectively. In this research, students' voluntary participation in the project may have increased the chances of success of the project. Baran et al. (2015) emphasized cooperation and disruptions in working processes, which is in line with the results of this study. Eroğlu and Bektaş (2016) stated that they suffered from lack of materials in STEM training, which is similar to the results of the present research. Morrison (2006) indicated that STEM classes for the students aged between 6-12 should be student-centered which encourages active participation of the students, which is suitable for innovation and invention, which is equipped with portable tools, recyclable materials, ventilation and computers with STEM software and which promotes the students' self-inquiry. The scholar also underlined that it should have furniture that can be easily changed to function and serve disabled students, as well.

A couple of practical implications were offered in the light of the findings reported in this research. First of all, it was concluded that STEM training make academic, social and personal contributions to the students. Therefore, it should be expanded as much as possible. Secondly, it was revealed that STEM training improved students' high-level thinking and manual skills. Hence, similar practices can be done in other schools and STEM workshops can be established in these schools. Third, it was found that the students had problems working in groups. In that regard, teachers are suggested to be rigorous when creating a group (number of people) and in the process (communication within the group and distribution of tasks) so that the students do not have such problems. More specifically, activities to develop students' manual skills can be held to minimize the problems they encounter. The research also revealed that the students encounter some problems arising from the lack of materials and failure to recognize the materials to perform the assigned tasks. Accordingly, the teachers are recommended to document and report the lack of materials for administrators to supply and to introduce the existing materials to the students during the initial days of STEM training. In addition, based on the participant teachers' and students' views, STEM training should be integrated into the curriculum as a course. Furthermore, Science and Math curricula could be revised to include STEM training. Another suggestion of the research might be the expansion of STEM training with the cooperation among MoNE, the Scientific and Technological Research Council of Turkey (TUBITAK), universities and municipalities. In-service teacher education programs and seminars on STEM training should be organized by MoNE. Lastly, students attending teacher training programs at faculties of education should be offered courses on STEM training.

5. Conflict of Interest

The author declares that there is no conflict of interest.

6. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Akgündüz, D., Aydeniz, M., Çakmakçı, G., Çavaş, B., Çorlu, M. S., Öner, T. & Özdemir, S. (2015). *STEM eğitimi Türkiye raporu: Günün modası mı yoksa gereksinim mi? [A report on STEM education in Turkey: A provisional agenda or a necessity?]* İstanbul: İstanbul Aydın Üniversitesi STEM Merkezi ve Eğitim Fakültesi Yayınları.

Altunel, M. (2018). STEM eğitimi ve Türkiye: Fırsatlar ve riskler [STEM training and Turkey: Opportunities and risks]. *Seta Perspektif, 207,* 1-7.

Bahar, M., Yener, D., Yılmaz M., Emen, H. & Gürer, F. (2018). 2018 Fen bilimleri öğretim programı kazanımlarındaki değişimler ve fen teknoloji matematik mühendislik (STEM) entegrasyonu [The changes of standards in the 2018 Science curriculum and STEM integration]. *Abant İzzet Baysal University Faculty of Education Journal, 18*(2), 702-735.

Bakırcı, H. & Kutlu, E. (2018). Fen bilimleri öğretmenlerinin FeTeMM yaklaşımı hakkındaki görüşlerinin belirlenmesi [Determination of science teachers' views on STEM approach]. *Türk Bilgisayar ve Matematik Eğitimi Dergisi, 9*(2), 367-389.

Baran, E., Canbazoğlu Bilici, S. & Mesutoğlu, C. (2015). Fen, teknoloji, mühendislik ve matematik (FeTeMM) spotu geliştirme etkinliği [Science, technology, engineering, and mathematıcs (STEM) publıc servıce announcement (PSA) development activity]. *Araştırma Temelli Etkinlik Dergisi (ATED), 5*(2), 60-69.

Bozkurt, E. (2014). *Mühendislik tasarım temelli fen eğitiminin fen bilgisi öğretmen adaylarının karar verme becerisi, bilimsel süreç becerileri ve sürece yönelik algılarına etkisi [The effect of engineering design based science instruction on science teacher candidates' decision making skills, science process skills and perceptions about the process]*. Unpublished doctoral dissertation, Gazi University Institute of Educational Sciences, Ankara.

Breiner, J. M., Harkness, S. S., Johnson, C. C. & Koehler, C. M. (2012). What is STEM? A discussion about conceptions of STEM in education and partnerships. *School Science and Mathematics, 112*(1), 3-11

Bybee, R. (2010). Advancing STEM education: A 2020 vision. *Technology and Engineering Teacher, 7*(1), 30-35.

Creswell, J. W. (2016). *Nitel araştırma yöntemleri, beş yaklaşıma göre nitel araştırma ve araştırma Deseni [Qualitative research methods, qualitative research and research design according to five approaches]*. (Çeviri Ed. M. Bütün & S. B. Demir) Ankara: Siyasal Kitabevi

Çepni, S (2018). *Kuramdan uygulamaya STEM eğitimi [STEM education from theory to practice]. (2nd edition).* Ankara: Pegem Akademi Yayınları.

Delen, İ. & Uzun, S. (2018). Matematik öğretmen adaylarının FeTeMM temelli tasarladıkları öğrenme ortamlarının değerlendirilmesi [Evaluating STEM based learning environments created by mathematics pre-service teachers]. *Hacettepe University Faculty of Education Journal, 33*(3), 617-630. doi: 10.16986/HUJE. 2018037019.

Duban, N. & Ay S. T. (2016) Eğitim bilimlerinde çağdaş yaklaşımlar [Contemporary approaches in educational sciences] (Ed. F.S. Kırmızı & N. Duban). *Eğitim Bilimlerine Giriş [Introduction to Educational Sciences]*, pp. 314-345. Ankara: Anı yayıncılık

Dugger, E. W. (2010). *Evolution of STEM in the United States*. 6th Biennial International Conference on Technology Education Research, Australia.

Eroğlu, S., & Bektaş, O. (2016). STEM eğitimi almış fen bilimleri öğretmenlerinin stem temelli ders etkinlikleri hakkındaki görüşler [Ideas of science teachers took STEM education about STEM based activities]. *Journal of Qualitative Research in Education, 4*(3), 43-67. doi: :10.14689/issn. 2148-2624.1.4c3s3m

Fortus, D., Dershimer, R. C., Krajcik, J. S., Marx, R. W. & Mamlok-Naaman, R. (2004). Design-based science and student learning. *Journal of Research in Science Teaching, 41*(10), 1081-1110.

Gencer, A. (2015). Fen eğitiminde bilim ve mühendislik uygulaması: Fırıldak etkinliği [Scientific and engineering practices in science education: Twirl activity]. *Journal of Research-based Activities, 5*(1), 1-19.

Gonzalez, H.B. & Kuenzi J. (2012). Science, technology, engineering, and mathematics (STEM) education: A primer. *Congressional Research Service Science*, 1-34.

Gülhan, F., & Şahin, F. (2016). Fen-teknoloji-mühendislik-matematik entegrasyonunun (STEM) 5. Sınıf öğrencilerinin bu alanlarla ilgili algı ve tutumlarına etkisi [The effects of science technology-engineering math (STEM) integration on 5th grade students' perceptions and attitudes towards these areas]. *International Journal of Human Sciences, 13*(1), 602-620.

Herdem, K. & Ünal, İ. (2018). STEM eğitimi üzerine yapılan çalışmaların analizi: Bir meta-sentez çalışması [Analysis of studies about STEM education: A meta-synthesis study]. *Journal of Educational Sciences, 48*(48), 145-163. doi: 10.15285/maruaebd.345486.

Honey, M., Pearson, G. & Schweingruber, H. (2014). *STEM integration in K-12 education: Status, prospects, and an agenda for research.* National academy of engineering and national research council. Washington D.C. : The National Academies Press.

Johnson, B. & Christensen, L. (2004). *Educational research: Quantitative, qualitative and mixed approache*s. Boston: Pearson Education Inc.

Kennedy, T. & Odell, M. (2014). Engaging students in STEM education. *Science Education International, 25*(3), 246–258.

Kızılay, E. (2017). Türkiye'de öğretmen eğitimi konusundaki STEM çalışmaları [STEM researches on teacher education in Turkey]. *Tarih Okulu Dergisi (TOD),11*, 1201-1226. doi: 10.14225/Joh1163

Labov, J. B., Reid, A. H. & Yamamoto, K. R. (2010). Integrated biology and under graduate science education: A new biology education for the twenty first century? *CBE Life Science Education,* 9, 10–16.

Lacey, T. A. & Wright, B. (2009). Occupational employment projections to 2018. *Monthly Labor Review, 132*(11), 82- 123.

Merriam, S. B. (2013). *Nitel araştırma desen ve uygulama için bir rehber[Qualitative research A guide to design and implementation]* (Çev. Ed. S. Turan) Ankara: Nobel Akademik Yayıncılık.

Ministry of National Education [MoNE]. (2016). *STEM eğitim raporu [STEM training report]*. Ankara: Yenilik ve Eğitim Teknolojileri Genel Müdürlüğü.

Ministry of National Education [MoNE]. (2018). *STEM eğitimi öğretmen el kitabı [STEM education teacher handbook]*. Ankara: MEB Yenilik ve Eğitim Teknolojileri Genel Müdürlüğü

Morrison, J. (2006). TIES STEM education monograph series, attributes of STEM education. Baltimore, MD: TIES.

Ocak, G. (2010). The effect of learning stations on the level of academic success and retention of elementary school students. *The New Educational Review, 21*(2) 146-157.

Patton, M. Q. (2014). *Nitel araştırma yöntemleri, beş yaklaşıma göre nitel araştırma ve araştırma deseni [Qualitative research methods, qualitative research and research design according to five approaches]*. (Çeviri Ed. M. Bütün & S. B. Demir) Ankara: Siyasal Kitabevi.

Penner, D., Giles, N., Lehrer, R. & Schauble, L. (1997). Building functional models: Designing an elbow. *Journal of Research in Science Teaching, 34*(2), 125-143.

Seren, S & Veli, E. (2018). 2005 yılı itibariyle değişen fen bilimleri dersi öğretim programlarında STEM eğitimine yer verilme düzeylerinin karşılaştırılması [Comparison of different levels of including STEM education in science curriculum modified since 2005]. *Journal of STEAM Education, 1*(1),24-47

Silverman, D. (2005). *Doing qualitative research: A practical handbook*. London: Sage.

Smith, J. & Karr-Kidwell, P. (2000). The inter disciplinary curriculum: A literary review and a manual for administrators and teachers. Retrieved from ERIC database. (ED443172).

Şahin, A., Ayar, M. C. & Adıgüzel, T. (2014). Fen, teknoloji, mühendislik ve matematik içerikli okul sonrası etkinlikler ve öğrenciler üzerindeki etkileri [STEM related after-school program activities and associated outcomes on student learning]. *Educational Sciences in Theory and Practice, 14*(1), 297-322.

Thomas, B. & Watters, J. (2015). Perspectives on Australian, Indian and Malaysian approaches to STEM education. *International Journal of Educational Development, 45*, 42–53.

Türk Sanayicileri ve İş İnsanları Derneği (2017). *2023'e doğru Türkiye'de STEM gereksinimi [STEM requirement in Turkey towards 2023]*. Ankara: TÜSİAD

Ulutan, E. (2018). *Dünyada eğitim trendleri ve ülkemizde STEM öğrenme etkinlikleri: MEB K12 okulları örneği [Education trends in the world and STEM learning activities in our country: MoNE K12 schools example]* Ankara: MEB Yayınları.

Wang, H. H., Moore, T. J., Roehrig, G. H., & Park, M. S. (2011). STEM integration: Teacher perceptions and practice. *Journal of Pre-College Engineering Education Research (J-PEER) 1*(2), 1-13.

Wendell, K., Connolly, K., Wright, C., Jarvin, L., Rogers, C., Barnett, M. & Marulcu, I. (2010). *Incorporating engineering design in to elementary school science curricula.* Paper presented at the Annual Meeting of American Society for Engineering Education. Singapore.

Yamak, H., Bulut, N. & Dündar, S. (2014). 5. sınıf öğrencilerinin bilimsel süreç becerileri ile fene karşı tutumlarına FeTeMM etkinliklerinin etkisi [The impact of STEM activities on 5th grade students' scientific process skills and their Attitudes Towards Science]. *Gazi University Gazi Faculty of Education Journal, 34*(2), 249-265

Yasak, M. T. (2017). *Tasarım Temelli Fen Eğitiminde, Fen, Teknoloji, Mühendislik ve Matematik Uygulamaları: Basınç Konusu Örneği[Applications of science, technology, engineering and mathematics in design based science education: Sample of the theme of pressure]*, Unpublished MA thesis, Cumhuriyet University Institute of Educational Sciences, Sivas.

Yıldırım, A. & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri [Qualitative research methods in the social sciences.* Ankara: Seçkin Yayıncılık.

Yıldırım, B. (2016). An analysis and meta-synthesis of research on STEM education. *Journal of Education and Practice, 7*(34), 23-33.

Yıldırım, B. (2018a). *Teoriden pratiğe STEM eğitimi uygulama kitabı [STEM education practice book from theory to practice]*. Ankara: Nobel Akademik Yayıncılık.

Yıldırım, B. (2018b). STEM uygulamalarına yönelik öğretmen görüşlerinin incelenmesi [Research on Teacher Opinions on STEM Practices]. *Eğitim Kuram ve Uygulama Araştırmaları Dergisi 4(1), 42-53*

Yıldırım, B. & Altun, Y. (2015). STEM eğitim ve mühendislik uygulamalarının fen bilgisi laboratuar dersindeki etkilerinin incelenmesi [Investigating the effect of STEM education and engineering applications on science laboratory lectures]. *El-Cezeri Journal of Science and Engineering, 2*(2), 28-40.

Yılmaz, H., Yiğit Koyunkaya, M., Güler, F. & Güzey, S. (2018). Fen, teknoloji, mühendislik, matematik (STEM) eğitimi tutum ölçeğinin Türkçeye uyarlanması [Turkish adaptation of the attitudes toward science, technology, engineering, and mathematics (STEM) education scale]. *Kastamonu Journal of Education, 25*(5), 1787-1800.

Ayçiçek, B. (2020). Investigation of the students' opinions on vocational guidance services conducted at high schools. *International Online Journal of Education and Teaching (IOJET)*, *7*(3). 827-842. https://iojet.org/index.php/IOJET/article/view/919

Received: 25.05.2020
Received in revised form: 02.06.2020
Accepted: 10.06.2020

INVESTIGATION OF THE STUDENTS' OPINIONS ON VOCATIONAL GUIDANCE SERVICES CONDUCTED AT HIGH SCHOOLS

Research article

Burak Ayçiçek

Gaziosmanpaşa University

burak.aycicek@gop.edu.tr

Burak Ayçiçek received his Ph.D. degree in Curriculum and Instruction from Mersin University. He is currently a Dr. lecturer in Gaziosmanpaşa University. Curriculum development, teacher education, teaching and learning environments, continuous professional development, higher education, and technology-supported teaching approaches are among his research interests.

INVESTIGATION OF THE STUDENTS' OPINIONS ON VOCATIONAL GUIDANCE SERVICES CONDUCTED AT HIGH SCHOOLS

Burak Ayçiçek

burak.aycicek@gop.edu.tr

Abstract

The aim of this study is to analyze different views of students studying at Anatolian high school, industrial vocational high school and private high school about vocational guidance services. The sample of the study consisted of 180 high school students from three different school types. Of them, 103 were male and 77 were female. In the study, survey method was employed and the data were collected through vocational guidance service evaluation questionnaire developed by the researcher. The findings showed that some students found the vocational guidance services that provided at school insufficient. In addition, students' opinions on vocational guidance services were found to differ significantly in terms of gender and school type variables. The students stated their opinions on the importance of vocational guidance services and their main problems, expectations and suggestions related to the vocational guidance services.

Keywords: vocational guidance services, high school students, school types

1. Introduction

The profession is an important part of human life as it has a significant value in determining the social prestige of the human being and even the happiness level of the individuals (Turan & Kayıkçı, 2019). Having a profession is of great importance for all individuals since it is an area of activity that allows people to be respected in society, to establish relationships with others and to have a place in society (Kuzgun, 2000). Moreover, it has a direct influence on the standard of living, social relations, emotional health and the feeling of self-worth (Nyamwange, 2016). Therefore, career planning and career choice are considered as the most important and distinctive aspects of life.

The career choice has a long-lasting influence on the individual. It serves as a predictor and determinant of income level, nature of work and personal development (Kazi & Akhlaq, 2017). Thus, it can be argued that a wrong choice in career planning can change the fate of an individual. The choice of profession can be defined as the individual's determination of one of the professions based on his/her personal interest and the efforts that he/she makes to acquire this profession (Bacanlı, 1996). According to Savickas and Lent (1994), profession choice process includes three components, which are as *establishing a goal, taking action to implement the choice, and attaining a significant position and stage of performance determining the future directions and career behaviors.*

On the other hand, career choice is not an easy and straightforward process. Making the right decisions depends on the student's self-knowledge, awareness of their interests, needs, expectations and abilities (Tuzcuoğlu, 2000). Career planning becomes significant especially during the early adulthood. During this time, high school students seek information on their career and become more aware of their vocational interests (Khan et al; 2011). In the literature, it is seen that various factors have influences on career choices of high school students. The studies conclude that personality, interests, socio-economic factors, teachers, friends, parents, cultural identity and family business, etc. are among the most prominent factors affecting

career choice (Kumar, 2016; Pascual, 2014; Edwards & Quinter, 2011). In the study conducted by Kıyak (2006), the criteria of high school students on the profession choice are found as the possibility of finding a job in the profession, skills, interest, values, personality traits (self-recognition), the awards of the profession (money, prestige, fame, etc.) and the wishes of the family. On the other hand, Bahar (2002) found a positive relationship between the social-economic situation and the professional choice of the students.

Nyamwange (2016) stated that students should be provided with the adequate information regarding various career choices. Therefore, the consultants at schools are expected to support the students in their career planning. As a result, the guiding and counseling services at schools become more prominent. In Turkey, guiding and counseling services are conducted at schools based on the regulations of Ministry of National Education (MoNE, 2017). It is stated in Article 6 of the Ministry of National Education Regulation on Guidance Services that *"Vocational guidance is a service offered to individuals and the parents for the recognition of self and occupations, making choices for the profession in line with skills, interest, need, value and personality traits, to prepare them for the profession, to start, to continue the profession and to develop himself/herself in the lifelong learning process."* (Official Gazette, 2018). Guidance services play the most important role in conducting guidance services at schools. In addition, various individuals and boards such as school principals, deputy principals, guidance services executive commission, coordinator guidance teachers, guidance teachers, classroom guidance teachers and other teachers are involved in conducting guidance activities (MoNE, 2017).

In the study conducted by Turan and Kayıkçı (2019), it was aimed to determine the role of school guidance services in senior vocational high school students' professional choice based on the opinions of the guidance counselor, parents and students. Ulaş and Yıldırım (2015) aimed to find out whether family, peer and teacher support variables and demographic properties predict the high school students' career maturity levels. On the other hand, the studies showed that vocational guidance services conducted on high school students have a positive influence on making correct decisions in terms of career choice (Efilti, 1998), choosing the appropriate field based on their interest and recognizing themselves professionally (Öksüz, 2001; Bektaş & Demir, 2004) and making the professional preferences appropriate to the skills and interests of the students (Çetinkaya, 1995).

Based on the information in the literature, in this study it was aimed to investigate the opinions of the Anatolian high school, industrial vocational high school and private high school students about vocational guidance services and the differences between the opinions were tried to be presented. The study is expected to make contribution to the literature since it will provide information on to what extent high school students benefit from school guidance services provided by the vocational guidance services; whether the students understand the importance of vocational guidance services; problems, expectations and suggestions of the high school students about the vocational guidance services. Therefore, the main problem of the study is determined as; "Is there any difference between the opinions of Anatolian high school, industrial vocational high school and private high school students about vocational guidance services?" Based on this main problem, the following sub-problems were tried to be answered:

1. What are the opinions of the high school students on vocational guidance services?
2. Do the high school students' opinions about vocational guidance services differ according to gender and school type variables?
3. What are the opinions of high school students on the importance of vocational guidance services?

4. What are the high school students' main problems, suggestions and expectations related to vocational guidance services?

2. Research Methodology

In the study, the survey method was employed. Survey models aim to describe, compare, analyze and interpret the situations of individuals, institutions, groups or sources in the way that they are (Cohen, Manion & Morrison, 2007).

2.1. Participants

The sample of the study consisted of 180 students from 9th and 12th grades studying at an Anatolian high school, an industrial vocational high school and a private high school in the spring term of 2018-2019 academic year in Elazıg, Turkey. Of these students, 103 were male and 77 were female. In addition, 60 of the students were studying at Anatolian high school, 60 were at the industrial vocational high school and 60 were at private high school. In terms of school type variable, 90 students were 9th grade students while 90 students were 12th grade students. On the other hand, the convenience sampling method was employed for the selection of the participants. Since it allows the researcher to choose a situation that is close and easy to access, convenience sampling method gives the researcher speed and practicality (Yıldırım & Şimşek, 2008).

2.2. Data Collection

In the study, "Vocational Guidance Services Evaluation Questionnaire" was used to collect the data. The questionnaire developed by the researcher aimed to reveal whether the school has provided sufficient awareness and information to the high school students in terms of recognition of the occupations, whether the student has received sufficient assistance from the school for the choice of profession, the students' opinions on the importance of a correct career choice, their problems experienced in the vocational guidance process and the expectations and suggestions of the students for vocational guidance services. The questionnaire consists of 16 closed ended and 4 open-ended questions. The relevant literature and expert opinions were used in the development of the questionnaire. The questionnaire consisted of two parts. In the first part, the participants were asked to answer questions about vocational guidance services. The questionnaire consists of 16 items as a five-point Likert-type instrument, ranging from "1=completely disagree, "5=completely agree". In the second part, four different open-ended questions related to high school students' opinions on vocational guidance services were asked. Since the questionnaire items were handled independently for detailed analysis and interpretation, no analysis of the reliability of the scores (such as Cronbach's alpha internal consistency coefficient) was conducted.

2.3. Procedures

The study was conducted during the spring term of 2018-2019 academic year in Elazıg with 180 high school students studying at an Anatolian high school, industrial vocational high school and a private high school. The vocational guidance services evaluation questionnaire used in the study was applied to the students in the classroom environment. For this purpose, firstly the required permission was taken from the classroom teachers and the most appropriate time was determined for the application. The researcher went to the schools on a determined day. The students were also informed about the aim of the study. The study was carried out on a voluntary basis.

2.4. Data Analysis

The obtained data were analyzed using SPSS 17.0 statistical program. All statistical tests were conducted at significance level of 0.05, which was preferred in the social sciences. In

order to test the validity of the questionnaire, Kaiser-Meyer-Olkin statistics were used. Descriptive statistics such as means and standard deviations were computed. Then, Kolmogorov-Smirnov test was conducted to see whether the data was normally disturbed. The analysis results showed that the data did not normally distributed ($p<.05$). Therefore, Mann-Whitney U test and Kruskal-Wallis H test were used for the data analysis.

3. Findings

In the study, students' opinions about vocational guidance services were examined in terms of gender and school type variables item by item using non-parametric tests Mann-Whitney U test and Kruskal-Wallis H test. After analyzing the sub-problems of the problems with statistical data, students' answers on the importance of vocational guidance, problems experienced within the scope of vocational guidance services, expectations from the school administration, guidance teachers and other teachers within the scope of vocational guidance services, and students' suggestions about vocational guidance services are given in tables in frequency and percentage.

3.1. Findings Related to the First Sub-Problem

The frequencies and percentages of the high school students' opinions related to vocational guidance services are given in Table 1.

Table 1. *The frequencies and percentages of the high school students' opinions for each item*

ITEMS	Completely Disagree		Disagree		Neutral		Agree		Completely Agree	
	f	%	f	%	f	%	f	%	f	%
1	36	20,0	23	12,08	43	23,09	30	16,7	48	26,7
2	29	16,01	33	18,3	34	18,09	40	22,2	44	24,4
3	11	6,1	34	18,9	36	20,0	44	24,4	55	30,6
4	13	7,2	45	25,0	38	21,1	46	25,6	38	21,1
5	20	11,1	31	17,2	39	21,7	48	26,7	42	23,3
6	43	23,9	42	23,3	27	15,0	46	25,6	22	12,2
7	30	16,7	31	17,2	34	18,9	27	15,0	58	32,2
8	46	25,6	31	17,2	37	20,6	43	23,9	23	12,8
9	24	13,3	45	25,0	33	18,3	26	14,4	52	28,9
10	24	13,3	44	24,4	39	21,7	38	21,1	35	19,4
11	19	10,6	41	22,8	37	20,6	48	26,7	35	19,4
12	13	7,2	41	22,8	43	23,9	36	20,0	47	26,1
13	40	22,2	43	23,9	46	25,6	34	18,9	17	9,4
14	18	10,0	32	17,8	44	24,4	42	23,3	44	24,4
15	20	11,1	36	20,0	39	21,7	41	22,8	44	24,4
16	46	25,6	30	16,7	42	23,3	37	20,6	25	13,9

When the Table 1 is examined, it is seen that some students think that vocational guidance services are insufficient in providing them realize themselves. Most of the students regard vocational guidance services as a professional aid.

Some of the students think that school guidance services are insufficient in providing the actual data about the occupations. In addition, according to some students, there are not enough activities to raise awareness about the occupations.

It is found that some students have the opinion that the measurement tools implemented within the scope of vocational guidance are not applied effectively. Also, most of the students think that the importance of vocational guidance services is sufficiently comprehended by teachers.

3.2. Findings Related to the Second Sub-Problem

In the second sub-problem of the study, the Mann-Whitney U Test was applied to determine whether students' opinions differed according to gender variable. The analysis results are given in Table 2.

Table 2. *Mann-Whitney U test results in terms of gender variable*

Items		N	$\overline{X}$	*SS*	Z	Sig.
1. I think that the vocational guidance services provided by the school guidance service make me realize myself.	Male	103	2,88	1,47	-3,048	,002
	Female	77	3,56	1,37		
2. I think that vocational guidance is a professional aid.	Male	103	2,82	1,46	-4,175	,000
	Female	77	3,73	1,17		
3. I think that vocational guidance services will contribute to my social development	Male	103	3,17	1,32	-4,402	,000
	Female	77	4,04	1,02		
4. Within the scope of vocational guidance services, occupational group information is provided sufficiently.	Male	103	2,91	1,15	-4,688	,000
	Female	77	3,78	1,22		
5. Guidance teachers who provide vocational guidance services are at a sufficient level in their fields (subject dominance, giving information to students, presentation, occupations, etc.).	Male	103	3,06	1,28	-3,426	,001
	Female	77	3,71	1,26		
6. Within the scope of vocational guidance services, the guidance given to us to obtain up-to-date information about the occupations (progress, employment opportunities, etc.) is not sufficient.	Male	103	2,98	1,46	-2,052	,040
	Female	77	2,53	1,22		
7. Within the scope of vocational guidance services, the techniques applied to measure the professional tendencies of the student are sufficient.	Male	103	3,07	1,48	-2,290	,022
	Female	77	3,58	1,45		

8. Within the scope of vocational guidance services, seminars, conferences, panels, trips etc. aiming to raise awareness about the occupations are not included.	Male	103	3,06	1,41	-2,738	,006
	Female	77	2,48	1,28		
9. Within the scope of vocational guidance services, guidance teachers give enough space to individual interviews in order to get to know our features better.	Male	103	2,88	1,41	-3,371	,001
	Female	77	3,64	1,36		
10. I receive adequate assistance and support from my school within the scope of vocational guidance.	Male	103	2,84	1,34	-2,839	,005
	Female	77	3,42	1,25		
11. I think that measurement tools such as tests, questionnaires etc. applied within the scope of vocational guidance services are implemented to us in a healthy and timely manner.	Male	103	2,99	1,35	-2,654	,008
	Female	77	3,52	1,13		
12. I think that the guidance counselors in our school are aware of the principles and responsibilities required by the vocational guidance service.	Male	103	3,11	1,26	-2,999	,003
	Female	77	3,68	1,25		
13. I do not think that the importance of vocational guidance services is well understood by teachers.	Male	103	2,91	1,26	-2,716	,007
	Female	77	2,40	1,23		
14. Within the scope of vocational guidance services, I think that the guidance hours are evaluated by the class guidance teachers in a healthy and appropriate way.	Male	103	3,16	1,31	-2,297	,022
	Female	77	3,60	1,24		
15. I find the point of view of the administrators (school principal and assistant principals) on guidance service within the scope of vocational guidance services positive.	Male	103	3,10	1,37	-2,273	,023
	Female	77	3,56	1,24		
16. I do not find the weekly guidance course hours sufficient within the scope of vocational guidance services.	Male	103	2,98	1,36	-1,987	,047
	Female	77	2,57	1,39		

As can be seen in the Table 2, the students' opinions on vocational guidance services differ significantly in terms of gender variable [p<.05]. When the each item was analyzed separately to determine the source of the differences, significant differences were obtained in favor of the female students in all items. As seen from the table, female students have higher average scores than male students. Therefore, it can be concluded that female students have more positive opinions on the positive sides of the offered vocational guidance services than male students.

In the second sub-problem of the study, it was also aimed to determine whether students' opinions on the vocational guidance services differed significantly in terms of school type variable. For this purpose, the Kruskal - Wallis H test was conducted. The results are presented in Table 3.

Table 3. *Kruskal - Wallis H test results in terms of school type variable*

Items		N	$\overline{X}$	*SS*	Chi-Square	*df*	Sig.
1. I think that the vocational guidance services provided by the school guidance service make me realize myself.	Anatolian	60	3,83	1,15	54,719	2	,000
	Private	60	3,67	1,28			
	Industrial	60	2,02	1,21			
2. I think that vocational guidance is a professional aid.	Anatolian	60	3,90	1,08	50,428	2	,000
	Private	60	3,57	1,32			
	Industrial	60	2,15	1,18			
3. I think that vocational guidance services will contribute to my social development.	Anatolian	60	4,12	0,88	77,073	2	,000
	Private	60	4,15	1,10			
	Industrial	60	2,37	0,88			
4. Within the scope of vocational guidance services, occupational group information is provided sufficiently.	Anatolian	60	3,78	1,11	50,663	2	,000
	Private	60	3,72	1,19			
	Industrial	60	2,35	0,88			
5. Guidance teachers who provide vocational guidance services are at a sufficient level in their fields (subject dominance, giving information to students, presentation, occupations, etc.).	Anatolian	60	3,88	1,03	49,663	2	,000
	Private	60	3,75	1,30			
	Industrial	60	2,38	1,03			
6. Within the scope of vocational guidance services, the guidance given to us to obtain up-to-date information about the occupations (progress, employment opportunities, etc.) is not sufficient.	Anatolian	60	2,10	1,10	32,978	2	,000
	Private	60	2,72	1,34			
	Industrial	60	3,55	1,29			
7. Within the scope of vocational guidance services, the techniques applied to measure the professional tendencies of the student are sufficient.	Anatolian	60	4,08	1,01	54,363	2	,000
	Private	60	3,63	1,52			
	Industrial	60	2,15	1,13			
8. Within the scope of vocational guidance services, seminars, conferences, panels, trips etc. aiming to raise awareness about the occupations are not included.	Anatolian	60	1,95	1,00	50,107	2	,000
	Private	60	2,75	1,47			
	Industrial	60	3,73	1,02			
	Anatolian	60	3,97	1,10	50,172	2	,000

9. Within the scope of vocational guidance services, guidance teachers give enough space to individual interviews to get to know our features better.	Private	60	3,48	1,44			
	Industrial	60	2,17	1,08			
10. I receive adequate assistance and support from my school within the scope of vocational guidance.	Anatolian	60	3,48	1,02	52,995	2	,000
	Private	60	3,70	1,31			
	Industrial	60	2,08	1,03			
11. I think that measurement tools such as tests, questionnaires etc. applied within the scope of vocational guidance services are implemented to us in a healthy and timely manner.	Anatolian	60	3,72	0,98	52,715	2	,000
	Private	60	3,70	1,29			
	Industrial	60	2,23	0,96			
12. I think that the guidance counselors in our school are aware of the principles and responsibilities required by the vocational guidance service.	Anatolian	60	3,82	1,05	50,337	2	,000
	Private	60	3,83	1,28			
	Industrial	60	2,40	0,94			
13. I do not think that the importance of vocational guidance services is well understood by teachers	Anatolian	60	2,25	0,99	28,042	2	,000
	Private	60	2,47	1,48			
	Industrial	60	3,37	1,01			
14. Within the scope of vocational guidance services, I think that the guidance hours are evaluated by the class guidance teachers in a healthy and appropriate way.	Anatolian	60	3,82	1,00	35,296	2	,000
	Private	60	3,67	1,39			
	Industrial	60	2,55	1,10			
15. I find the point of view of the administrators (school principal and assistant principals) on guidance service within the scope of vocational guidance services positive.	Anatolian	60	3,87	0,91	52,475	2	,000
	Private	60	3,73	1,39			
	Industrial	60	2,28	1,03			
16. I do not find the weekly guidance course hours sufficient within the scope of vocational guidance services.	Anatolian	60	1,97	0,86	47,464	2	,000
	Private	60	2,77	1,64			
	Industrial	60	3,68	0,95			

As can be seen in the Table 3, the students' opinions on the vocational guidance services differ significantly in terms of school type variable in all items [p<.05]. The sources of these differences were analyzed for each item separately. The obtained results showed that the average score of the Anatolian high school students and private high school students were significantly higher than the average scores of industrial vocational high school students.

3.3. Findings Related to the Third Sub-Problem

In the third sub-problem of the study, open-ended questions were asked to the students on the importance of vocational guidance services. By the obtained data, it was aimed to determine the opinions of the students on the vocational guidance services. In the Table 4 below, frequency and percentage results are given.

Table 4. *High school students' opinions on the importance of vocational guidance*

Opinions	Frequency	%
Increase level of awareness about occupation	16	16.3
Help student in discover himself/herself	14	14.3
Lead students to vocations compatible with students' characters	12	12.2
Provide comprehensive information on different professions	11	11.2
Provide opportunities to explore interests and talents	9	9.2
Lead to the appropriate occupation	9	9.2
Create an activity environment for recognizing professions	7	7.1
Contribute to personal and social development	6	6.1
Help the individual to make a correct profession choice	5	5.1
Help students develop a realistic self-concept	3	3.1
Support lifelong career development	2	2.0
Provide the ability of self-management for the individuals	2	2.0
Support for career planning	1	1.0
Determine the existing qualities of the individual	1	1.0

When the findings in Table 4 are analyzed, it is seen that some students state their opinions on the importance of vocational guidance services as *increasing awareness about the occupations, to help them discover themselves, to guide them to the profession appropriate to their personality characteristics, to give them the opportunity to get to know different occupations more closely, to offer them the opportunity to explore their interests and abilities and to direct them to the appropriate profession.*

3.4. Findings Related to the Fourth Sub-Problem

In the fourth sub-problem of the study, open-ended questions were asked to the students on the main problems experienced in vocational guidance services; and students' suggestions and expectations about vocational guidance. In Table 5 below, frequency and percentage results related to the main problems of the students about vocational guidance services are given.

Table 5. *Main problems of the high school students related to vocational guidance services*

Main Problems	Frequency	%
Insufficient number of guidance teachers according to the number of students at schools	17	17.5
Lack of physical equipment of guidance services	13	13.4
Students are not sufficiently informed about vocational guidance services	12	12.4
Administrators have a negative perspective on guidance services	12	12.4
Limited time allocated to students by guidance counselors	10	10.3
Failure to evaluate the guidance duration in a healthy and appropriate way	9	9.3
Inadequate guidance hours	8	8.2
Failure to understand the importance of vocational guidance services	5	5.2
Not having the consciousness of principles and responsibility required by the guidance services	5	5.2
Failure to assess the situation with parents	3	3.1
Unwillingness of guidance counselors for guidance	3	3.1

When the findings in Table 5 are examined, the problems experienced by some students related to the vocational guidance services are expressed as *an insufficient number of guidance teachers, lack of physical equipment of the vocational guidance services, insufficient information about vocational guidance, and the negative viewpoints of the administrators on the guidance services.* Other problems such as *inadequate guidance hours and inadequate evaluation of the guidance duration in a healthy and appropriate way* are also stated by some of the students. The expectations and the suggestions of the high school students for vocational guidance services are presented in Table 6.

Table 6. *Expectations and suggestions of high school students related to vocational guidance services*

Expectations and Suggestions	Frequency	%
Guidance teachers with professional knowledge and awareness should conduct the classes.	17	19.1
Guidance teachers should develop themselves.	14	15.7
Guidance teachers should communicate more with students.	12	13.5
Vocational guidance services should be introduced to students more clearly	11	12.4
Students' personal development should be supported	9	10.1
The lack of physical equipment in the guidance of the school should be eliminated	8	9
Vocational guidance activities should be organized for families as well.	8	9
More activities should be organized to promote occupations	5	5.6
Branch teachers should be more active in guidance services.	3	3.4
The confidentiality of individual interviews should be ensured.	2	2.2

When the findings in Table 6 are analyzed, the main suggestions and expectations of some students were as *teachers with professional knowledge and awareness should be included in the courses, guidance teachers are required to develop themselves continuously, communication with the students should be increased within the scope of vocational guidance services, students should be more informed about vocational guidance services and it is necessary to support the personal development of the students through activities to be conducted within the scope of guidance studies*.

In conclusion, in the study it was found that the opinions of the students on vocational guidance services differed significantly in terms of gender and school type variables. In addition, most of the students stated that the importance of vocational guidance has significant value in increasing the level of awareness about occupations. On the other hand, some students expressed that the biggest problem experienced during vocational guidance was the low number of guidance teachers at schools and as a suggestion, most of the students stated that guidance counselors with professional knowledge and awareness should first conduct the guidance courses.

4. Discussion and Conclusion

This study aimed to determine the students' opinions on vocational guidance services. The findings showed that some students found the vocational guidance services provided at school insufficient. In the study conducted by Turan and Kayıkçi (2019) while some students expressed their positive opinions about the guidance services conducted at school, some students expressed their negative opinions about guidance services and stated that the guidance services were quite insufficient. In her study, Şahin (2008) found that students had the opinion that 56% of the psychological guidance services were conducted at school. Similarly, in the studies conducted by Hatunoğlu and Hatunoğlu (2006) and Karagüven (2001), students assessed the services they received from psychological guidance as insufficient. In addition, Karataş and Baltacı (2013) found that while some students assessed the psychological and guidance services as sufficient, some students stated that they assessed the services as insufficient. In their study Arıcıoğlu and Tagay (2008), it was found that the students found guidance services provided by class teachers insufficient. Topçu (2014) found in his study that students found vocational guidance services included in the 9th grade guidance program moderately useful. When considering how career choice affects the whole life of an individual, the importance of vocational guidance services becomes more prominent. Therefore, more activities should be conducted at schools on vocational guidance services and the students should be supported.

Students' opinions on vocational guidance services were found to differ significantly in terms of gender variable. When the each item was analyzed separately to determine the source of the differences, significant differences were obtained in favor of the female students in all items. Therefore, it can be concluded that female students have more positive ideas on vocational guidance services provided by school. On the contrary in the studies conducted by Şahin (2008) and Poyraz (2007), the students' scores on assessing the psychological guidance services did not differ significantly in terms of gender variable.

Students' opinions on the vocational guidance services were found to differ significantly in terms of school type variable in all items. The obtained results showed that the average score of the Anatolian high school students and private high school students were significantly higher than the average scores of industrial vocational high school students. Therefore, it can be concluded that students studying at Anatolian high school and private high school have more

positive opinions on the importance, necessity and benefits of the industrial vocational high school students. On the other hand, the opinions of the students on the negative or insufficient side of the vocational guidance services were higher for the Anatolian and private high school students compared to the industrial vocational high school students. In the study conducted by Çivicioğlu (2016), it was found that students' opinions on the vocational guidance services differed significantly in terms of school type variable. In the study, scores of students studying at Anatolian High School were found to be higher than the scores of students studying at different school types. In addition, Peker (2008) concluded that students' expectations on vocational guidance services differed significantly in terms of school type variable.

In the next sub-problem of the study, open-ended questions were asked to the students on the importance of vocational guidance services, main problems experienced in vocational guidance services; and students' suggestions and expectations about vocational guidance. Some students stated their opinions on the importance of vocational guidance services as *increasing awareness about the occupations, to help them discover themselves, to guide them to the profession appropriate to their personality characteristics, to give them the opportunity to get to know different occupations more closely, to offer them the opportunity to explore their interests and abilities and to direct them to the appropriate profession*. In addition, it is understood that the activities aiming at recognizing the professions contributes to the personal and social development, which shows that the students approach the issue from different perspectives. Different opinions have been expressed about the importance of vocational guidance. An individual's profession is the most important element that defines and identifies his/her identity (Herr et al., 2004). The occupation gives a certain form to the thoughts and life of the individual (Kuzgun, 2000). It should be kept in mind that the most important criterion determining the social status of the individual is profession. The answers to the questions such as "What kind of environment will he/she work with, with whom he/she will contact, what kind of lifestyle will he/she have, how much holiday will he/she have?" are related to the profession.

On the other hand, the problems experienced by some students related to the vocational guidance services were expressed as *insufficient number of guidance teachers, lack of physical equipment of the vocational guidance services, insufficient information about vocational guidance, and the negative viewpoints of the administrators on the guidance services.* Other problems such as *inadequate guidance hours and inadequate evaluation of the guidance duration in a healthy and appropriate way* are also stated by some of the students. There is a major imbalance in the distribution of guidance teachers in schools according to provinces and schools. While the recommended rate for conducting these services is 250 students for each counselor (ACA), this ratio varies between 1/905 and 1/2836 in Turkey (Akkök, 2006). Although the psychological counseling and guidance services in Turkey have been adopted from America, where these services are developed most since the beginning of the psychological counseling and guidance services, and all the resources and approaches have been taken from America, in the recent period, with the hope of membership in the European Union and with the support of the EU project, European countries have started to be modeled in vocational guidance and career counseling services and efforts have been made to create a system with some countries there (Akkök & Zelloth, 2010; Cedefop, 2008; Sultana &Watts, 2007).

The main suggestions and expectations of some students were as *teachers with professional knowledge and awareness should be included in the courses, guidance teachers are required to develop themselves continuously, communication with the students should be increased within the scope of vocational guidance services, students should be more informed about*

vocational guidance services and it is necessary to support the personal development of the students through activities to be conducted within the scope of guidance studies.

Based on the findings, the following suggestions can be provided:

- In order for the students to benefit more from the vocational guidance services, activities to raise awareness for the student are required.
- Priority should be given to the appointment of guidance counselors for schools that do not have guidance counselors or where the number of guidance counselors is insufficient.
- Deficiencies related to the implementation of vocational guidance services should be eliminated and it should be a priority for the students to make useful activities and practices.
- Student recognition and individual interview services should be increased.
- School guidance services should be turned into places that can serve better in terms of occupational information and awareness-raising.
- Administrators and branch teachers should support the development of vocational guidance services.
- Vocational guidance should be continuous.
- Vocational guidance services should be provided more frequently and with sufficient time.
- Vocational guidance services should not be kept on paper as a plan and implementation and evaluation activities should be emphasized.
- Vocational guidance should not be limited to students, but should also be organized for families that play a major role in the choice and preferences of students.

5. Conflict of Interest

The author declares that there is no conflict of interest.

6. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Akkök, F. (2006). *Mesleki bilgi, rehberlik ve danışmanlık hizmetleri Türkiye ülke raporu.* Ankara: İŞKUR Dökümanları.

Akkök, F., & Zelloth, H. (2010*). Lifelong guidance-a feasible policy option for Turkey.* Ankara: İŞKUR Dökümanları.

Arıcıoğlu, A., & Tagay, Ö. (2008). Okullarda ruh sağlığı hizmetleri. *Kuramsal Eğitimbilim Dergisi, 1*(2), 76-99.

Bacanlı, F. (1996). *Bir mesleki grup rehberliği programı ve uygulama klavuzu.* Ankara: M.E.B. Talim ve Terbiye Kurulu Bşk. Yayınları.

Bahar, H. (2002) Eğitim fakültesi, tıp fakültesi ve iktisadi ve idari bilimler fakültesi öğrencilerinin bazı sosyoekonomik özellikleri ile fakülte tercihleri arasındaki ilişki. *Erzincan Eğitim Fakültesi Dergisi, 1*(4), 125-144.

Bektaş, D. Y., & Demir, A. (2004). Üniversite öğrencileri için mesleki grup rehberliği programı ve programın etkisi üzerine bir çalışma. *Türk Psikolojik Danışma ve Rehberlik dergisi, 3*(22), 27-34.

Cohen, L.,Manion, L., & Morrison, K.(2007). *Research methods in education*. London: Routledge Falmer.

Çetinkaya, B. (1995). *Lise son sınıf öğrencilerinin yetenek ve ilgilerine uygun mesleki tercihleri yapmalarında mesleki rehberlik uygulamalarının etkinliğinin incelenmesi.* (Yayımlanmamış yüksek lisans tezi). Karadeniz Teknik Üniversitesi Sosyal Bilimler Enstitüsü, Trabzon.

Çivicioğlu, M. (2016). *Ortaöğretim rehberlik programının öğrenci görüşlerine göre değerlendirilmesi.* (Yayımlanmamış yüksek lisans tezi). Bülent Ecevit Üniversitesi Sosyal Bilimler Enstitüsü, Zonguldak.

Edwards, K., & Quinter, M. (2011). Factors influencing students career choices among secondary school students in Kisumu Municipality, Kenya. *Journal of Emerging Trends in Educational Research and Policy Studies, 2*(2), 81-87.

Efilti, E. (1998). *Mesleki rehberliğin meslek seçimine etkisi üzerine bir araştırma*. (Yayımlanmamış doktora tezi). Selçuk Üniversitesi Sosyal Bilimler Enstitüsü, Konya.

European Centre for the Development of Vocational Training (CEDEFOP). (2008). *Establishing and developing lifelong guidance policy forums: A manual for policy makers and stakeholders.* Luxembourg: Puplications Office.

Hatunoğlu, A., & Hatunoğlu, Y. (2006). Okullarda verilen rehberlik hizmetlerinin problem alanları [Problem areas of counseling services in Turkey]. *Kastamonu Eğitim Dergisi, 14,* 333-338.

Herr, E. L., Cramer, S. H., & Niles, S. G. (2004). *Career guidance and counseling: Through the lifespan* (6th ed.). Boston: Pearson Education Inc.

Karagüven, H. (2001). *Endüstri meslek liselerinde rehberlik servislerinin işlerliğinin incelenmesi ve gereksinim belirleme çalışması.* VI. Ulusal Psikolojik Danışma ve Rehberlik Kongresi. Ankara: ODTÜ Eğitim Fakültesi.

Karataş, Z., & Şahin Baltacı, H. (2013). Ortaöğretim kurumlarında yürütülen psikolojik danışma ve rehberlik hizmetlerine yönelik okul müdürü, sınıf rehber öğretmeni, öğrenci

ve okul rehber öğretmeninin (psikolojik danışman) görüşlerinin incelenmesi, *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi, 14*(2), 427-460.

Kazi, A. S., & Akhlaq, A. (2017). Factors affecting students' career choice. *Journal of Research & Reflections in Education (JRRE), 11*(2), 187-196.

Khan, A. Z., Khan, H. G., Siraj, A., & Hijazi, T. (2011). Importance of school based ICT Curriculum & Career Counseling in Pakistan. *International Journal of Humanities and Social Science, 1*(2), 61-67.

Kıyak, S. (2006). *Genel lise öğrencilerinin meslek seçimi yaparken temel aldığı kriterler.* (Yayımlanmamış yüksek lisans tezi). Yeditepe Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.

Kumar, S. (2016). Career choice and college students: Parental influence on career choice traditionalism among college students in selected cities in Ethiopia. *International Journal of Psychology and Educational Studies, 3*(3), 23-30.

Kuzgun, Y. (2000). *Meslek danışmanlığı kuramlar ve uygulamalar.* Ankara: Nobel Yayın Dağıtım.

Ministry of National Education (MoNE). (2017). Ministry of National Education Regulations. Official Gazette. Date: 10/11/2017 Issue: 30236. Retrieved from https://www.resmigazete.gov.tr/eskiler/2017/11/20171110-2.htm

Nyamwange, J. (2016). Influence of student's interest on career choice among first year university students in public and private universities in Kisii County, Kenya. *Journal of Education and Practice, 7*(4), 96-102.

Official Gazette, (2018). Milli Eğitim Bakanlığı Rehberlik Hizmetleri Yönetmeliği. https://orgm.meb.gov.tr/meb_iys_dosyalar/2017_11/10113305_yeni_rehbrlk_yon.pdf

Öksüz, H. (2001). *Mesleki grup rehberliğinin lise öğrencilerinin ilgi ve yeteneklerine uygun alan seçmelerine etkisi.*(Yayımlanmamış yüksek lisans tezi). Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Pascual, N. T. (2014). Factors affecting high school students' career preference: A basis for career planning program. *International Journal of Sciences: Basic and Applied Research, 16*(1), 1-14.

Peker, A. (2008). *Farklı liselerdeki öğrenci, öğretmen ve yöneticilerin rehberlik beklentilerinin bazı değişkenler açısından incelenmesi*.(Yayımlanmamış yüksek lisans tezi). Atatürk Üniversitesi Sosyal Bilimler Enstitüsü, Erzurum.

Poyraz, C. (2007). *Orta dereceli okullarda yürütülen rehberlik hizmetleri üzerine bir araştırma.* (Yayımlanmamış yüksek lisans tezi). İstanbul Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.

Savickas, M. L., & Lent, R. W.(1994). (Eds.). *Convergence in career development theories: Implications for science and practice.* Palo Alto, CA: CPP Books.

Sultana, R. G., & Watts, A. G. (2007). *Career guidance in the mediterranian region.* Luxembourg: Puplications Office.

Şahin, F. (2008). Ortaöğretimdeki öğrenci görüşlerine göre Psikolojik Danışma ve Rehberlik (PDR) hizmetlerinin değerlendirilmesi. *Uluslararası İnsan Bilimleri Dergisi*, 5(2), 1-26.

Topçu, Ç. (2014). *9. sınıf rehberlik programının öğrenci görüşlerine göre değerlendirilmesi.* (Yayımlanmamış doktora tezi). Bülent Ecevit Üniversitesi Sosyal Bilimler Enstitüsü, Zonguldak.

Turan, Ü., & Kayıkçı, K. (2019). Lise son sınıf öğrencilerinin meslek seçiminde okul rehberlik hizmetlerinin rolü. *E-International Journal of Educational Research*, *10*(1), 15-33.

Tuzcuoğlu, S. (2000). Benlik ve mesleki benlik kavramlarının öğrenim yılları ile ilişkisi. *M.Ü. Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi,* (12), 267-280.

Ulaş, Ö., & Yıldırım, İ. (2015). Lise öğrencilerinde mesleki olgunluğun yordayıcıları. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 30*(2), 151-165.

Yıldırım, A., & Şimşek, H. (2008). *Sosyal bilimlerde nitel araştırma yöntemleri.* Seçkin Yayıncılık, Ankara.

Al-efeshat, H., & Baniabdelrahman, A. (2020). The EFL teachers' and students' attitudes towards the use of songs in learning English. *International Online Journal of Education and Teaching (IOJET), 7*(3). 844-858.
https://iojet.org/index.php/IOJET/article/view/862

Received: 12.04.2020
Received in revised form: 15.05.2020
Accepted: 19.05.2020

THE EFL TEACHERS' AND STUDENTS' ATTITUDES TOWARDS THE USE OF SONGS IN LEARNING ENGLISH

Research Article

Heba Al-efeshat

Directorate of Education for Wadi Al-Seir, Amman, Jordan

hebbahmansoor@yahoo.com

Abdallah Baniabdelrahman

Yarmouk University, Irbid, Jordan

baniabdelrahman@gmail.com

Heba M.N. Al-efeshat is the Head of the Supervision Department at the Directorate of Education for Wadi Al-Seir/Amman /Jordan.

Abdallah Baniabdelrahman is a Professor of Curriculum and Instruction Department at Yarmouk University / Irbid/ Jordan.

THE EFL TEACHERS' AND STUDENTS' ATTITUDES TOWARDS THE USE OF SONGS IN LEARNING ENGLISH

Heba M.N. Al-efeshat

hebbahmansoor@yahoo.com

Abdallah Baniabdelrahman

baniabdelrahman@gmail.com

Abstract

The purpose of this study is to investigate the EFL teachers' and students' attitudes towards the use of songs in teaching and learning English language. The participants were (43) English teachers who teach Sixth Grade in public schools in the directorate of Education for Wadi Al-Sier in Amman. (42) Sixth-grade students were participated as well in this study from the same Directorate. Questionnaires were filled out by both EFL teachers and students. The results show that students are of view that songs helped them learning English vocabulary and it is also considered as good practice by teachers. Based on the results, some recommendations for both teachers and students have been highlighted.

Keywords: EFL teachers and students, attitudes, songs and music

1. Introduction

English is an international language and fundamental to learning and communication in all cultures. For Jordanian students, English is a Foreign Language (EFL). Thus, curriculum should help the students to use the English Language properly. This, however, cannot be achieved unless students have a vast vocabulary that allows them to be able to communicate, comprehend, acknowledge, and interact with people from all around the world as well as those who identify as Jordanians. Owing to the growing acceptance and popularity of Information Technology (ICT), students are now required to stay up to date with the latest technological trends and practices for which they must possess a firm grip over the English Language so that they may advance in their respective careers. Learning English will enable them to be self-confident and proficient in their pursuit of further education and the needs of school-based employment opportunities.

Educating English, particularly in essential schools, points to propel and empower understudies to be more certain in considering English. For essential understudies, instructing English is uncovering them to lexicon in expansion to elocution when they learn for the primary time (Burhayani, 2013). For this, instructors play a crucial part. They ought to keep understudies interested, persuaded, and locked in in learning a outside dialect and accomplish the lesson destinations (Ratnasari, 2007). Instructors are to assist understudies in overcoming the challenges that they may confront whereas learning and securing a remote dialect (Burhayani, 2013).

For decades, teaching English in our schools has been characterized by the employment of a usual manner. Academics seldom use teaching aids. Recently, they have begun to use them. However, due to restricted resources available in schools, flashcards and posters are amongst

the most frequent and foremost used aids in displaying vocabulary. Listening and speaking activities are almost always neglected and not given the amount of attention required or deserved.

Students suffer from difficulties in saying bound words. Through technological developments and alteration in teaching demands, several different studies prove the effectiveness of using music and songs in teaching English, particularly for young learners. Using music and songs in language schoolroom as good pedagogics has been suggested particularly for young learners. Communication techniques from the Nineteen Fifties to Seventies used songs in pedagogy lecture rooms to cut back the tedium that might occur from repetitive drills (Kanel, 2000).

This study will explore the attitudes of both students and teachers towards the use of songs to improve the acquisition of English vocabulary. For teachers, the study will examine their use of unconventional methods such as the use of English songs to enhance individuals' vocabulary of the said language. The focus of this study revolves around a group of sixth grade EFL students and English teachers who teach this stage. Music and songs are known to play an essential role in motivating students to learn new languages, and it also stimulates their abilities to read, write, as well as verbally communicate with proficiency in phonetics, pronunciation, and grammar (Lo & Li, 1998). The role of songs in improving vocabulary has been extensively covered in several past studies. (Orlova1997, Murphy 1992).

The utilize of tunes in instructional method is regularly accommodating to amplify lexical, syntactic, phonological, etymological, and social competencies, notwithstanding of person instructing approach, fashion or melodic preparing, and without relinquishing center competencies (McLaren & Lankshear, 1994).

Moreover, songs play a significant role in developing learners' skills: reading, writing, speaking and listening, pronunciation, rhythm, synchronic linguistics, and vocabulary (Lo & Li, 1998).

Melodies encourage the presence of a wonderful and interesting air and exercises at school (Ulate, 2008). Orlova (1997) recognizes that melodies will work as relate degree support for learners to utilize English. They will encourage learners recognizing words basically in case they are upheld with photographs and activities. Besides, they will eventually spur them towards lexicon procurement (Al-Mamary, 2007).

In Jordan, the language of English has gained much importance, and English is taught as a Foreign Language. Due to its importance, it has become a compulsory subject in the Jordanian School's syllabus, and English is studied in their schools from grade one to grade twelve (Tawjihi). The principal aim of making English compulsory in all schools of Jordan is that all the students that are graduating from their schools must be speaking fluent English and having full command in English. By learning English, they can deal with universal developments (Abu Qulbein, 2004).

By making English subject compulsory in all elementary schools of Jordan, teachers can make the students more confident, and they can encourage them to take part in different English speech competitions so that they will have complete command of English. In the elementary schools, teachers select the Basic English for the students so that they can pronounce easily and they can quickly learn the vocabulary of the words because it is a beginning for them to learn English as a language so we should develop their basics first regarding the English language (Burhayani, 2013).

Teachers play an essential role in developing their English Learning skills because if a teacher is motivated and wants to learn a new language, then he/she can also motivate and

encourage his/her students to learn the English Language. A teacher should have some aims and goals to achieve only then he/she can motivate the students (Ratnasari, 2007).Thus, the researchers investigated the attitudes of English teachers who mainly teach English for primary stages in public schools in Jordan.

Teachers are responsible for taking care of every child and for seeing if anyone finds difficulty in learning the vocabulary of the English words, or he/she can pronounce the words correctly or not. It is their responsibility to teach every student and cope up with every problem that occurs during their teaching session (Burhayani, 2013).

Every teacher should plan different techniques or develop some strategies to attain his/her goals. But the methods should be chosen according to the objectives, and it should be a basic level for the students, and the teaching style should be effortless so that the students can understand it easily. A teacher should think before teaching that he/she is showing it to the elementary classes because there is a vast difference in teaching to secondary learners and the basic learners (Harb, 2007).

1.1. Advantages of the Use of Songs in the English Class

Many researchers, including (Mardliyatun, 2007; Asih, 2011; Millington, 2011; Apsari, 2012; Burhayani, 2013), observe that using songs in their English lesson class will be very beneficial in learning English. And if there will be a variety of songs available in the category, then the students can select their favorite songs, and they will be more encouraged to learn the English language.

Songs help the students to improve their vocabulary, their English learning skills, and develop the habit of learning the English language with more passion (Burhayani, 2013).

Music is a relaxation for the mind, and it involves different parts of the brain, including the right hemisphere of the brain. By engaging different parts of the brain, it will be a more relaxing and comprehensive behavior (Saeki, 1994). To include a fun element in the class and to make the course more entertaining and to involve students in different activities, music and songs are used in the class.

Including songs in the English class has many advantages because it enhances the vocabulary of a person and improves their grammar skills and pronunciation. Playing music in class helps improve your speaking skills, and these are the views of Orlova (2003).

1.2. Statement of the Problem

Learning a second language is influenced by several key factors. These factors include not just the method of teaching or nature of learning but also individual readiness and willingness to learn. It has also observed that social encouragement and modern methods of teaching (using technology) are especially useful in such a case. In Jordon, English remains one of the most challenging subjects, as reported by the students.

Teaching EFL, particularly for young learners, involves using creative and motivating methods and techniques. Students might have problems in learning vocabulary.

Despite the communicative nature of the Jordanian English info, the students have lack of vocabulary competency. Without adequate vocabulary learners cannot communicate successfully or express their thoughts. Some learners contemplate learning vocabulary as a tedious job, which ends up in a restricted vocabulary that stops them from learning a language. The utilization of songs and music in teaching English is one methodology that is used to facilitate learning (Lappi, 2009). Music plays a very important role in setting the tone of the schoolroom, developing skills and ideas, serving kids to build transitions, and creating

a way of the community (Schiller, 2007). Jordanian English info encompasses a restricted variety of songs and games (Dajani & Mclaughlin, 2009). Therefore, this study aims to investigate the attitudes of English teachers and students towards the use of songs in teaching elementary grade students' vocabulary.

1.3. Objectives of the Study

The primary purpose of this study is to investigate the English language teachers' attitudes who teach English for the primary stages towards applying English songs in teaching vocabulary in their classrooms as well as the attitudes students who learn English. The study aims to answer the following question:

What are the EFL teachers' and students' attitudes towards the use of songs in learning English?

1.4. Significance of the Study

The English Language remains as a source of pressure and stress for school (including principals and teachers), pupils and parents alike. Therefore the importance of this study lies in the relevance and intensity of the topic itself. It sheds lights on the attitudes of both teachers and students towards applying English songs in the process of teaching and learning English. Some teachers are unaware of applying some teaching methodologies in their categories like songs. This study highlights the effectiveness of exploitation songs and their effects on EFL teachers' and students' attitudes and teaching EFL vocabulary for the Sixth-grade students. It is hoped that the results of this study will facilitate English language teachers to make productive learning surroundings within the lightweight of exploitation songs.

1.5. Definition of the Terms

Attitudes: people's beliefs towards certain topic and they can be positive or negative. In this study they are the teachers' and students' beliefs towards using songs and music in teaching and learning English.

Children's song: It is a nursery rhyme that is made by the students in their own different words and is used for various purposes like education and culture. In this study they are a number of songs selected for the sixth grade students in English language classes.

Sixth Grade Students: Six grade or class six are the students aging between 11-12 years.

1.6. Limitations of the Study

The limitations of this study are stated as follows:

1. This study is restricted to two sections of the sixth grade at Al-Swaysa High School for girls and Al- Zeyoud Elementary School for boys in the Directorate of Educational for Wadi Al –seir.

2. The small sample size limits the generalization of the results finding of the study.

2. Literature Review

Considers with respect to utilizing tunes in instructing are restricted; particularly the ones that tend to examine the demeanors of instructors and understudies towards the utilize of English tunes. Most ponders attempt to discover out how melodies can be consolidated in instructing procedures, how they influence learners, how instructors utilize, and the benefits of music and tunes in creating dialect aptitudes (Pasanen 2010).

Melodies are a combination of dialect and music that capture consideration. When language and music are blended together, tunes ended up great source for educating social subjects, expressions, lovely expressions in expansion as they may be utilized as a helpful work (Shen, 2009). For this, Melodies are considered as educational apparatuses in dialect educating (Millington, 2011).

Utilizing tunes in youthful learners' classes has numerous benefits. Melodies are adaptable and can be utilized for numerous purposes (Millington, 2011). Instructors can utilize tunes for illustration to form the instructing and learning prepare more curiously and viable, plan understudies for a modern movement, engage understudies and make them discover learning through tune entertaining, make understudies be recognizable with the cadence of a outside dialect and indeed culture of the nation of the dialect (Kuźma,2008).Adding to that, tunes are too an successful instrument for, educating phonetics, language structure, elocution, lexicon building and encouraging memorization (Forster, 2006).

Hejjawi (2007) investigated the attitudes of students and teachers toward the use of music in UAE English classes. Her study examined 160 participants from two groups: the first was secondary and collage male and female teachers. The second group was collage males and females students in UAE. The qualitative data using interviews indicated that religious beliefs toward the use of music decreased the use of music in English classrooms for both teachers and students. Questionnaires were also used in the study. Other reasons including lack of teaching materials, lack of time as well as difficulty of choosing music and songs decreased the use of songs and music in classrooms. However, most students showed a positive attitude toward the use of songs and music in classrooms.

Joel &Shah (2018) examined the attitude of rural primary Kanowit students toward the use of songs in their English classrooms.60 students were participated in the study. The data collected via a questionnaire .The results revealed that students had a positive attitudes toward learning songs through songs.

Utilizing tunes may offer assistance in educating youthful learners. For illustration, Ara (2009) expressed that children learn quicker than grown-ups particularly in case they weren't instructed in conventional ways. So, the utilize of tunes and diversions is an successful apparatus in instructing English for youthful learners particularly that they made them oblivious that they are learning a dialect, i.e. they give an curiously and pleasant environment for learning without the feeling of weight. Ara's discoveries investigation appeared that in Bangladesh instructors are oblivious of the viability of utilizing tunes, rhymes and diversions in children's classes as implies of intrigued and inspiration; they still utilize incapable conventional ways of educating with memorization. The impact of the adequacy of melodies will show up in afterward stages with least level of capability in English to manage with their courses. Even great students need to battle to induce higher auxiliary exams CGPA

2.1. Importance of Vocabulary Development

According to Macaro (2003), vocabulary enhances teaching and learning English. Vocabulary is important for the following purposes:

1- Rich vocabulary facilitates clear communication and effective expression.

2- Rich vocabulary results in enhanced reading comprehension and vice versa.

3- Thinking vocabulary is similar to Linguistic vocabulary.

4- People judge others on the basis of their vocabulary (Vocabulary, 2014).

Lexicon estimate is critical in success in school (Lehr et al., 2004; Pikulski & Templeton, 2004; Blachowicz, Fischer & Watts-Taffe, 2005; Sobolak, 2008; winter, 2010). Lexicon measure is imperative particularly in essential levels to assist understudies anticipate be able to comprehend (Johnson, 2004). Understudies with destitute lexicon may confront challenges in perusing and composing. The Report of the National Perusing Board (2000) concluded, "The significance of lexicon information has long been recognized within the improvement of perusing abilities. As early as 1924, analysts famous that development in perusing control depends on nonstop development in word knowledge" (Pikulski& Templeton, 2004. p.1).

3. Method

3.1. Study Population

Sixth grade students from all schools of the Directorate of Education for Wadi Al–Seir were selected as study population. As per official record, there are about fifty-five schools in the mentioned directorate. From this population of two thousand nine hundred and thirty eight students who were enrolled in the first semester of the academic year 2019-2020, a random selection was made for study sample.

3.2. Study Sample

Eighty students were randomly selected from this population of about two thousand nine hundred and thirty eight students of all of the schools of the Directorate of Education for Wadi Al–seir as study sample. Arabic was mother tongue of these sixth grade students and these students were learning English as a second language. A comprehensively representative sample of these EFL students was selected by the researchers.

The sample was further categorized into four groups; two groups of male students and two groups of female students. The female students were selected from Al-Swaysa High School for girls and the male students belonged to Al- Zeyoud Elementary School for boys in the Directorate of Education for Wadi Al –seir. Out of these four groups, two were designated as the experimental group (n =41 students) and the other two were placed in the control group. The control group (n =39 students) was delivered instructions via traditional teaching techniques while the experimental group was taught by using innovative techniques using songs. In the pre-test, performance of the experimental group was lower than that of the control group that is grades of the control group were higher than those of the experimental one. The teachers' sample consists of (43) English teachers who teach English for the primary stage in public schools in Jordan. For males teachers (n=26) while for female teachers (n=17).Thus a total of (43) English teachers has been chosen as a sample for the teacher's attitude questionnaire.

3.3. Study Instruments

3.3.1. Attitudes questionnaire for teachers

This questionnaire was devised for acquisition of quantitative data for the study. Objective of this questionnaire was to get a glimpse of attitudes of the elementary grade teachers towards the use of songs in English classes and to record their views regarding affectivity of this teaching method in English learning.

The questionnaire items were developed for this current research from some significant ideas identified in the related literature and in the previous studies. The first draft was adapted and adopted from various recourses: (Yu-Ling; 2005, Sevic; 2011, Bevic; 2013, Sevic; 2014 Tse; 2015). The questionnaire was composed of three sections. In every section, the participants were asked to choose a suitable option as per his/her preference. First section was related to personal information about participants like gender, education, years of

experience, and teaching diploma. Second section was related to participant's school information like public or private, grades, class size, and curriculum taught. In the final section, twenty five statements were arranged in four sub-sections. These statements were given to explore the attitudes to beliefs towards using songs in English classes of the participant teachers. The statements were aimed to collect responses of the teachers regarding the educational value of songs, their role in enhancing academic performance of the students, ease of songs' accessibility and the suggested frequency at which songs should be used in the classes. The teachers were also allowed to write any suggestion or additional comments. Responses were scaled of 1 "Strongly Disagree" 2 "Disagree" 3 "Neutral" 4 "Agree" 5 "Strongly Agree". The collected data was analyzed on Likert scale format.

Experts from the English Language University professors of 'Evaluation and Measurement department', Faculty of Education at Yarmouk University, The University of Jordan and AL-Hussein Bin Talal University as well as a group of English supervisors from different Directorates of Education reviewed the first draft of the questionnaire. In the light of these experts' comments, a second draft was prepared. The updated and modified second draft was then reviewed by researchers. Three parts were included in the final version of the questionnaire which are:

Part One: In the first part, various demographic factors were included. Four such items were included which are; gender of the participant, teaching diploma, academic qualification, and teaching experience. These factors served as an additional variable for the study.

Part Two: Second part included information related to school, relevant classes, average class size and English curriculum that school used.

Part Three: Twenty five statements were included in this final part. This part consisted of 25 items. A five-point Likert scale was utilized for rating the respondents from 1= strongly disagree to 5= strongly agree (5= strongly agree, 4=agree, 3=neutral, 2=disagree, and 1= strongly disagree). Purpose of this part was to know the beliefs and attitudes of teachers towards incorporating songs in their teaching methodology. The statements were designed on two dimensions:

1. Pedagogical value of using songs: It consisted of 17 items (1-17). These items examined participants' beliefs and attitudes towards incorporating songs in teaching methodology.

2. Frequency of using songs: It consisted of 8 items (18-25). These items examined the frequency that participant use songs in classroom and when to use it. Participants were asked to write any additional comments they would like to mention pertaining to songs usage in teaching English language and their impact on language teaching.

3.3.2. Attitudes questionnaire for students

In addition to teachers' questionnaire, a questionnaire for measuring the impact of songs on the students' learning attitude was also designed see (Appendix 2). This questionnaire was a modified version of questionnaire of Huwari (1996). Twenty two statements were arranged in the four sections of the questionnaire. In the first section of the questionnaire, six statements were included whose purpose was to gauge the discovery skills of the participants. There were also six statements in the second section of the questionnaire, the goal of which was to measure activity skills of the participants. In the third section, four statements were included for measuring word recognition skills of the participating students. In the final section, six statements were included for measuring the attention skills of the participating students. The participants were told to complete the questionnaire and their responses were recorded for further analysis.

In the questionnaire, alternatives were used for recording responses of the participating students. Each alternative was assigned a certain value for example 'Always 4, Usually 3, Sometimes 2, and Never 1'. A five point scale was used by the researcher that is, 'Very High 5, High 4, Mid 3, Low 2, Very Low 1'.

3.3.2.1. Validity of the learning attitude questionnaire via songs

To establish the validity of the learning attitude questionnaire via songs, the questionnaire was given to a panel of specialists in instructional technologies, specialists in evaluation and measurement and psychologists at Yarmouk University, University of Jordan, Al-Hussien Bin Talal University, as well as a group of English supervisors from different directorates of Education in Jordan. They were asked to read the items of the questionnaire, and provide their suggestions and modifications concerning the contents with regard to construction, purpose, and clarity of the item. Their suggestions were taken into consideration in the final format of the questionnaire.

3.3.2.2. Reliability of the learning attitude questionnaire via songs

The questionnaire was distributed on a sample consisting of 42 students out of 80 students who were taught by using song in their English classrooms from males and females students. Pearson coefficients were computed and found to be (0.78). Internal consistency coefficients were also computed (Cronback alpha =0.84).

3.4. Data Analysis

A description of the sample and the findings are presented, concluding with a summary of the findings. All analyses were performed using SPSS statistical package version 21. Statistical significance was defined for two-sided $p < 0.05$.

Students' and teacher's attitude towards use of songs in learning English was illustrated in frequencies, mean, SD, minimum and maximum. Students' and teacher's attitude towards use of songs in learning English was compared by independent sample t -test. The reliability of student's and teacher's attitude questionnaire was tested using Cronbach's alpha test.

4. Findings

4.1. Students' Attitudes

Attitude of students were also measured and 42 students participated in it. Out of them, 25 of them were males while only 17 were females.

Table 1. *Gender distribution of sixth grade students*

Gender	Number	Percentage
Male	25	59.5
Female	27	40.5

The following table indicates the attitudes of students towards the use of songs in learning. The attitude of students towards the learning of English using songs were assessed by statements in which they were asked to rate their attitude in a scale of 5. Scale 1 indicates strongly disagree while scale 5 indicates strongly agree.

Table 2. *Students' attitudes towards use of songs in learning*

Statement	Min	Max	Mean	SD
I feel calm with songs.	1	5	4.33	.979
I feel that working with songs is interesting.	3	5	4.83	.437
I feel that songs enrich my knowledge.	1	5	4.38	.825
I like work by Which computer is used	1	5	4.38	.854
I feel that book's role began to vanish in the communication era.	1	5	4.52	.943
I feel that songs increase my mental skills.	1	5	4.45	.739
I feel that learning English by songs is useful.	1	5	4.48	.890
I feel that songs enrich my vocabulary	1	5	4.00	1.082
I feel that songs enable me to communicate better than the traditional one.	2	5	4.31	.897
I feel that songs make E. vocabulary more familiar	1	5	4.31	1.000
I feel that songs are better than traditional strategies to learn	1	5	4.00	1.189
I feel that learning by songs Shortens lecture's time.	1	5	4.26	.989
I feel more serious towards my duties through songs	1	5	4.19	1.234
I feel that songs refresh the class environment.	3	5	4.76	.484
I feel that songs form a unique addition to grasp E-Text	1	5	4.38	1.011
I think that using songs increases my desire to learn more.	1	5	4.21	1.200
I feel that using songs to teach non- scientific subjects is desirable	1	5	3.52	1.452
I feel glad to learn at songs lab.	2	5	4.00	1.012
My attraction is increased by songs during lecture.	1	5	3.67	1.373
I feel that songs are a loss of time	1	5	1.67	1.282

The table indicates that the students enjoy the use of songs in their studies as most of the statements scored more than 3.5. They disagree with the statements of "I feel that songs are a loss of time."

4.2. Descriptive Statistics of Teachers

The following table indicates the gender distribution of teachers participated for this study.

Table 3. *Gender distribution of teachers*

Gender	Number	Percentage	Valid percentage
Male	26	59.1	60.5
Female	17	38.6	39.5
Missed	1	2.3	

Based on valid data, 60.5% of the teachers in this study are males while only 39.5% of them are female teachers.

The educational level of teachers is as follows.

Table 4. *Educational level distribution of teachers*

Educational level	Number	Percentage	Valid percentage
Bachelor	14	31.8	35.9
Masters	20	45.5	51.3
Diploma	5	11.4	12.8
Missed	5	11.4	

As shown in the table above, based on valid data, the majority of the teachers hold a master degree (51.3%) while 35.9% of them have bachelor degrees.

Table 5. *Distribution of teaching diplomas among teachers*

Have a teaching diploma	Number	Percentage	Valid percentage
Yes	30	68.2	96.8
No	1	2.3	3.2
Missing	13	29.5	

Based on valid data, 96.8% of the six grade teachers have a teaching diploma while only 3.2% do not have a teaching diploma.

The attitude of teachers towards the learning of English using songs were assessed by 17 statements in which the teachers were asked to rate their attitude in a scale of 5. Scale 1 indicates strongly disagree while scale 5 indicates strongly agree.

Table 6. *Teachers' attitudes towards use of songs in English learning*

Statement	Min	Max	Mean	SD
Songs are considered a valuable pedagogical tool in learning English.	3	5	4.45	.589
Songs help develop language acquisition.	4	5	4.48	.505
Songs can be used to illustrate themes or topics.	3	5	4.36	.532
Songs help learners become familiar with word stress, intonation and rhythm.	2	5	4.36	.685
Songs enable learners to remember chunks of language	2	5	4.48	.628
Songs provide students with opportunity for great exposure to improve vocabulary acquisition.	2	5	4.27	.694
Songs help improve students' speaking skills.	3	5	4.45	.589
Songs help students to better understanding of the culture of the target language.	4	5	4.59	.497
Songs are useful in the teaching of sentence structure	3	5	4.34	.680
Songs help learners improve their listening and pronunciation skills.	3	5	4.50	.591
Songs increase students' enjoyment of learning English	3	5	4.34	.645
Songs add interest to the classroom routine	3	5	4.50	.629
Songs improve student's motivation.	3	5	4.43	.545
Songs help create a relaxed and non-threatening environment of learning.	3	5	4.48	.664
Songs can be used to practice the four skills.	1	5	4.43	.759
Songs help create more students' participation.	1	5	4.32	.771
Songs lower students' anxiety toward learning English	2	5	4.39	.689

It is clear that the teachers have positive attitude towards the use of songs in English learning. All of the statements scored above 4 which indicate a significant agreement. In most of the statements, the minimum value of 3 or 2 indicates that almost all teachers believe that the use of the songs in learning is an effective tool.

4.3. Comparison of the attitudes between teachers and students towards use of songs in English learning

Independent sample t test was conducted to compare the attitudes between the students and the teachers towards English learning. The independent sample t test results are as follows.

Table 7. *Paired sample t test for the difference in attitude between teachers and students*

	Group	Number	Mean	SD	Std. Error Mean	t value	P value
Attitude score	Student	84	4.1333	.45439	.04958	-3.445	0.001**
	Teacher	84	4.37	.360	.039		

There is a significant difference in levels of attitude between the teachers and the students towards the use of songs in learning English. This is evident in the above independent sample t test results that the teachers (4.37) have higher attitude than the students' towards the use of songs in English learning (4.1333), t (83) = - 3.445, $p < 0.05$.

5. Discussion and Conclusion

The focus of this research study mainly is to investigate the teachers' and students' attitudes toward using songs in teaching vocabulary. Combining the songs melody with the target language offers many advantages in learning English language.

In order to achieve purpose of this research, study mode was designed using Attitudes Questionnaire for Teachers, and Attitudes Questionnaire for Students The judges and jury of all the assessment belongs to the Yarmouk University, University of Jordan, and Al-Hussain Bin Talal University .In addition to a group of English supervisors from different Directorates of Education who checked the first draft of assessment results and then directed to design second draft of assessment. The data analysis was carried out by using SPSS software for calculating standard deviation and means.

Through questionnaires for students and teachers, it is quite clear that students are of view that songs helped them learning English vocabulary and it is also considered as good practice by teachers. The taste and choice of the music for each individual is also very important as most of the students search for their favorite music and then listen it every day. It should be part of the teachers training that which type of music and song is more suitable for their students and what are their interests towards them.

As a conclusive summary, it is clear that music plays a very big and important role in the society because it is a part of human life as important events. Nowadays, teachers of English language found it meaningful to use songs to teach vocabulary. In addition, Songs are considered as source of motivation and beneficial in learning English language.

Teachers have very meaningful role in the process of the teaching English language vocabulary. They are the one responsible for helping students to expand and improve their knowledge of vocabulary. Songs bring interesting changes in the classroom by energizing the learning environment, as student find listening to song as good approach to learn English language because in order to understand what song is about, they read and then translate the

lyrics by their own. In this way, they learn new words of language subconsciously. Additionally, another important benefit is that many words in the songs are repetitive making easy for student to remember and memorize.

Analyzing results, it can be said that the use of songs is an effective teaching tool having pedagogical values. Moreover, this teaching approach has ability to improve the listening and speaking skills of the learners. Furthermore, with the use of songs in the English language class, students will be motivated to learn English language with the addition of joy and enjoyment. The findings of this study strongly demonstrate that songs have effective potential of playing role in the language learning and teaching process. The results obtained are strongly in favour of the believe that songs should be part of the teaching methods of language learning.

In order to achieve the goal of using songs in the leaning process, major role is of teachers. They should have different and interesting techniques to add song in the learning process based upon the interest, age and curriculum design.

6. Recommendations

Through this study, it can be said we can say that it is a collective role of learners, teachers, parents and educational institutes to implement the use of songs in learning process of language. This study recommends them to effectively take part in this process of learning English as it is need of today's time in order succeed internationally in any field of life. In addition, they should have positive attitudes towards the use of songs in teaching English vocabulary.

6.1. Recommendations to learners

It is very important that students of every age should understand that English language is very necessary, and it should not be neglected for many reasons. If students aim to have high command of English, they should listen and follow the commands of the teacher. As this research says, that teacher found songs and games more effective way to teach language, it is a responsibility of the students that they should take part in the activities. One should learn that beyond the concept of fun and enjoyments with songs, there are many other important things to learn from them as well.

It is now up to the learners that they get maximum benefit from songs and games in term of leaning language and other things.

6.2. Recommendations to teachers

Teachers should use the method of using songs in the learning classroom for effective outcomes. They also work for enhancing the communicative abilities of their students by using this practice as discussed in this research study. It should also important for teachers that they do not worry about the results of their students in final exam, rather work on enhancing theirs FEL and communication abilities.

7. Conflict of Interest

The authors declare that there is no conflict of interest.

8. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Abu Qulbein, I. (2004). *The Effect of Using Language Games on EFL VocabularyAchievement: The Case of Seventh Grade Students in Jerusalem District*. Unpublished M.A Thesis, Al-Quds University.

Al-Mamary, N. N. (2007). *Using songs to promote vocabulary learning in grade 1*. Muscat, Oman: Ministry of Education. Retrieved October 10, 2012, from: http://www.moe.gov.om/portal/sitebuilder/sites/eps/English/MOE/baproject/C

Apsari, Y. (2012). Teaching English vocabulary through songs. *Universitas Pendidikan Indonesia*. Retrieved November 18, 2012, from: http://repository.upi.edu/operator/upload/abs_2012_yanuarti_teachingenglishvocabularythroughsongs.pdf

Ara, S. (2009). Use of songs, rhymes and games in teaching English. *The Dhaka University Journal of Linguistics, 2*(3), 161-172. doi:10.3329/dujl.v2i3.4150.

Asih, N. (2011). The effectiveness of using pictures and songs in teaching vocabulary to young learners. *GUNADARMA UNIVERSITY LIBRARY*. Retrieved : November 18, 2012, from http://papers.gunadarma.ac.id/index.php/letter/article/view/16970/16151

Bevik, M. (2013). Teacher views about using songs in teaching English to young learners. *African Journal of Music Education*, 1(2), 023-030. Retrieved April 15, 2014, from: http://internationalscholarsjournals.org/download.php?id=245861984395492062.pdf&type=application/pdf&op=1

Blachowicz, C. L., Fischer, P. J., & Watts-Taffe, S. (2005). *Integrated Vocabulary Instruction: Meeting the needs of diverse learners in grades K-5.* USA: Learning Point Publisher, NCREL. Retrieved October 17,2013 from: http://www.learningpt.org/pdfs/literacy/vocabulary.pdf

Burhayani. (2013). The effectiveness of teaching vocabulary through songs to the second years students of Ikatan Keluarga KesejahteraanTentara (IKKT) Elementary School West Jakarta. *2nd International Seminar on Quality and Affordable Education, (ISQAE 2013)*. 70-73.

Dajani, D. & Mclaughlin, S. (2009). Implementing the first Palestinian English language curriculum: A need for teacher empowerment. *Mediterranean Journal of Educational Studies*, 14(2), 27-47.

Forster, E. (2006). The value of songs and chants for young learners. *Journal of Research and Innovation in the Langauge Classroom*, 63-68.

Harb, A. (2007). *The Effectiveness of Educational Games on the sixth Graders' Achievement English language in Gaza southern Governorates***.** Unpublished M.A thesis. The Islamic University, Gaza.

Hejjawi, K. (1996). *Teachers' and Students' Attitudes Toward the use of Music in UAE English classrooms***.** Unpublished M.A thesis. University of Sarjah, Sharjah.

Huwari, K. (2007). *An Analysis evaluation of the Procedures Employed by EFL teachers at the Mfraq District***.** Unpublished M.A thesis. Yarmouk University, Irbid.

Joel, j& Shah, P. (2918). Pupils' Motivation and Attitudes Towards the Use of English Songs in Rural Primary English Classrooms. *International Journal of new Technonlogy and Research, 12*(4), 13-19.

Johnson, C. a. (2004). *Why teach vocabulary?* Anaxos, Inc. Retrieved May 14, 2013 from: eps.schoolspecialty.com/downloads/articles/Why_Teach_Vocabulary.pdf

Kanel, K. (2000). Songs in language teaching: Theory and practice. *Paper presented at The Proceedings of the JALT (Japan Association for Language Teaching) 25th Annual International Conference on Language Teaching & Learning and Educational Materials Expo*: 69-75.

Kuźma, K. (2008). Song- Music and Songs in English Language Teaching. *Harnessing language teaching*, 10 (6). Doi 1755-9715. Retrieved January 10, 2013 form: http://www.hltmag.co.uk/dec08/less03.htm

Lappi, M. (2009). *Musical experiences in learning English as a foreign language*. (Pro Gradu Thesis). University of Jyväskylä, Department of Languages. Retrieved November 14, 2012 from: http://urn.fi/URN:NBN:fi:jyu-200911164411

Lehr, F., Osborn, J., & Hiebert, E. (2004). *A focus on vocabulary (Research based Practices in Early Reading Series.* U.S.: Regional Educational Laboratory at Pacific Resources for Education and Learning.

Lo, R., & Li, H. (1998). Songs enhance learner involvement. *English Teaching Forum, ,* 36, 8-11, 21. Retrieved from http://iteslj.org/Articles/Schoepp-Songs.html

Macaro, E. (2003).*Teaching and learning a second language.* New York: Continuum.

Mardliyatun. (2007). *Children songs as media in teaching English pronunciation (The case of fourth graders of SD N 01 Sekaran Gunungpatiin the academic year 2006/2007)*. (Unpublished undergraduate thesis). University Negeri Semarang. Indonesia. Retrieved February10, 2013 from: http://lib.unnes.ac.id/1733/

McLaren, P. & C. Lankshear. (1994).*Politics of liberation: Paths from Freire*. London: Routledge.

Millington, N. T. (2011). Using songs effectively to teach English to young learners. *Language Education in Asia, 2*(1), 134-141. Retrieved March 13,2013 from: http://dx.doi.org/10.5746/LEiA/11/V2/I1/A11

Orlova, N. (1997). Developing speech habits with the help of songs. *English Teaching Forum, 35*(3).

Orlova,N. F. (2003). Helping prospective EFL teachers learn how to use songs in teaching conversation classes. Retrieved from http://iteslj.org/Techniques/Orlova-Songs.html

Pasanen, H. (2010). *Using music in EFL teaching at lower secondary education: Teachers' experiences and opinions*. (Pro Gradu Thesis). University of Jyväskylä, Department of Languages. Retrieved September 21, 2012 from http:// urn.fi/URN:NBN:fi:jyu-201005081721

Pikulski, J., & Templeton, S. (n.d.). Teaching and developing vocabulary: Key to long- term success. *Current Research in Reading/ Langugae Arts*. Retrieved 2013 from: http://www.eduplace.com/state/pdf/author/pik_temp.pdf

Ratnasari, H. (2007). *Songs to improve the students' achievement in pronouncing English words (An action research of the year seventh students of MTs.* Retrieved from: http://aguswuryanto.files.wordpress.com/2011/10/ptk-smp-teaching-songs.pdf

Saeki, K. (1994). Stimulating classes with background music. *Forum Journa, 32*(2), 30-31. Retrieved January 12, 2013 from: http://www.revistas.unal.edu.co/index.php/profile/article/download/10716/1118

Schiller, P. (2007). Songs and rhymes as a springboard to literacy. Early Childhood News. Retrieved on May 17, 2013 from: www.earlychildhoodnews.com/earlychildhood/article_print.aspx?ArticleID=4 78

Sevik, M. (2014). Young EFL learner beliefs about classroom songs. *International Journal of English and Education,3*(1), 50-59. doi:2278-4012.

Sevik, M. (2011). Teacher views about using songs in teaching English. *Educational Research and Review, 6*(21), 1027-1035. doi:10.5897/ERR11.250. Retrieved May 15, 2013 from:http://www.academicjournals.org/err/PDF/Pdf%202011/12Dec/Sevik.pdf

Shen, C. (2009). Using English songs: an enjoyable and effective approach to ELT. *English Language Teaching, 2*(1). Retrieved April 20, 2013 from: ccsenet.org/journal/index.php/elt/article/download/341/30.

Sobolak, M. J. (2008). *Effects of vocabulary instruction for low-socioeconomic students.* (Unpublished doctoral dissertation). University of Pittsburgh. Pittsburgh.

Tse, A. (2014). Malaysian teachers' perspectives on using songs in English language teaching. *International Journal of Social Science and Humanity*, 5 (1), 87-89.doi: 10.7763/IJSSH.2015.V5.428. Retrieved from:http://www.ijssh.org/index.php?m=content&c=index&a=show&catid=51&id=744

Ulate, N. V. (2008). Using songs to improve EFL students' pronunciation. *Congress lnternational de Lillgiiística Aplicada*, (93-108). Costa Rica.

Winter, N. D. (2010). *Sing, Sing a Song: How using songs affect productive vocabulary acquisition of English language learners*. (Unpublished Thesis). Hamline University St. Paul, Minnesota. Retrieved April 28, 2013

Yu-Ling, Lai. (2005). *Teaching Vocabulary Learning Strategies: Awareness, Beliefs, and Practices. A survey of Taiwanese EFL Senior High School Teachers*. (Unpublished master thesis). University of Essex. Colchester, England. http://english.tyhs.edu.tw/epaper/epaper9/thesis_eng.pdf

Aydın, S., & Uştuk, Ö. (2020). A descriptive study on foreign language teaching anxiety. *International Online Journal of Education and Teaching (IOJET)*, *7*(3). 860-876. https://iojet.org/index.php/IOJET/article/view/846

Received: 13.03.2020
Received in revised form: 05.05.2020
Accepted: 21.05.2020

A DESCRIPTIVE STUDY ON FOREIGN LANGUAGE TEACHING ANXIETY

Research article

Selami Aydın

İstanbul Medeniyet University

selami.aydin@medeniyet.edu.tr

Özgehan Uştuk

Balikesir University

oustuk@balikesir.edu.tr

Selami Aydin (Ph.D.) is a professor at the ELT Department of Istanbul Medeniyet University, Turkey. He researches on EFL writing, testing, affective states, technology use and social media effects on the language learning and teaching processes. Currently, he teaches ELT courses for pre-service EFL teachers.

Ozgehan Ustuk is a Ph.D. candidate studying English language teacher education in Turkey. He is a research assistant at Balikesir University, Turkey. His research interests include language teacher education, teacher learning, and professional development. He also researches teacher identity, and emotions.

A DESCRIPTIVE STUDY ON FOREIGN LANGUAGE TEACHING ANXIETY

Selami Aydın

selami.aydin@medeniyet.edu.tr

Özgehan Uştuk

oustuk@balikesir.edu.tr

Abstract

Anxiety is one of the most commonly investigated topics in the field of foreign language education; however, foreign language anxiety is attributed to learners extensively even though most teachers suffer from high levels of anxiety both as language teachers and language users while teaching. In this study, foreign language teaching anxiety is investigated descriptively to provide a clear picture concerning the terrain of this teacher emotion. Using the Foreign Language Teaching Anxiety Scale (FLTAS) and data collected from 156 teachers with diverse nationalities, the study aims to give a cross-culturally consistent understanding of the phenomenon. The results show that foreign language teaching anxiety cannot be limited to language use of teachers; factors such as low interest among learners and being observed by colleagues, mentors, or supervisors are also anxiety-provoking factors. To add, variables such as age, gender, school type, and teaching experience can also lead to significant results. Accordingly, several implications and recommendations are presented to elevate emotional sustainability in the teaching profession.

Keywords: English as a foreign language, teacher emotion, anxiety, teaching anxiety

1. Introduction

Many studies focused on foreign language anxiety, one of the significant affective factors that may adversely affect learners in the foreign language learning context, while a limited number of studies concentrated on foreign language teaching anxiety (FLTA) (Aydın, 2008, 2016). In other words, while research investigated the identification of anxiety, its sources, and impacts on the learning process, FLTA has not drawn enough attention from researchers. Within this scope, research remained too limited to reach implications and conclusions in terms of FLTA (Tüm, 2012). However, FLTA is a major factor that has a debilitating factor on teachers' efficiency of their teaching practice and emotional sustainability regarding their well-being (İpek, 2006; Merç, 2011; Mercer, 2018). Thus, the current study aims to examine anxiety in the foreign language teaching process.

Horwitz (1996), who discusses FLTA in the scope of nonnative teachers and student/pre-service teachers' experiences, notes that they experience teaching anxiety that is sourced from inadequacy in the target language and the feeling of uneasiness. She also underlines that FLTA has adverse effects on teachers' instructional preferences and the use of target language in classes and reduces their self-confidence. At this point, a crucial claim arises: Foreign language teachers suffer from teaching anxiety because they are still language learners. However, Aydın (2016) points out that there are contextual differences between foreign language learning and teaching. More specifically, anxiety in the learning context may not be the same as FLTA. Thus, when the lack of research on the issue is considered,

research is necessary for a better understating of this contextual difference. Moreover, as Aydın (2016) emphasizes, studies should focus on the sources of FLTA, factors affecting the FLTA levels among foreign language teachers, and the relationship between the levels of FLTA and certain internal, external, and demographic variables. Below, before presenting a brief synthesis of research, a theoretical framework for FLTA is presented.

1.1. Theoretical framework

Within the educational/applied linguistics research, being one of the most widely studied emotions, anxiety has long interested scholars, language teachers, as well as learners (Horwitz, 2010; Koteková, 2013). Beginning from Scovel's assertions (1978), scholars investigating anxiety within foreign and second language (L2) contexts, regarded *anxiety* as a complex individual difference that may have both facilitating and debilitating impacts on second and foreign language (L2) learners (Horwitz, 2010; Koteková, 2013). In addition to this binary distinction, several anxiety types have been underlined to emphasize its multifaceted nature; these types were trait, state, and situation-specific anxieties. *Trait anxiety* refers to the general dispositional type of anxiety as a behavioral pattern (Scovel, 1978) whereas *state anxiety* is temporary emotion experienced at a particular moment related to a definite situation (Spielberger, 1983). *Situation-specific anxiety*, though, is associated with specific situations and events. Anxiety manifested in the L2 education context is mostly categorized as situation-specific anxiety and this type of anxiety is typically referred as foreign language anxiety (Horwitz, 2010). That being said, MacIntyre and Gardner (1994) defined foreign language anxiety as the feeling of tension and apprehension among learners who are not proficient enough to perform in L2 in a specific situation, and they are associated with L2 contexts such as speaking, listening, and learning.

Foreign language anxiety has been classified into three constructs, which are communication apprehension, test anxiety, and fear of negative evaluation (Horwitz et al., 1986). According to Aydın (2016), *communication apprehension* occurs when learners have difficulty in conveying their mature thoughts and ideas due to their insufficient communicative skills. Second, *test anxiety* refers to an individual's anxiety related to exam failure, and last, *fear of negative evaluation* can be defined as the apprehension that is based on one's "incapacity of making a proper social impression" (p. 630). Here, it is important to highlight Horwitz's assertion (2010) that these constructs are simply related to foreign language anxiety rather than constituting it.

That being said, Aydın (2016) also underlines that these constructs are associated with foreign language anxiety and not with foreign language teaching anxiety (FLTA). Horwitz (1996) pointed out the performative aspect of language teaching that requires L2 teachers to speak in the target language in the classroom contexts, and this may result in foreign language anxiety particularly for non-native teachers teaching a particular foreign language. Similarly, Mercer (2018) sees teaching anxiety among language teachers as a teacher emotion that is potentially a result of low language skill self-efficacy and foreign language anxiety, especially for non-native teachers. However, Aydın (2016) proposes a wider understanding of FLTA by stating that it is not limited to situation-specific anxiety of teachers as the generic users of foreign languages and defines FLTA as "an emotional and affective state experienced by a language teacher because of personal, perceptual, motivational, and technical concerns of language teaching before, during, and after the teaching practice" (p. 639). According to his understanding, FLTA includes foreign language anxiety among non-native language teachers but goes beyond by underlining other aspects of it.

1.2. Literature review

The current study specifically focuses on the anxiety experienced by foreign language teachers; therefore, the extensive literature of foreign language classroom anxiety of learners is not presented in this review. Compared to foreign language anxiety among learners, little research has been conducted on FLTA. Albeit foreign language teaching's complexity compared to other subjects (i.e. FL teachers are also language users; language is both the aim and means), FL teachers' anxiety is either extensively associated with the fact that especially the non-native teachers are foreign language speakers, or with that, they may experience anxiety due to the generic situations related to the teaching profession. Nevertheless, little focus has been invested to acknowledge both sides of the coin.

In tandem with the multidimensional view of FLTA, prior research includes a limited number of studies reporting different dimensions. Some directly investigated FLTA, whereas some focused on negative emotions and/or anxiety provokers language teachers experience. As for pre-service EFL teachers' anxiety, Bekleyen (2009) reported the relationship between foreign language anxiety and listening comprehension among teacher candidates. In her mixed-methods study, she suggested that teacher candidates suffer from high levels of foreign language anxiety in regards to listening comprehension, and this debilitating teacher emotion can be traced back to their experience as EFL learners. Similarly investigating anxiety experienced by pre-service language teachers, Merç (2010b) developed a scale, *the Foreign Language Student Teacher Anxiety Scale*. Factors underlying the teaching anxiety of pre-service EFL teachers were relationship with mentors, pre-service teachers' language proficiency, their feelings about academic incompetence, fears of peer-criticism and others' opinions, and the effect of students in the practicum environment. Merç (2011) also reported data collected from 150 pre-service EFL teachers via their practicum diaries and interviews with 30 participants to investigate sources underlying foreign language student-teacher anxiety. His content analysis demonstrated that pre-service EFL teachers felt anxious about student and class profiles, classroom management issues, teaching procedures, being observed by authorities, and mentor-related issues. Similarly, Yoon's study (2012) also provided evidence about foreign language anxiety sources among non-native pre-service EFL teachers in the South Korean context. The survey data showed that several factors such as using the target language, low self-esteem, and perceived unpreparedness caused anxiety among participants. In a similar context, Tüm (2015) found that pre-service EFL teachers with high levels of anxiety may avoid using the target language in classrooms and have problems during language-intensive teaching practices. According to the author, this was a particularly significant result because high-anxious pre-service EFL teachers avoiding the use of the target language may also avoid free and spontaneous use of the target language in their teaching practice. As a result, a high level of foreign language anxiety of an EFL teacher may have a negatively-multiplying effect on EFL instruction, which constitutes a serious hindrance to the effectiveness of foreign language education.

Specifically about FLTA experienced by language teachers, Kim and Kim (2004) noted that low level of language proficiency results in FLTA, as well as other factors such as mentor observation and classroom management problems. To add, Ipek (2006, 2016) depicted fear of failure and making language proficiency-related mistakes as another anxiety provoker whereas Kang (2013) portrayed FLTA as a result of teacher proficiency. Likewise, it was found in Kang's study (2013) that teachers with low target language proficiency prefer using their native language for classroom management and discipline issues. Moreover, teachers with low target language proficiency refrained from using the communicative approach in the classrooms. Kang's study (2013) supported Horwitz's stance on foreign

language teaching anxiety; however, the study was prominent, in that it provided insight on how foreign language anxiety may influence teaching practice.

In the Iranian context, Khani and Mirzaee (2015) conducted a quantitative study with 216 EFL teachers. In their analysis, the authors proposed that contextual variables may result in stressors and negative emotions, which may further lead to teacher burnout. Their study was important to find out correlational data among some contextual variables for EFL teachers -such as lack of social support, relations to colleagues and administrators, access to teaching equipment, and other stressors such as anger, frustration, and depression within the context of EFL teaching. However, there was no specific evidence regarding FLTA in their findings.

Last, Wieczorek (2016) regarded anxiety as one of the factors causing teacher stress. In her qualitative study in the Polish context, she collected data from 25 teachers working at various institutions. The findings yielded that factors underlying teacher stress can be grouped into two, which are general teacher stressors and foreign language teaching-specific stressors. According to her study, factors such as heterogeneity of the target learner group, lack of equipment, and teaching aids, teaching particular skills like listening and speaking, teaching grammar, and implementing new materials in the classroom were associated exclusively with foreign language teaching.

Based on the findings of the prior research, Aydın (2016) conducted a qualitative study to specifically focus on FLTA and the ways it is manifested in foreign language education. Drawing on the data collected by questionnaires, interviews, and reflective papers from 60 pre-service EFL teachers, he shed light on temporal dimensions of FLTA experienced by the participants. Furthermore, his study also supported some of the earlier findings such as technical concerns in the classrooms, low-level language proficiency. On the other hand, he provided evidence for further sources of FLTA such as fear of negative evaluation, lack of experience in teaching, teaching demotivation, and amotivation.

The review presented above showed that there are several studies directly addressed the issue of FLTA. To add, some studies focused on negative teacher emotions and stressors for teachers that can arguably be generalized to FLTA. However, both the number and the content of the studies reviewed made it clear that there is a lack of holistic view of FLTA. Despite huge interest in anxiety research in applied linguistics (Horwitz, 2010) and research in teacher emotions that recently gained impetus (Mercer, 2018), researchers have either discussed the issue of FLTA partially in a specific country context or avoided having an exclusive focus on it.

1.3. Research questions

In conclusion, several reasons guide this study. First, as previously mentioned, a fairly limited number of studies focused on FLTA, while studies mostly dealt with foreign language anxiety in the learning context. Second, research seems necessary to understand better how FLTA differs from anxiety in the learning context. Third, as can be seen from the research synthesis, studies mainly concentrated on negative teacher emotions and stressors for teachers, while FLTA, an independent predictor among affective factors, has attracted little attention among researchers. With these concerns in mind, this study aims to investigate the levels of foreign language teaching anxiety among EFL teachers and the relationships between FLTA and certain variables, gender, age, school levels and types, teaching experience in years and whether they are native or non-native speakers of English, the degree of graduation. In other words, the study seeks to answer two research questions:

- What are the levels of FLTA among EFL teachers?

- Do the levels of FLTA differ regarding the variables of gender, age, school levels and types, teaching experience in years, whether they are native or non-native speakers of English, the degree of graduation, and their nationalities?

2. Materials and methods

2.1. Research design

A descriptive research design was preferred for the study, as it seemed necessary to gain further insight into FLTA among EFL teachers. In a narrower scope, as the study focuses on the aspects of FLTA and relationships between FLTA and certain variables, a descriptive research design seemed appropriate to fulfill these objectives. Within this scope, descriptive research deals with the examination that uses already existing data with a preconceived research question, as Seliger and Shohamy (1989) note. Therefore, a scale, FLTAS was used among data collecting techniques as it best represents the already existing perspectives of the participants without intervention and enables them to collect first-hand data in a natural context.

2.2. Participants

The sample group of the study consisted of 156 EFL teachers working in various countries. The group consisted of 107 female (68.6%) and 49 male (31.4%) teachers. The mean of the participants' age was 35.5 within the range of 22 and 58. In terms of their nationalities, the group consisted of 15 Turkish (9.6%), 14 Brazilian (9.0%), 13 Greek (8.3%), 12 Bulgarian (7.7.%), 11 Italian (7.1%), 11 Algerian (7.1%), 11 Lithuanian (7.1%), 11 Spanish (7.1%), 11 Moroccan (7.1%), 10 Ukrainian (6.4%), 10 Malaysian (6.4%), nine Russian (5.8%), nine Iranian (5.8%) and nine Indonesian (5.8%) teachers. The rationale behind this distribution was the context of EFL instruction; in that, English is taught in the foreign language context in the mentioned countries. The participants worked as EFL teachers in Turkey (9.6%), Russia (5.8%), Italy (7.1%), Bulgaria (7.7%), Algeria (5.8%), Lithuania (7.1%), Malaysia (7.1%), Spain (6.4%), Greece (7.1%), Brazil (8.3%); Ukraine (9.0%), Indonesia (6.4%), Morocco (5.8%) and Colombia (7.1%).

Of the participants, 34 teachers (21.8%) worked at primary schools (ISCED 1), whereas 40 participants (25.6%) worked at secondary schools (ISCED 2). Besides, 31 teachers (18.9%) worked at high schools (ISCED 3), whereas 51 participants (32.7%) worked at higher education institutes (ISCED 5, 6, and 7). Of the participants, 103 teachers worked at public schools (66.0%) and 53 (34.0%) worked at private institutions. The mean score for their teaching experience in years was 10.8 within the range of 1 and 40 years. Among the teachers, 68 had a BA degree, whereas (43.6%), 68 had an MA degree (43.6%). To add, 20 teachers had a Ph.D. degree (12.8%). Finally, 140 teachers were non-native speakers of English (89.7%), while 16 participants were native speakers (10.3%). As a note, the rationale behind the participation of native speakers in the study was that they taught English in the foreign language context in various countries where English was taught as a foreign language.

2.3. Tools

The data collection tools consisted of a background questionnaire and *the Foreign Language Teaching Anxiety Scale* (FLTAS). The background questionnaire probed participants' genders, ages, nationalities, countries where they worked, the types of schools they worked at, teaching experiences in years, graduation degrees, and native/nonnativeness. The FLTAS, designed by Aydın and Uştuk (2020), consisted of 27 items on a Likert scale

ranging from one to five (never=1, rarely=2, sometimes=3, often=4, always=5), and preliminary results were reported. The scale was developed over a long-term research process that started with qualitative research concerning the underlying factors of FLTA, which reported in Aydın (2016). Later, FLTAS was created and piloted; relatedly, it obtained a high level of reliability coefficient (.95 in Cronbach's Alpha) and internal consistency in a five-factor solution in the preliminary study (Aydın & Uştuk, 2020). The five-factor solution was found accounting for 69.09% of the variance. The factors were self-perception of language proficiency, teaching inexperience, lack of students' interest, fear of negative evaluation, and difficulties in time management. In other words, the items were given in the order of the above-mentioned factors. As a final note, it should be also added that the items in the scale reflected the specific *situations* about the foreign language teaching context.

2.4. Procedure

After the participants were informed about the purpose, significance, and methodology of the study, the rationale behind the subject choice was clarified. They were also informed that participation was voluntary and they could withdraw anytime without any penalty. They were also informed that researchers ensured the anonymity and the confidentiality of their answers and their personal information. After an online form version of the questionnaire and the FLTAS was designed, the form was published online, and the participants were invited to complete the form involving the questionnaire and scale.

Statistical Package for Social Sciences (SPSS) software was used to analyze the collected data. First, the data on participants' gender, country, types of schools, graduation degrees, and whether they were native or non-native speakers of English were presented in frequencies and percentages. Then, mean scores for age and teaching experience in years were calculated. Then, the reliability coefficient was computed. For the items in the scale, the reliability coefficient was found to be .95 in Cronbach's Alpha. These values were consistent with the ones that were noted as .95 in Cronbach's Alpha and .95 in Cronbach's Alpha Based on Standardized Items by Aydın and Ustuk (2020). Values showed that the reliability level of the scale was acceptable. Next, factor analysis was performed to test the validity of the scale. The percentage of variance was 65.18%, whereas the rotated factors explained 69.09% of the variance in the preliminary study (Aydın and Uştuk, 2020). Similar to the ones in the preliminary study, the results indicated a five-factor solution based on self-perceptions of foreign language proficiency, teaching inexperience, lack of students' interest in classes, fear of negative evaluation by observers and students, and difficulties in time management. These values demonstrated that the scale was valid for estimating levels of FLTA among EFL teachers. Finally, *t*-test and ANOVA were performed to examine the relationships among the items in the scale and the subject variables.

3. Results

3.1. The levels of foreign language teaching anxiety among EFL teachers

According to the values in Table 1, EFL teachers mainly experience a low level of teaching anxiety that may stem from their self-perceptions of foreign language proficiency. To begin with, they stated that they sometimes had difficulties in using the target language in their classes when they felt anxious ($\bar{x}$=2.53). On the other hand, they rarely felt embarrassed when they perceived that students performed better at speaking than them ($\bar{x}$=1.74) and while using the target language ($\bar{x}$=1.51). Similarly, EFL teachers rarely felt nervous when they used English in their classes ($\bar{x}$=1.51) and when they encountered unfamiliar topics in textbooks ($\bar{x}$=2.33). Teachers also stated that they rarely felt anxious due to making mistakes

while speaking ($\bar{x}$=2.35) and teaching the cultural content of the target language ($\bar{x}$=2.21). Speaking specifically, they rarely felt tense regarding pronunciation ($\bar{x}$=2.24) and making grammar mistakes ($\bar{x}$=2.07). Furthermore, they rarely felt pressure due to students' unexpected questions ($\bar{x}$=2.13). To conclude, EFL teachers rarely experienced anxiety during their teaching activities ($\bar{x}$=1.74).

Table 1. The levels of teaching anxiety regarding self-perceptions of foreign language proficiency (N=156)

Items	Frequencies					Mean	Std. Error	Standard Deviation
	Never	Rarely	Sometimes	Often	Always			
When I feel anxious in classes, I have difficulty in using English.	40	43	36	25	12	2.53	.10	1.25
	25.6%	27.6%	23.1%	16.0%	7.7%			
I feel embarrassed when some students speak English better than me.	74	37	19	12	14	2.07	.10	1.31
	47.4%	23.7%	12.2%	7.7%	9.0%			
I feel embarrassed because I am not good at English.	94	28	19	11	4	1.74	.09	1.08
	60.3%	17.9%	12.2%	7.1%	2.6%			
It makes me nervous to use English in classes.	109	22	19	4	2	1.51	.07	0.90
	69.9%	14.1%	12.2%	2.6%	1.3%			
Unfamiliar topics in the textbook confuse me.	42	50	42	14	8	2.33	.00	1.12
	26.9%	32.1%	26.9%	9.0%	5.1%			
I feel embarrassed when I think that I am not good at English.	64	39	26	13	14	2.19	.10	1.30
	41.0%	25.0%	16.7%	8.3%	9.0%			
Pronunciation mistakes while I am speaking make me nervous.	49	55	27	15	10	2.24	.09	1.18
	31.4%	35.3%	17.3%	9.6%	6.4%			
Making mistakes while I am speaking makes me feel embarrassed.	42	55	30	21	8	2.35	.09	1.16
	26.9%	35.3%	19.2%	13.5%	5.1%			
I am bothered when I have difficulties in teaching the cultural content of English.	47	58	28	18	5	2.21	.09	1.09
	30.1%	37.2%	17.9%	11.5%	3.2%			
Unexpected questions from students put pressure on me.	57	54	21	16	8	2.13	.09	1.17
	36.5%	34.6%	13.5%	10.3%	5.1%			
I forget almost everything while I am teaching.	90	41	11	4	19	1.74	.09	1.13
	57.7%	26.3%	7.1%	2.6.%	6.4%			
I feel tense when I have difficulties in teaching grammar.	62	46	29	13	6	2.07	.09	1.13
	39.7%	29.5%	18.6%	8.3%	3.8%			

Values in Table 2 indicate that teachers experience a low level of teaching anxiety in terms of teaching inexperience. For instance, they stated that they rarely felt tense in the classroom ($\bar{x}$=1.55) and were worried before entering the classroom ($\bar{x}$=1.75) and during teaching activities ($\bar{x}$=1.62). Furthermore, they believed that the lack of teaching experience rarely constituted a source of anxiety ($\bar{x}$=1.76). Finally, fear of making mistakes while teaching English in the classroom was rarely a source of teaching anxiety ($\bar{x}$=2.21).

Table 2. The levels of teaching anxiety regarding teaching inexperience (N=156)

Items	Frequencies					Mean	Std. Error	Standard Deviation
	Never	Rarely	Sometimes	Often	Always			
	39.7%	29.5%	18.6%	8.3%	3.8%			
I feel tense when I am in the classroom.	101	32	17	4	2	1.55	.07	0.88
	64.7%	20.5%	10.9%	2.6%	1.3%			
I feel worried before entering the classroom.	90	32	22	7	5	1.75	.09	1.06
	57.7%	20.5%	14.1%	4.5%	3.2%			
I feel anxious when I teach in the classroom.	92	42	14	6	2	1.62	.07	0.90
	59.0%	26.9%	9.0%	3.8%	1.3%			
I think the lack of teaching experience makes me nervous.	92	31	18	9	6	1.76	.09	1.11
	59.0%	19.19 %	11.5%	5.8%	3.8%			
I fear to make mistakes while I am teaching in the classroom.	57	48	26	12	13	2.21	.10	1.25
	36.5%	30.8%	16.7%	7.7.%	8.3%			

As shown, in Table 3, EFL teachers suffer from teaching anxiety at a moderate level due to the lack of interest in their classes among students. For instance, they stated that they sometimes felt stressed when students did not prefer participating in the activities in the classes ($\bar{x}$=3.00). Besides, they sometimes felt upset when they thought that students were not good at learning the target language ($\bar{x}$=2.76), whereas they sometimes felt discouraged when students lost their interest in the activities ($\bar{x}$=3.29). Last, EFL teachers sometimes felt worried when students were not interested in the activities ($\bar{x}$=2.38).

Table 3. The levels of teaching anxiety regarding students' interest in classes (N=156)

Items	Frequencies					Mean	Std. Error	Standard Deviation
	Never	Rarely	Sometimes	Often	Always			
I feel stressed when students do not participate in the activities.	19	30	55	36	16	3.00	.09	1.15
	12.2 %	19.2 %	35.3 %	23.1 %	10.3 %			
I feel upset because my students are bad at learning language.	35	33	40	30	18	2.76	.10	1.31
	22.4 %	21.2 %	25.6 %	19.2 %	11.5 %			
I feel discouraged when students lose interest in the activities.	13	27	48	38	30	3.29	.10	1.20
	8.3%	17.3 %	30.8 %	24.4 %	19.2 %			
I feel tense when students are not interested in activities.	21	33	43	37	22	3.04	.10	1.25
	13.5 %	21.1 %	27.6 %	23.7 %	14.1 %			

Values in Table 4 indicated that fear of negative evaluation is a source of foreign language teaching among EFL teachers at a moderate level. For example, they stated that they sometimes felt anxious due to their mentors' observations ($\bar{x}$=2.52). Then, they felt panicked during mentor-teachers' observations. On the other hand, they sometimes suffered from mentors' observations, students' negative comments about teachers, which caused a low-level of teaching anxiety ($\bar{x}$= 2.38).

Table 4. The levels of teaching anxiety in relation to fear of negative evaluation (N=156)

Items	Frequencies					Mean	Std. Error	Standard Deviation
	Never	Rarely	Sometimes	Often	Always			
My mentors' observations make me nervous.	48	40	27	21	20	2.52	.11	1.38
	30.8 %	25.6 %	17.3 %	13.5 %	12.8 %			
I feel panicked when my mentor-teacher observes me.	53	37	27	24	15	2.53	.11	1.35
	34.0 %	23.7 %	17.3 %	15.4 %	9.6%			
Students' negative comments about me make me nervous.	48	43	33	21	11	2.38	.10	1.25
	30.8 %	27.6 %	21.1 %	13.5 %	7.1%			

Values in Table 5 demonstrate that problems concerning time management constituted a low-level anxiety-provoking factor, while unpreparedness for classes was a source of teaching anxiety at a moderate level. As an example, teachers stated that they rarely felt panicked when they could not finish their classes on time. Furthermore, they were rarely nervous when they finished the activities before classes ended. On the other hand, they sometimes felt anxious when they thought that they were not prepared for their classes.

Table 5. The levels of teaching anxiety regarding time management (N=156)

Items	Frequencies					Mean	Std. Error	Standard Deviation
	Never	Rarely	Sometimes	Often	Always			
I feel panicked when I cannot finish the class on time.	68	39	30	13	6	2.04	.09	1.15
	43.6 %	25.0 %	19.2 %	8.3%	3.8%			
I am nervous when I finish the activities before the class ends.	73	42	18	15	8	1.99	.10	1.20
	46.8 %	26.9 %	11.5 %	9.6%	5.1%			
I feel tense when I am not prepared for the class.	29	34	35	30	28	2.96	.11	1.37
	18.6 %	21.8 %	22.4 %	19.2 %	17.9 %			

3.2. The relationship between FLTA and certain variables

Results indicate that gender, age, school levels and types, teaching experience in years, and whether they are native or non-native speakers of English significantly vary in relation to FLTA. On the other hand, values show that the degree of graduation does not relate to the

FLTA levels. The details on the relationship between (the levels of) FLTA and the mentioned variables are presented.

Values given Table 6 show that there is a statistically significant difference between gender and the levels of FLTA regarding six items in the scale. Male teachers feel more anxious than female teachers do in terms of the self-perceptions of language proficiency, fear of negative evaluation, inexperience, and time management. To begin with, male teachers seemed more anxious in classes when they had difficulties in using the target language than when females did (p=.03). Similarly, males felt more bothered when they had difficulties in teaching the cultural content of the target language than female teachers (p=.00). What is more, male teachers seemed to have more pressure when students asked unexpected questions compared to female teachers (p=.00). Male teachers also suffered more from the lack of teaching experience as a source of anxiety than females (p=0.01). They are also more negatively affected by students' negative comments (p=0.03) and felt more panicked when they could not finish class on time than female teachers (p=.02).

Table 6. Gender and foreign language teaching anxiety (t-test)

Items	Gender	Number	Mean	Mean Difference	F	Sig.
When I feel anxious in classes, I have difficulty in using English.	Female	107	2.37	-.49	4.82	.03
	Male	49	2.86			
I am bothered when I have difficulties in teaching the cultural content of English.	Female	107	2.06	-.47	15.37	.00
	Male	49	2.53			
Unexpected questions from students put pressure on me.	Female	107	2.00	-.41	9.91	.00
	Male	49	2.41			
I think the lack of teaching experience makes me nervous.	Female	107	1.65	-.33	6.72	.01
	Male	49	1.98			
Students' negative comments about me make me nervous.	Female	107	2.29	-.30	4.75	.03
	Male	49	2.59			
I feel panicked when I cannot finish the class on time.	Female	107	1.94	-.30	5.44	.02
	Male	49	2.24			

According to the values given in Table 7, age is a considerable predictor of FLTA concerning three items of FLTAS. That is, younger teachers feel more worried than the older in terms of self-perceptions of target language proficiency and fear of making mistakes. For instance, younger teachers seemed more worried when they encountered unfamiliar topics in the textbooks than older ones did (p=.00). In addition, younger teachers stated that they felt more nervous when they had pronunciation mistakes during speaking (p=.04). Last, fear of making mistakes was a stronger source of anxiety among younger EFL teachers (p=.04).

Table 7. Age and foreign language teaching anxiety (ANOVA)

Items	Age	Number	Mean	F	Sig.
Unfamiliar topics in the textbook confuse me.	20 - 30	65	2.69	4.66	.00
	31 - 40	44	2.20		
	41 - 50	34	2.03		
	51 - 60	13	1.78		
Pronunciation mistakes while I am speaking make me nervous.	20 - 30	65	2.42	2.84	.04
	31 - 40	44	2.25		
	41 - 50	34	2.23		

	51 - 60	13	1.38		
I fear to make mistakes while I am teaching in the classroom.	20 - 30	65	2.52	2.87	.04
	31 - 40	44	2.09		
	41 - 50	34	1.94		
	51 - 60	13	1.69		

According to Table 8, results indicate that teachers working at high schools seem more anxious regarding fear of making mistakes. For example, teachers working in high schools sometimes felt nervous because of pronunciation mistakes while speaking (p=.0.03). In addition, they had fear of making mistakes at a higher level than the ones during speaking activities in their classes (p=.0.05).

Table 8. School levels and foreign language teaching anxiety (ANOVA)

Items	School type	Number	Mean	F	Sig.
Pronunciation mistakes while I am speaking make me nervous.	Primary school	34	2.32	3.02	.03
	Secondary school	40	1.95		
	High school	31	2.74		
	University	51	2.12		
Making mistakes while I am speaking makes me feel embarrassed.	Primary school	34	2.44	2.73	.05
	Secondary school	40	2.08		
	High school	31	2.81		
	University	51	2.22		

According to the values in Table 9, teachers working at public schools feel more anxious than the ones working at private schools regarding the use of target language in classes, time management, and perceived unpreparedness for classes. The ones teaching at public schools seemed tenser when they were in classes (p=.01), and when they used English while teaching (p=.01). They were also more anxious when they experienced difficulties in time management (p=.00) and did not feel sufficiently prepared for their classes (p=.05).

Table 9. School types and foreign language teaching anxiety (t-test)

Items	School Type	Number	Mean	Mean Difference	F	Sig.
It makes me nervous to use English in classes.	Public	103	1.59	.23	8.04	.01
	Private	53	1.36			
I feel tense when I am in the classroom.	Public	103	2.16	.25	6.92	.01
	Private	53	1.91			
I feel panicked when I cannot finish the class on time.	Public	103	2.20	.48	8.81	.00
	Private	53	1.72			
I feel tense when I am not prepared for the class.	Public	103	3.08	.34	3.90	.05
	Private	53	2.74			

Values given in Table 10 demonstrate that EFL teachers who have less teaching experience feel more anxious when compared to the more experienced/senior/veteran teachers concerning their perceived target language proficiency, fear of negative evaluation, lack of teaching experience, and fear of making mistakes. More specifically, the teachers who had less experience felt more embarrassed because they thought that they were not good at

English when compared to the more experienced ones (p=.01). Less experienced teachers also stated that unfamiliar topics in the textbooks were a source of confusion (p=.00). To add, they felt more pressure due to students' unexpected questions compared to the more experienced (p=.00). Last, the lack of teaching experience (p=.00) and fear of making mistakes (p=.00) were other sources of anxiety for the teachers who had less experience in teaching.

Table 10. Teaching experience and foreign language teaching anxiety (ANOVA)

Items	Experience	Number	Mean	F	Sig.
I feel embarrassed because I am not good at English.	0 -10	94	2.19	4.59	.01
	11 - 20	34	1.97		
	21 - 30	28	1.79		
Unfamiliar topics in the textbook confuse me.	0 -10	94	2.57	6.10	.00
	11 - 20	34	2.06		
	21 - 30	28	1.86		
Unexpected questions from students put pressure on me.	0 -10	94	2.31	3.26	.04
	11 - 20	34	1.82		
	21 - 30	28	1.86		
I think the lack of teaching experience makes me nervous.	0 -10	94	2.02	7.32	.00
	11 - 20	34	1.32		
	21 - 30	28	1.39		
I fear to make mistakes while I am teaching in the classroom.	0 -10	94	2.47	5.56	.01
	11 - 20	34	1.79		
	21 - 30	28	1.82		

Values in Table 11 show that the relationship between being a native or non-native teacher and FLTA presented significantly different values in two items. In other words, non-native speakers of English felt more worried than native speakers. For example, non-native speakers of English felt more nervous when they used English in classes than native speakers did (p=.00). Non-native speakers also felt more upset when their students were bad at learning English than native speakers (p=.04).

Table 11. Speaker type and foreign language teaching anxiety (t-test)

Items	Gender	Number	Mean	Mean Difference	F	Sig.
It makes me nervous to use English in classes.	Non-native speaker of English	140	1.56	.50	22.27	.00
	Native speaker of English	16	1.06			
I feel upset because my students are bad at learning language.	Non-native speaker of English	140	2.89	1.20	4.12	.04
	Native speaker of English	16	1.69			

Values in Table 12 indicate that EFL teachers' nationality significantly differs in terms of only one item on the FLTAS. The ones who were Indonesian, Italian, Russian, Moroccan, Algerian, Turkish, Greek, Bulgarian, Ukrainian, and Lithuanian felt anxious at a high level when they thought that their students were bad at learning English. On the other hand, the

ones who are Spanish, Iranian, Brazilian, and Malaysian experienced a low level of teaching anxiety if they believed that their students were bad at learning (p=.02).

Table 12. Nationalities and foreign language teaching anxiety (ANOVA)

Items	Nationalities	Number	Mean	F	Sig.
I feel upset because my students are bad at learning language.	Indonesian	9	**3.89**	2.11	0.02
	Italian	11	**3.73**		
	Russian	9	**3.33**		
	Moroccan	11	**3.00**		
	Algerian	11	**2.91**		
	Turkish	15	**2.80**		
	Greek	13	**2.77**		
	Bulgarian	12	**2.75**		
	Ukrainian	10	**2.60**		
	Lithuanian	11	**2.55**		
	Spanish	11	2.36		
	Iranian	9	2.22		
	Brazilian	14	2.07		
	Malaysian	10	2.00		

4. Discussion

Two main conclusions were drawn from the study. From the broadest perspective, it can be concluded that the in-service EFL teachers experience FLTA overall at a low level. More specifically, their self-perception of the target language proficiency is not a source of FLTA. On the other hand, the lack of students' interest in foreign language classes is a cause of FLTA at a moderate level among EFL teachers, as well as the fear of negative evaluation. Besides, time management issues caused FLTA at a low level, while preparedness for classes was a source of anxiety at a moderate level. The second conclusion is that gender, age, school levels, and types, teaching experience, and nativeness/nonnativeness significantly varied in terms of the levels of FLTA, while the degree of graduation did not differ in relation to FLTA. In terms of gender, male teachers felt more anxious than female teachers in terms of the self-perceptions of language proficiency, fear of negative evaluation, inexperience, and time management, whereas younger teachers felt more worried than older ones in terms of perceived target language proficiency and fear of making mistakes. To add, teachers working at high schools seem more anxious regarding fear of making mistakes, whereas the ones working at public schools feel more worried than the ones working at private schools regarding the use of target language in classes, time management, and unpreparedness for classes. EFL teachers who have less teaching experience are more worried in terms of their self-perceptions of target language proficiency, fear of negative evaluation, the lack of teaching experience, and fear of making mistakes. Finally, non-native speakers of English felt more worried than native speakers, while the ones who are Spanish, Iranian, Brazilian and Malaysian experience less anxiety when they use English in classes and when they feel that their students are bad at learning English.

Drawing on these results, it can be discussed that FLTA falls under the category of situation-specific anxiety. It should be also noted that FLTA differs from foreign language anxiety in the learning context fundamentally because teachers' self-perception of the target language proficiency is not a source of FLTA, while Horwitz (1996) claims that inadequacy in the target language is a source of teaching anxiety. Moreover, as one of the factors that

provoke FLTA is the lack of students' interest in foreign language classes, FLTA is different from foreign language anxiety; this perception mistakenly indicates that teachers get anxious only as language users themselves. On the other hand, fear of negative evaluation and unpreparedness for classes are two sources of anxiety in both learning and teaching contexts. From this conclusion, it can be underlined that anxiety in the mentioned contexts has similar sources.

Anxiety is surely a debilitating emotion in the language classroom but it cannot be limited only to anxiety experienced by the learners. The specific features of language classrooms make teachers life-long learners. To add, foreign language teachers need to perform in the target language, which is also a foreign language to them in most of the cases. It is important to see that foreign language teachers may feel anxiety because they are life-long language learners; however, teaching-situation-specific factors should not be neglected. They can also be anxiety provokers for foreign language teachers.

Earlier studies underline various factors such as mentors and being observed (Merç, 2010a, 2011; Tüm, 2015), learner proficiency (İpek, 2006, 2016), or language use related factors (Horwitz, 1996; Tüm, 2012). However, the current descriptive study showed the two teaching-sıtuation-specific factors (being observed while teaching, and problems concerning learner engagement) as major anxiety provokers whereas language use related factors resulted in lower levels of FLTA. Accordingly, the current descriptive study is of critical importance to get the picture concerning FLTA clearer. This clear picture may provide several pedagogical implications that may minimize the debilitating effect of FLTA.

First of all, language teacher trainers should take into the account that foreign language teachers (and teacher candidates) need more pedagogical preparation and support to cope with FLTA rather than a preparation/support that would make them feel more proficient. Second, policy-makers and school leaders who administer schools or school districts can inform their administrative practice with the descriptive findings of the current study. Specifically speaking, certain variables such as gender, age, school type, and teaching experience may be closely related to FLTA. Relatedly, it was found that males, younger teachers who teach at high schools with lower teaching experience are more likely to experience FLTA. Last, the findings may shed light on teachers' teaching practice; more awareness regarding the factors of FLTA that were demonstrated in this study can increase the reflexivity and awareness of these teachers.

5. Conclusion

Drawing on the discussion of results, several recommendations can be noted. First, given that the lack of interest in classes among students is one of the important sources of FLTA, teachers should develop strategies and techniques to raise students' interest in their classes. Those strategies should also be incorporated into the content of pre- and in-service teacher education/professional development programs. This way, the efficiency of practicum and in-service education of EFL teachers can increase. Second, as fear of negative evaluation is found as a source of FLTA at a moderate level, foreign language teachers should focus on the improvement of their social impressions among students and colleagues. For this, they should be supported by counselors and school administrators. Third, EFL teachers should be prepared for their classes before starting their classes so that careful lesson planning is important to decrease the level of overall FLTA. In tandem with this, teachers should raise their awareness of time management, and plan/organize the activities they use in classes. Fourth, teachers should raise their awareness of gender and age differences regarding FLTA.

In other words, male teachers need to improve their perceived target language proficiency, and they should work on the fear of negative evaluation, feeling of being inexperienced and time management skills, whereas younger teachers need support in terms of perceived target language proficiency and fear of making mistakes. Fifth, given that teachers working at high schools seem more anxious regarding fear of making mistakes and that the ones working at public schools feel more worried regarding the use of target language in classes, time management and unpreparedness for classes, they should raise their awareness of adolescent learner characteristics and develop strategies to overcome those management problems. Sixth, as non-native teachers feel more worried when they use the target language in classes, they should find ways to improve the perceived target language proficiency and confidence.

Some limitations of this research were that the participants were restricted to 156 EFL teachers working in various countries. Moreover, the scope of the research is confined to a descriptive research design that uses a background questionnaire and the FLTAS including 27 items. The data collected are limited to EFL teachers' perceptions of FLTA and the relationships between the perceived anxiety levels and certain variables. In light of current findings, further research should focus on anxiety levels among EFL teachers rather than perceived anxiety levels. To achieve this, experimental studies interrogating several variables should be carried out. In those studies, further descriptive details can be inquired such as whether EFL teachers' graduate degrees are within the area of FLT-related areas or not. What is more, as the online teaching context is becoming a norm in foreign language education, anxiety related to online FLT teaching can be investigated. Similarly, further research may focus on internationally-diverse samples greater in number so that FLTA differences across the nations of L2 teachers can be discussed. In addition, studies may research the relationship between anxiety levels and students' characteristics.

6. Conflict of interest

No potential conflict of interest was reported by the authors.

7. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Aydın, S. (2008). An investigation on the language anxiety and fear of negative evaluation among Turkish EFL Learners. *Asian EFL Journal*, *30*(1), 421—444.

Aydın, S. (2016). A qualitative research on foreign language teaching anxiety. *The Qualitative Report*, *21*(4), 629- 642.

Aydın, S. & Uştuk, Ö. (2020). The Foreign Language Teaching Anxiety Scale: Preliminary tests of validity and reliability. *Journal of Language and Education*,*6*(2), (in press).

Bekleyen, N. (2009). Helping teachers become better English students: Causes, effects, and coping strategies for foreign language listening anxiety. *System*, *37*(4), 664–675. https://doi.org/10.1016/j.system.2009.09.010

Horwitz, E. K. (1996). Even teachers get the blues: Recognizing and alleviating language teachers' feelings of foreign language anxiety. *Foreign Language Annals*, *29*(3), 365–372. https://doi.org/10.1111/j.1944-9720.1996.tb01248.x

Horwitz, E. K. (2010). Foreign and second language anxiety. *Language Teaching*, *43*(2), 154–167. https://doi.org/10.1017/s026144480999036x

Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal*, *70*(2), 125–132. https://doi.org/10.1111/j.1540-4781.1986.tb05256.x

İpek, H. (2006). *Foreign language teaching anxiety*. (Unpublished doctoral dissertation), Anadolu University, Turkey.

İpek, H. (2016). A qualitative study on foreign language teaching anxiety. *Journal of Qualitative Research in Education*, *4*(3), 1–14. https://doi.org/10.14689/issn.2148-2624.1.4c3s5m

Kang, D. M. (2013). EFL teachers' language use for classroom discipline: A look at complex interplay of variables. *System*, *41*(1), 149–163. https://doi.org/10.1016/j.system.2013.01.002

Khani, R., & Mirzaee, A. (2015). How do self-efficacy, contextual variables and stressors affect teacher burnout in an EFL context? *Educational Psychology*, *35*(1), 93–109. https://doi.org/10.1080/01443410.2014.981510

Kim, S.-Y., & Kim, J. (2004). When the learner becomes a teacher: Foreign language anxiety as an occupational hazard. *English Teaching*, *59*(1), 165–185.

Koteková, D. (2013). Confidence in the fundamental role in learning a foreign language. *Journal on Efficiency and Responsibility in Education and Science*, *6*(2), 84–104. https://doi.org/10.7160/eriesj.2013.060203

MacIntyre, P. D., & Gardner, R. C. (1994). The subtle effects of language anxiety on cognitive processing in the second language. *Language Learning*, *44*(2), 283–305. https://doi.org/10.1111/j.1467-1770.1994.tb01103.x

Merç, A. (2010a). *Foreign language student teacher anxiety*. (Unpublished doctoral dissertation), Anadolu University, Turkey.

Merç, A. (2010b). Self-Reported Problems of Pre-Service Efl Teachers Throughout Teaching Practicum. *Anadolu University Journal of Social Sciences*, *10*(2), 199–226.

Merç, A. (2011). Sources of foreign language student teacher anxiety: A qualitative inquiry. *Turkish Online Journal of Qualitative Inquiry*, *2*(4), 80–94. https://doi.org/10.17569/tojqi.08990

Mercer, S. (2018). Psychology for language learning: Spare a thought for the teacher. *Language Teaching*, *51*(4), 504–525. https://doi.org/10.1017/s0261444817000258

Scovel, T. (1978). The effect of affect on foreign language learning: A review of the anxiety research. *Language Learning*, *28*(1), 129–142. https://doi.org/10.1111/j.1467-1770.1978.tb00309.x

Seliger, H. W., & Shohamy, E. (1989). *Second language research methods*. Oxford: Oxford University Press.

Spielberger, C. D. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.

Tüm, D. O. (2012). Feelings of language anxiety amongst non-native student teachers. *Procedia - Social and Behavioral Sciences*, *47*, 2055–2059. https://doi.org/10.1016/j.sbspro.2012.06.948

Tüm, D. O. (2015). Foreign language anxiety's forgotten study: The case of the anxious preservice teacher. *TESOL Quarterly*, *49*(4), 627–658. https://doi.org/10.1002/tesq.190

Wieczorek, A. L. (2016). High inhibitions and low self-esteem as factors contributing to foreign language teacher stress. In D. Gabrys-Barker & D. Gałajda (Eds.), *Positive psychology perspectives on foreign language learning and teaching* (pp. 231–248). https://doi.org/10.1007/978-3-319-32954-3_13

Yoon, T. (2012). Teaching English though English: Exploring anxiety in non-native pre-service ESL teachers. *Theory and Practice in Language Studies*, *2*(6), 1099–1107. https://doi.org/10.4304/tpls.2.6.1099-1107

Koşar, G. (2020). A phenomenological study of the place of joining Erasmus+ Program in pre-service English teachers' professional development. *International Online Journal of Education and Teaching (IOJET)*, *7*(3). 878-889. https://iojet.org/index.php/IOJET/article/view/883

Received: 04.04.2020
Received in revised form: 14.05.2020
Accepted: 20.05.2020

A PHENOMENOLOGICAL STUDY OF THE PLACE OF JOINING ERASMUS+ PROGRAM IN PRE-SERVICE ENGLISH TEACHERS' PROFESSIONAL DEVELOPMENT

Research Article

Gülten Koşar

Hatay Mustafa Kemal University

gencoglugulten@gmail.com

Dr. Gülten KOŞAR is working in the department of English Language Teaching at Hatay Mustafa Kemal University. Her research concentrations include second language learning, teaching language skills, language teacher education, and teaching English to adult and young learners.

A PHENOMENOLOGICAL STUDY OF THE PLACE OF JOINING ERASMUS+ PROGRAM IN PRE-SERVICE ENGLISH TEACHERS' PROFESSIONAL DEVELOPMENT

Gülten Koşar

gencoglugulten@gmail.com

Abstract

This phenomenological research aims to explore the place of the Erasmus+ program (EP) in enhancing pre-service English teachers' (PSETs) professional development. Additionally, this study targets learning about their experiences in the EP and their recommendations on how the program could be ameliorated to better serve prospective PSET participants. The data collected through in-depth interviewing were analysed adopting an inductive approach. The findings revealed that the PSETs believed participating in the EP helped them to develop their speaking skills and broaden their extant knowledge of different cultures, yet they overwhelmingly pointed out that since some courses they took at the host universities were not directly related to the field of English language teaching, the EP did not significantly contribute to their professional development. The findings also demonstrated PSETs' suggestions concerning how to improve the EP to alleviate the problems they confronted for other PSETs whose future plans contain participating in the program.

Keywords: EP, in-depth interviewing, initial English language teacher education, professional development, PSETs

1. Introduction

The EP, popular among university students (Bell, 2016), is developed to support Europeans in "education, training, youth and sport", and it targets "stimulating the sustainable development of its partners in the field of higher education and contributing to achieving the objectives of the EU youth strategy" (European Commission [EC], 2019). One of the youth strategies embedded in the EP is aiding young people in taking responsibility for their own learning through surmounting diverse challenges to be faced in the program. The youth goals, mirroring the conceptions of European youth, involve "connecting EU with youth, equality of all genders, inclusive societies, information and constructive dialogue, mental health & well-being, moving rural youth forward, quality employment for all, quality learning, space and participation for all, youth organizations & European programmes" (EC, 2019). Moreover, a comprehensible emphasis is placed upon mutual learning between member states in the EP.

PSETs' professional development has been explored from a wide range of perspectives, from the role of initial English language teacher education program (e.g., Darwin & Barahona, 2019; Ramdani & Widodo, 2019) to that of field experience (e.g., Choy, Wong, Goh & Low, 2014; Jones & Ryan, 2014; Makina, 2019); yet, no study has been undertaken to scrutinize the effect of joining the EP on PSETs' professional development and to explore their experiences of the EP. The present study thereupon targets investigating the role occupied by the program in PSETs' professional development, their experiences in the program, and uncovering their suggestions for improving it.

1.1. Literature Review

Relevant literature encapsulates limited number of research exploring the advantages of participating in the EP, the findings of one of which demonstrated that the benefits of joining the EP encompassed professional development, and improvement in linguistic, social and intercultural skills (Golubeva, Parra & Mohedano, 2018). In the same vein, enhancing professional and personal development was reported as a profit to be reaped by joining the EP in the study done by Salajan and Chiper (2012). Another advantage of participating in the EP was reported in the literature as the greater likelihood of finding jobs and the higher chances of asking for higher salaries as against non-participants (Iriondo, 2019). According to Roy, Newman, Ellenberger and Pyman (2019), the outcomes produced by participating in international student mobility programs involved cultural, language, personal and employment ones.

The reasons university students set out to study abroad were explored in the study conducted by Jeanpierre and Broadbent (2016), the results of which showed that learning about a different culture, being away from home, building up self-confidence, learning a language, increasing the chance of employability, and improving final year grades were the reasons lying behind the desire to participate in the EP. The most significant motive for the subjects in the research carried out by Juvan and Lesjak (2011) to participate in the EP was related to professional and personal growth. Likewise, the research undertaken by Llurda, Balsa, Barahona and Rubio (2016) demonstrated that participating in the EP enabled students to feel more comfortable about using a foreign language and that their enthusiasm to improve their proficiency in that language grew by virtue of joining the program. The study done by Messer and Wolter (2007) revealed that the reasons for participating in the EP involved increased probability of getting a post-graduate degree or that of being employed with higher starting salaries. The results of the research undertaken by Llanes, Tragant and Serrano (2012) showed that joining the EP led to the development in participants' speaking skills and that individual differences played a prominent role in learning a second language in the program.

A set of determinants such as cost of living in the host country, language, climate, educational background and distance are identified as the factors affecting mobility flows most (Gonzales, Mesanza & Mariel, 2011). Reasons behind not participating in the EP were investigated in the research carried out by Beerkens, Otero, Wit and Huisman (2016), which revealed that home-ties and lack of interest in the program were the prevalently stated reasons by students for not participating in the program irrespective of their nationalities.

The problems that are likely to be encountered in the EP were pinpointed in the study by Delmartino and Beernaert (1998) as the obstacles with coordinating student mobility, students' unwillingness to learn a not-widely spoken language, non-conformity between the education systems and organizations of the academic years of the home and host university. The significance of informing students on the advantages of being a part of the EP could increase the number of students having benefitted from the program to date (Otero, Huisman, Beerkens, Wit & VujiĆ, 2013).

This research was undertaken with an eye to seeking answers to the following research questions:

1. What are PSETs' evaluations of their experiences in the EP?
2. To what extent does joining the EP contribute to PSETs' professional development?
3. How could the EP be improved to better serve prospective PSET participants?

2. Methodology

2.1. Research Design and The Context

This study was designed as a phenomenological research, in which, according to Creswell (2014), "the researcher describes the lived experiences of individuals about a phenomenon as described by participants" (p. 14). Considering the primary purpose of this research, which was gaining a full understanding of the lived EP experiences of the PSETs, and the rationale behind employing phenomenological research, the reason for the research design used in this study could be uncovered. In the context of this study, PSETs are to fulfil the following requirements to join the EP:

a) The student applying the program needs to be a full-time student enrolled in the institution.
b) The average grade of the applicant should be minimum 2.70 over 4.00.
c) The applicant needs to have sufficient ECTS, which is 60 ECTS per academic year.
d) Not exceeding the time frame of 12 months on the condition that the applicant has benefitted from Erasmus + or lifelong learning program before.
e) The student should be at least a first year student to apply for the program (Hatay Mustafa Kemal University, 2019).

PSETs meeting the above-mentioned requirements could take both the written and oral exam administered by the commission set up by the Rectorate of the university. 50% of their final grade is determined by their exam scores while applicants' general academic average is worth the remaining 50%.

2.2. Participants

Purposive sampling was used in selecting the study participants consisting of 28 PSETs studying at a state university. Ten participants were male while the rest were female. The mean age of the participants was 22.04. Six of the participants were fourth-year students while the remaining were third-year students when this research was carried out. All of them participated in the EP in the spring term of the academic year 2018/2019. The participants were informed about the purpose of the study and their consent was obtained before commencing to collect the data. The name of the participants will not be mentioned to protect their confidentiality and each participant is assigned a number such as PSET 1, PSET2 etc.

2.3. Data Collection and Analysis

In-depth interviewing was administered with an eye to gathering data in that Smith, Flowers and Larkin (2009) point out "in-depth interviews … may be the best means of accessing a rich, detailed, first-person account of … experiences" (p. 58). The date and time of the interviews were determined by keeping in sight participants' convenience. Each audio-recorded interview lasted 30-35 minutes and transcribed verbatim.

The interview questions were produced after reviewing the literature on examining higher education students' perceptions of the effectiveness of participating in student mobility programs. Thereafter, the questions were emailed to two English language teacher educators to ensure they would serve as the agents to find answers to the research questions and to avoid the probability of leading participants' responses due to the choice of words used to formulate them. In light of the feedback offered by the teacher educators, the questions were reworded. Afterwards, the interview was conducted with five PSETs having participated in the EP before and studying at a different university to make sure the questions were clear for the interviewees. In view of the five PSETs' answers to the questions, minor changes were made to them, and

then, the process of preparing interview questions was finalized. Below are the questions asked in the interviews.

1- What was your EP experience like for you?

2- What do you think about the effect of your EP experience on your professional development?

3- What differences and similarities are there for you between the teaching styles of the lecturers who have been teaching you at your home university and those of the lecturers who taught you at the host university?

4- How do you think the EP could be developed to better serve PSETs wishing to participate in it in the future?

The first question in the interview was asked in an attempt to seek answers to the first research question, yet the answers given to it were also referred to as presenting the findings on the second research question. Interviewees' responses to the second question were used to find answers to the second research question. The answers given to the third question in the interview contributed to the findings with respect to the first and second research questions and the last question in the interview was posed to look for answers to the third research question.

An inductive approach was applied in the analysis of the collected data. Two coders, one of whom is the researcher, read through the transcriptions in their entirety several times to gain an overview of them, coded them, and created categories from them. An iterative process was gone through during the analysis via rereading the transcriptions in order to be able to arrive at a deeper understanding of the responses of the PSETs, which helped the coders to achieve a consensus over the discrepancies between the categories they created and to refine them. Afterwards, themes were developed. Member checking was used to validate the accuracy of the data and their interpretations, which was realized by sharing the findings with ten participants to make sure the results reflected what they had in their minds (Creswell, 2012).

3. Findings

3.1. PSETS' Evaluations of Their EP Experiences

The analysis of participants' responses on their evaluations of their experiences in the EP indicated that they had both positive and negative experiences.

3.1.1. Positive experiences

The analysis of participants' positive experiences in the EP led to the emergence of the themes of heightened intercultural awareness, higher level of self-confidence, development in speaking skill, and opportunity for comparing and contrasting education systems of the home and host universities.

Heightened intercultural awareness

The participants stated that by virtue of joining the EP, they enhanced their intercultural awareness. They had the chance to gain information about different cultures, and also to provide information about Turkish culture to the EP participants of different nationalities. Following are the statements of two participants that could typify other participants' opinions on increased intercultural awareness enabled by participating in it.

I had two Georgian, eight Korean, 2 Japanese, 1 Greek, 1 Italian, 5 Polish friends and many others from different countries. With my Korean friend, we came to İstanbul and hanged

around when the program was continuing. I introduced our culture to him and we stayed in my uncle's house, he learnt many things about Turkish culture and promised to invite me to Korea. (PSET 19)

I built a close friendship with a Spanish student and an Italian one. I cooked Turkish meals for them and they cooked their traditional meals for me. We spent time, visited European countries together, and I realized that we really resembled each other. I hadn't thought before that people from different countries could get along well with each other that much. (PSET 1)

Higher level of self-confidence

Another theme that developed from the content analysis of participants' positive experiences in the EP is the increased level of self-confidence. Knowing that their families would fall back upon them whenever they needed support led the participants not to take responsibility in their home country; nevertheless, being alone at the host institution abroad helped them to learn to survive by solving any problem they had thought they would never be able to overcome on their own without receiving help from family members.

The biggest contribution of joining the EP was feeling more self-confident. I confronted many problems and fortunately solved them. If I had been in Turkey when I had those problems in my life, I would have not been able to solve them myself. After the EP, I am now more self-confident, and I will not ask my parents to do something for me anymore. (PSET 6)

Development in speaking skill

Having the chance to improve their speaking skills through practicing speaking without being paralysed by the fear of being subjected to people's humiliation appears to be participants' common gain brought by the program. Two participants' statements could epitomize those of others.

I spoke merely English for three and half months in lessons, and I needed to speak it to survive in real life. This helped me develop my speaking skill. The only place where I spoke Turkish was the kebab saloon I went to. (PSET 14)

I did not have self-confidence before participating in the EP to participate in discussions in lessons because I believed that I would be ridiculed by my classmates if they heard my English. Then, when I decided to join the EP, the drive for me to join the program was getting a chance to practice speaking and I did so. Now, I think I can speak better because I have really developed my speaking skill. (PSET 17)

Opportunity for comparing and contrasting the education systems of the home and host universities

The participants stated that they also had the opportunity to compare and contrast the education systems of their own university and that of the host university when they were in the EP. Participants' responses showed that while there were participants viewing the teacher educators working at their home university as more friendly than the ones in the host university, there were participants claiming that the importance attached to student learning in their host universities was higher than the one placed on it in their home university as, according to them, exams mattered more in the home institution.

After taking the courses in the program, I started to think that I am a lucky student because I believe that our instructors are friendly people and I can talk to them anytime I need help but the instructors at my host institution were more serious and the only way I could talk to them was sending emails. (PSET 17)

I went to university X and had a chance to observe how student teachers are educated in that university and compared it with the way student teachers are educated at my university. The thing I have realized, for example, is that Turkish students are more concerned about the exams and the scores they get, but exams are not very important at university X; I mean, permanent learning is more significant than students' scores on exams. (PSET 9)

3.1.2. Negative experiences

Participants' responses in relation to their experiences in the EP showed that they had negative experiences in the program as well as the positive ones, originating from the difficulty in having communication with local people, and the troubles with the courses that they selected or had to select.

Problems with communicating with the local people

Some participants stated in the interview that they confronted problems with communicating in English with the local people at markets and at dormitories. It was highlighted by the participants that particularly elderly people did not speak English.

I really do not know why the local people did not want to talk to us in English because most probably they could speak English, at least could answer very basic questions, but they insisted on speaking in their mother tongue. Interestingly, the security staff at the dormitory did not talk to me in English, either. I used google translation to ask my questions or requested a local friend to help me with translation. (PEST 16)

Problems with the selected courses

Nine of the participants stated in the interview that they encountered acute problems with some of the courses they had selected and approved by the coordinator of their own university and that of the host university. The reasons for the serious problems with the selected courses could be found in the statements of one of the PSETs given below.

I selected courses before I went to university X by looking at the courses offered at the department on the website of the university. When I arrived at the university, I realized that three of the courses I had chosen were no longer offered and when I talked to the coordinators, they told me to choose from among other courses, but choosing different courses and getting them approved took one and half months. Well, you know, I was in university X for just four months and spent third of it on finding courses the contents of which were in line with the content of the courses offered at my own university in the same term. (PSET 8)

3.2. The Effect of the EP on PSETs' Professional Development

The second research question was posed with a view to investigating whether or not joining the EP contributed to participants' professional development. The findings revealed that, except two participants, the PSETs believed that participating in the EP contributed to their professional development to a certain extent. The participants not believing that joining the program enhanced their professional development pointed out that the courses they took at the host institution were not directly related to English language teaching but to general knowledge and/or literature. Additionally, they stated that it was not a matter, because they had invaluable experiences in the EP, which was more significant to them. The analysis of the responses of the PSETs conceiving that joining the EP contributed to their professional development to a certain extent led to the construction of the themes of improvement in speaking skill and the likelihood of integrating the accumulated intercultural knowledge they gained into their instructional practices in the future. Nonetheless, those participants also underscored that some of the courses they took in the host university were not relevant to English language teaching.

Improvement in speaking skill

All the participants believing that joining the EP enhanced their professional development stated that being able to speak English well was a significant part of their profession and joining the EP helped them develop their speaking skills. The statements of one of the participants could mirror the opinions of others on the impact of the program on improving their speaking skills.

Thanks to God, I decided to join the EP and went to university Y. I really could not speak English before going to university Y, and because of that, I was feeling terrible. I used to ask questions like 'What am I doing here?', 'Can I become an English teacher?' because speaking English well is, I believe, one of the qualities of a good English teacher. If I had not joined the program, I would not be able to speak English now. I am sure about that. (PSET 4)

The likelihood of integrating accumulated intercultural knowledge into teaching

The PSETs stated that the wide knowledge they gained on different cultures could be used in the lessons they would teach in the future. They accentuated that English is the lingua franca of the world, and hence, integrating the knowledge of different cultures into teaching it might enrich the content of lessons.

I have lots of friends from different countries now and we spent time together, hanged around together and got to know each other and each other's cultures. I can use this knowledge in my lessons when I start to teach so that my lessons can be more enjoyable for my students. Any person can read about Spanish, Italian or English culture but I experienced them and I believe this has contributed a lot to my professional development. (PSET 3)

3.3. PSETs' Suggestions Concerning How to Ameliorate the EP for Prospective PSET Participants

The third research question was asked in an effort to figure out PSETs' recommendations with regard to what initiatives could be undertaken to improve the EP. The content analysis produced three themes: placing less number of Turkish students in the same host institution, training EP coordinators on how to support EP participants and widening the number of the countries on the list to offer more alternatives to applicants.

Less number of students of the same nationality should be placed in the same host institution.

Studying at a university with numerous students of the same nationality was criticised heavily in the interviews. The major concern the participants expressed in regard to the large number of students of the same nationality placed in the same host university was the probability of speaking in the mother tongue more in place of English.

I believe that a rule should be established to predetermine the maximum number of students to study at the same university. For example, no more than 10 students of the same nationality can go to the same university. Then, I guess the program can be more useful for PSETs because their friends will be mostly foreigners and they will have to speak English with them. (PSET 11)

Training EP coordinators in how to support EP participants

The possibility of having things run smoothly before the start of, during and at the completion of the program was bound up by the participants with getting in contact with coordinators regularly and easily. It was highlighted in the interviews that the participants encountered intractable problems as a result of not being able to reach coordinators who did not check their e-mail boxes on a daily basis, and thus, did not respond to their questions on

time. Therefore, the participants pointed out the necessity of warning coordinators to reply participants' e-mails rapidly. Another recommendation concerning EP coordinators was training them in how to fully support EP participants because they did not view coordinators as knowledgeable enough about the program.

Multiplying the number of the countries on the list to offer more alternatives to applicants

The number of universities with which a university signs agreements for E+ study mobility programs varies from university to university. The participants in the present study complained about the insufficiency of the number of universities with which their home university signed agreements.

We had really limited choices as to the universities we could select. I had a different country in my mind but I had to go somewhere else because that country was not on the list and I was really disappointed about not being able to go to the country I had imagined. (PSET 2)

4. Discussion

This phenomenological research was conducted to investigate PSETs' evaluations of their experiences in the EP, the contribution of joining the EP to PSETs' professional development and to figure out their suggestions for ameliorating the EP to better serve prospective PSET participants. The results demonstrated that the participants raised their awareness of other cultures and introduced Turkish culture to other EP participants; that is to say, participants' intercultural awareness was heightened as a consequence of participating in the EP. This finding is congruent with the findings of the studies carried out by Golubeva et al. (2018) and Roy et al. (2019). PSETs' higher level of intercultural awareness subsequent to participating in the program parallels the objectives of the EP specified by the EC (2019) because fostering intercultural exchange is one of the primary objectives of the EP. Another positive experience the participants had in the EP and reported in this study is building up self-confidence to handle any problem they could confront in their lives in the absence of help they usually get from family members. Enhanced self-confidence is also likely to cater for the PESTs in their future professional lives as they will obviously face problems in their professional lives with students, parents, administration so on so forth, and their boosted self-confidence can support them in overcoming them.

Another theme that developed from the responses of participants' evaluations of their experiences in the EP was developing oral skills, which is in compliance with a number of studies on investigating the impact of student mobility programs on participants (e.g., Llanes et al., 2012; Llurda et al., 2016; Juvan and Lesjak, 2011). Conceiving the EP as a means to improve speaking skills is undeniably crucial for PSETs studying in EFL settings inasmuch as they have limited opportunities for using English to communicate in their daily lives. Participating in the EP can, hence, substantially contribute to the development in their speaking skills. Another point worth underscoring is the significance of improving speaking skills to an English teacher as students imitate their teachers, and for this reason, teachers should be good models for them by speaking English well.

The participants had the chance to compare and contrast education systems of the home and host universities in regard to how assessment and teaching was conducted. One of the issues raised by the participants was that exams occupied a significant place in their home university, creating a strain on the PSETs while exams were not that much significant in the host universities, instead, profound importance was given to student learning. The participants experiencing the positive impact of prioritizing student learning rather than exams may try to convert dreary and exam-oriented lessons into interesting, enjoyable and learning-centred lessons in the future.

The PSETs voiced the problems with the selected courses in the host university, because the courses presented on the web site as offered were no longer taught, which they learnt when they arrived at the university, and finding courses in place of them took a long time. Universities' websites need to be updated regularly in order that students can start to take the courses they have selected on time and do not lose time trying to choose other courses the contents of which are congruent with those of the ones in their home university. Furthermore, the cooperation and collaboration among Erasmus coordinators needs to be promoted to help EP participants tackle any problem with the courses they have selected.

The findings as to the research question of if participating in the EP enhanced PSETs' professional development revealed that the improvement in their speaking skills was the most remarkable contribution of the EP to their professional development. The need for speaking in English in the EP to survive on campus, in lessons, at dorm, and to socialize with other students seems to be the motive for the participants to develop their speaking skills. Moreover, the probability of reflecting the knowledge of different cultures the participants obtained in the program in their teaching practices in the future was presented as one of the positive impacts of joining the EP on their professional development. Since English is no longer a property of the countries where it is the native language, enriching lessons by sharing their experiences in the EP and the knowledge of different cultures could make English lessons more interesting and enjoyable for students than merely following the coursebook.

In line with the findings on the PSETs' negative experiences in the program as regards the selected courses, one of the suggestions put forward by the participants to ameliorate the EP for the PESTs planning to join the program was training the coordinators in how to advocate EU participants better. Organizing trainings for EP coordinators could serve as a means to ameliorate the program considering the roles they play during the application process, after EP participants start to get education in the host university, and at the completion of the program. Another theme reported in the findings is imposing a quota to the number of students of the same nationality to study at the same host university, which makes more sense keeping in mind the urge PESTs feel for practicing speaking English more. Some students may have a tendency to come together with the students from their own country whereas there could be another group of students trying to keep away from them to engage in communication in English more. The PSETs also recommended their university to sign agreements with more universities in diverse countries not to restrain applicants by few choices. Providing a list involving a wide range of universities from which students can select the university they want to study at might motivate them more.

5. Conclusions

This paper concerns whether participating in the EP enhances PSETs' professional development. The review of related literature on PSETs' professional development unveils notwithstanding the fact that professional development in initial English language teacher education has been investigated from a wide array of aspects involving on-campus and school-based learning, no research has been carried out heretofore to scrutinize the contribution of participating in the EP to their professional development. The results in this research showed that even though participating in the program did not considerably enhance their professional development; it took a fundamental role in improving their speaking skills, perceived to be particularly significant for PSETs. The recommendations offered by the participants need to be taken into account seriously by the authorities responsible for the EP not only in the context of the present study but also abroad so that the obstacles PSETs may encounter in the program could be surmounted with their support.

6. Limitations of the Study and Recommendations for Further Research

The data in this study was collected from 28 PSETs, which is insufficient to generalize the findings to broader population. For this reason, more research in which higher number of participants participates needs to be undertaken. To be able to compare and contrast the experiences of PESTs of different nationalities in the EP and the differences in the effect of the program on their professional development, researchers from different countries could produce a paper together.

7. Conflict of Interest

The author declares that there is no conflict of interest.

8. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Bell, R. (2016). Concerns and expectations of students participating in study abroad programmes: Blogging to reveal the dynamic student voice. *Journal of Research in International Education, 15*(3), 196-207.

Beerkens, M., Otero, M. S., Wit, H. D., & Huisman, J. (2016). Similar students and different countries? An analysis of the barriers and drivers for Erasmus participation in seven countries. *Journal of Studies in International Education, 20*(2), 184-204.

Choy, D., Wong, A. F. L., Goh, K. C., & Low, E. L. (2014). Practicum experience: Pre-service teachers' self-perception of their professional growth. *Innovations in Education and Teaching International, 51(5), 472-482.*

Creswell, J. W. (2012). *Educational research*. Pearson: Boston.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches.* Sage: London.

Darwin, S., & Barahona, M. (2019). Can an outsider become an insider? Analysing the effect of action research in initial EFL teacher education programs. *Educational Action Research, 27*(5), 709-725.

Delmartino, M., & Beernaert, Y. (1998). Teacher education and the ERASMUS program. *European Education, 30*(3), 56-85.

European Commission. (2019). What is Erasmus? Retrieved from https://ec.europa.eu/programmes/erasmus-plus/about_en

Golubeva, I., Parra, E. G., & Mohedano, R. E. (2018). What does 'active citizenship' mean for Erasmus students? *Intercultural Education, 29*(1), 40-58.

Gonzales, C. R., Mesanza, R. B., & Mariel, P. (2011). The determinants of international student mobility flows: an empirical study on the Erasmus programme. *Higher Education, 62*, 413-430.

Hatay Mustafa Kemal University. (2019). What is Erasmus? Retrieved from https://bit.ly/2ZzoaFU

Iriondo, I. (2019). Evaluation of the impact of Erasmus study mobility on salaries and employment of recent graduates in Spain. *Studies in Higher Education, 44*, 1-19.

Jeanpierre, E., & Broadbent, G. (2016). "I believe that it will be an amazing experience": pre-departure impressions of students on an Erasmus exchange programme. *The Law Teacher, 50*(2), 209-229.

Jones, M., & Ryan, J. (2014). Learning in the practicum: Engaging pre-service teachers in reflective practice in the online space. *Asia-Pacific Journal of Teacher Education, 42(2*), 132-146.

Juvan, E., & Lesjak, M. (2011). Erasmus Exchange Program: Opportunity for professional growth or sponsored vacations? *Journal of Hospitality & Tourism Education, 23*(2), 23-29.

Llanes, A., Tragant, E., & Serrano, R. (2012). The role of individual differences in a study abroad Experience: The case of Erasmus students. *International Journal of Multilingualism, 9*(3), 318-342.

Llurda, E., Balsa, L. G., Barahona, C., & Rubio, X. M. (2016). Erasmus student mobility and the construction of European citizenship. *The Language Learning Journal, 44*(3), 323-346.

Makina, B. (2019). Exploring pre-service teacher development through daily journal reflections: A case study. *Africa Education Review, 16(3*), 67-83.

Messer, D., & Wolter, S. C. (2007). Are student exchange programs worth it? *Higher Education, 54*, 647-663.

Otero, M. S., Huisman, J., Beerkens, M., Wit. H.D., & VujiĆ, S. (2013). Barriers to international student mobility: Evidence from the Erasmus program. *Educational Researcher, 42*(2), 70-77.

Ramdani, J. M., & Widodo, H. P. (2019). Student teachers' engagement in Facebook-assisted peer assessment in an initial teacher education context: speaking 2.0. *Journal of Education for Teaching, 45*(3), 348-352.

Roy, A., Newman, A., Ellenberger, T., & Pyman, A. (2019). Outcomes of international student mobility programs: a systematic review and agenda for future research. *Studies in Higher Education, 44*(9), 1630-1644.

Salajan, F. D., & Chiper, S. (2012). Value and benefits of European student mobility for Romanian students: Experiences and perspectives of participants in the ERASMUS programme. *European Journal of Higher Education, 2*(4), 403-422.

Smith, J. A., Flowers, P., & Larkin, M. (2009). *Interpretative phenomenological analysis: Theory, method and research*. London: Sage.

Çetin, F., Bingöl, A. S., Çetin, Ş., Budak, Y. (2020). Attitudes of prospective foreign language teachers towards learning a second foreign language. *International Online Journal of Education and Teaching (IOJET), 7*(3). 891-910. https://iojet.org/index.php/IOJET/article/view/886

Received: 05.05.2020
Received in revised form: 11.05.2020
Accepted: 23.05.2020

ATTITUDES OF PROSPECTIVE FOREIGN LANGUAGE TEACHERS TOWARDS LEARNING A SECOND FOREIGN LANGUAGE

Research article

Filiz Çetin
Gazi University
ficetin@gazi.edu.tr

A.Selcen Bingöl
Gazi University
aslihanselcen@yahoo.com

Şaban Çetin
Gazi University
cetin09@gmail.com

Yusuf Budak
Gazi University
ysfbudak@gmail.com

Filiz ÇETİN is an Associate Professor Dr. in Gazi University Gazi Faculty of Education Curriculum and Instruction Department.

A Selcen BİNGÖL is an Associate Professor Dr. in Gazi University Gazi Faculty of Education Curriculum and Instruction Department.

Şaban ÇETİN is an Associate Professor Dr. in Gazi University Gazi Faculty of Education Curriculum and Instruction Department.

Yusuf BUDAK is a Professor Dr. in Gazi University Gazi Faculty of Education Curriculum and Instruction Department.

ATTITUDES OF PROSPECTIVE FOREIGN LANGUAGE TEACHERS TOWARDS LEARNING A SECOND FOREIGN LANGUAGE

Filiz Çetin
ficetin@gazi.edu.tr

A.Selcen Bingöl
aslihanselcen@yahoo.com

Şaban Çetin
cetin09@gmail.com

Yusuf Budak
ysfbudak@gmail.com

Abstract

In this study it was aimed to scrutinize the attitudes of prospective teachers of foreign languages towards learning a second foreign language. The data were collected via "Attitude Scale Towards Second Foreign Language" developed by Çetin et.al. (2019) from a total of 300 student teachers of foreign languages in Gazi University Ankara. Out of these 300 student teachers, 206 were female and 94 were male. The study adopted the survey method and was conducted during the Spring Semester of 2018-2019 academic year. For the data analyses conducted via SPSS package program, t-test and one-way variance analysis (ANOVA) from parametric tests were conducted. In addition, the effect size values were calculated in order to determine the effect of independent variables on the attitudes of participants towards learning a second foreign language. At the end of the study it was observed that attitude scores of the prospective teachers of foreign languages were high 71% of the participant prospective teachers obtained scores between this score interval. Also, it was found that attitude scores of prospective teachers differed in accordance with their gender, grade, academic success, attaching importance to learning a language, department perception and attaching importance to second foreign language activities.

Keywords: Attitude, learning a second foreign language, prospective teachers.

1. Introduction

Increase in information and communication speed is a known fact of our age which effect all countries and their educational systems. Countries approaching one another via communication establish firm connections in all fields of life. Countries take into account their educational systems within the context of new cooperation fields, partnerships and interdependencies. These connections on one hand make the countries dependent on each other, on the other hand requires to educate the individuals with the ability to use the increasing information and be able to produce the new ones as well as cohesively work with the other

countries. All these phenomenon necessitates the education systems of the countries to be in harmony a certain extent (Öztekin, 2013). This situation requires to train the teachers so that they could accomplish their new roles and therefore take into account the teacher training programs in an international context. Among these new roles, the most important ones could be explained as; mutual understanding, tolerance, providing the students to explore the universal values that would contribute to the establishment of peace in the world so as to improve democratic understanding. Apart from their other roles, training teachers so that they could educate their students by introducing other cultures and improve peace and democratic understanding has been among the important teacher training issues (Budak, 2005). In accordance with this trend teachers or prospective teachers should be aware of cultural diversity. With this diversity understanding in mind, teachers' preparing their courses for supporting this richness and managing their classrooms being included in the international features of teacher training programs have started to form the basic approach in curriculum development (Banks, 2014).

Especially after the 1970's there has been a need for interaction and cooperation among societies of different cultures with the development of information and communication technologies. In the context of this need, the efforts of the nations in trying to get to know one another better and cooperation has increased. The concept of globalization has arisen parallel with the increase in politic, economic, cultural and academic relations all around the world. "Globalization is the spread and admission of social, cultural and economic values in international areas; also the exceeding of nationally produced values the national boundaries. The becoming widespread of the mass communication devices and the intertwining of world communities in economic, cultural and political levels (Özbolat, 2013; Tezcan, 2002; Toulmin, 1999).

In the context of concepts pointing to a close interaction of individuals or in terms of the world such as globalization, internalization, universalization (Aslan, 2004) common human values are shared and common solutions to the problems are sought. So the contemporary individual is expected to be self-sufficient as well as be a problem-solver with a universal point of view. The properly fulfillment of this expectation requires the competency in foreign languages. Possibly with this in mind, an individual's learning more than one foreign language is attached importance.

Foreign language teaching, beyond attaining some competencies about that foreign language, also contributes to the development and sharing the humanistic values through communication of the individual as a social being. The educational and sociological value of foreign language is seen in this context. It could be stated that those who have knowledge of foreign languages and communicate via them are more advantageous in terms of getting to know other cultures as well as eliminating form prejudices. Because the competences acquired via foreign languages guide the individual both in forming world views and being able to be themselves. Given these realities, contemporary states take precautions in training multilingual citizens so as to understand themselves correctly and make plans for teaching more than one foreign language in educational institutions. For instance, practices on teaching more than one foreign languages are actualized in the educational systems of the member of European Union states (Garabédian, 2013; Kuşçu 2018).

It could be stated that the need for development as well as having a say in international states and the desire to monitor the developments make the countries dependent on one another. In such a context the competency to be able to communicate in more than one foreign language stands out as the basic need.

International and supranational institutions such as the European Council supports incentive projects on teaching more than one foreign languages in member states (Hermans, 1997). In a study conducted it was seen that 33 percent of primary school students speak a second foreign language (Demirel, 2005). At this point it is seen that learning more than one foreign language is perceived as a need (Krzyżanowski & Wodak, 2011) and students are provided with foreign language teaching as far as possible.

States are increasingly convergent to one another and establish firm relationships among themselves. It is a known fact that especially member states of the European Union took precautions on many projects on teaching more than one foreign languages almost thirty and thirty-five years ago as well as the project called "Teaching Living Languages and European Citizenship" (Conseil de L'europe, ODCC-88-33.extrait). During that period United Nations have also carried out projects such as Linguapax (Unesco, 6614/89).

It is a reality that in the era which multilingual and multicultural education and life styles show up, learning more than one foreign language is a must for individuals to fully understand each other. In other words, information and communication age requires the learning of foreign languages for communication. It is inevitable for an individual to confront with multilingual and multicultural environments both for professional and other reasons. For an individual to meet social needs such as make her/him presence felt, self-express and have a say, communication in a foreign language or languages are required. Information and communication age necessitates the individuals as well as the states to build communication bridges among individuals from different nations in the context of both professional and hobby aims also lifelong learning and integration (Eren, 2018; Gündoğdu, 2005).

Our country struggling for noticing what is happening in the contemporary world and integrating into that so learning a foreign language is seen as an important factor, foreign language teachers are become apparent. For foreign language teachers, learning a second foreign language is important in terms of the increasing agenda of the world as "multilingualism understanding" also for closing teacher shortage. It is a fact that competency in one foreign language plays an incentive and facilitator role in learning a second foreign language and communicating with different individuals. Competency in one foreign language occupies an important position in attaining competency in a second foreign language (Eren, 2018; Le Point, 2019). It would be a reasonable practice to provide foreign language teachers an opportunity to learn a second foreign language and them to utilize this opportunity.

The effect of some factors in foreign language learning is in question. These factors could be taken into account as intrinsic or extrinsic factors with regard to the learner such as age, method, content, ability, motivation, attitude and etc. As in all learning domains attitudes as intrinsic factors have an important place in learning. It is observed that in terms of learning a second foreign language, the learnt first foreign language effects the attitudes thus motivation towards learning a second foreign language positively (Heinzmann, 2013).

Attitudes could be described as cognitive, affective and psychomotor psychological situations which are developed as a result of experiences and have a leading and dynamic effect on behaviours (Breckler & Wiggins, 1989). Although descriptions on attitudes do not overlap fully, they show some similarities in terms of discourse (Dörnyei & Schmidt, 2002; Tolan, İsen & Batmaz, 1985). Generally emphasized, attitudes play a determining role in determining, directing and finalizing the cognitive activities of the individual. Within his framework attitudes could be said to cover three components (İnceoğlu, 2004; Morgan, 1980; Üstündağ, 2001). These are; affective components related with neural feelings, cognitive components covering mental evaluation and behavioral components in the context of action and reaction. In other words, attitudes are the positive or negative mental patterns an individual takes on

towards the stimulants in their environment. It would be a cognitive component if a foreign language teacher candidate attaches importance to learning a second foreign language taking into account the benefits it will bring. Moreover, it would be described as the affective component when the teacher candidate would be happy in learning the second foreign language and its culture and finally it would be the behavioral component if the teacher candidate communicates with an individual from that culture to live the aforementioned happiness and sustain this situation.

Seen form this discourse it could be stated that attitudes effect the motivation towards learning as there is a relationship between attitude and the motivation for learning (Hainzmann, 2013). Motivation is a phenomenon which takes its resource from the learner's perception towards oneself and her/his environment, focuses the learner towards the provided educational activity aimed to be learnt by her/him and attains the learner the determination to complete the activity (Viau, 2008).

Whether it is general or particular, three kinds of perception have an impact on motivation. According to Viau (2008) these perceptions are as follows:

- The value for the learner attributed to the educational activity,
- Competency perception for achieving the relevant activity.
- Control perception for the relevant activity.

It was documented with many research that there is a positive relationship between motivation of the aforementioned perceptions and learner success (Deci & Ryan, 1987; Masgoret & Gardner, 2003; Schunk & Pajares, 2002; Wigfield et. al. 2006). Therefore, today it is given importance to the learner to develop positive attitudes towards learning and many multiple studies are being carried out varied from students to teachers, teachers to parents and parents to learning and teaching process (Gonzales, 2011). It is important that learning-teaching experiences are actualized in a student centered understanding as attitudes are originated from experiences and life. So, it would have a positive effect on the tendency of foreign language teachers to learn a second foreign language if the required arrangements are made in their learning environments for a second forging language.

It was observed that prospective foreign language teachers who have a positive attitude towards learning a second foreign language are eager to learn that language easier and faster, actively attend the learning process and are high-level achievers (Du, 2009). Success or failure could arise according to the direction of the attitudes towards language and language learning (Jain & Sidhu, 2013; Masgoret & Gardner, 2003). According to Wong and Nunan (2011) the determinant between those who are successful or unsuccessful in learning a foreign language is the attitude towards learning language.

As foreign language teachers know a first foreign language, they can be characterized as the least group to have a shock towards learning a second foreign language as there is a close relationship between learning and attitudes. Attitudes are among the one of the four dimensions of motivation the meaning of which is encouraging and incentive (Gardner, 1985; 2007). These dimensions could be specified as; learning aim, learning desire, learning effort and attitudes towards learning. If a foreign language teacher candidate takes learning a second foreign language as a goal, even though s/he shows effort and desire but has negative attitudes towards learning a second foreign language then the motivation conditions are not met and this could play a role as learning obstacle. Because attitudes are also taking a stand directed by the intellectual patterns in the light of the individual's past experiences (Tolan, İsen & Batmaz, 1985). This taking stand could affect learning according to whether it is positive or negative in

direction as an individual displays a behavior consistent with her/his emotions and beliefs (Morgan, 1980).

When national and international literature is examined it is seen that there are barely research on determining the attitudes of prospective foreign language teachers towards learning a second foreign language. So it is believed that this study will fulfill an important gap in the literature as well as reorganizing the foreign teacher training curriculum. Therefore, in this study it was aimed to determine the attitudes of prospective foreign language teachers towards learning a second foreign language.

In accordance with this aim answers to the following questions were sought:

1. What is the total distribution of the attitude scores of prospective teachers towards learning a second foreign language?

2. Do the attitude scores of prospective teachers towards learning a second foreign language differ in terms of gender, academic success, attaching importance to language acquisition, department perception and the degree of attaching importance to learning a second foreign language?

2. Method

In this research descriptive approach on survey model was used. The attitudes of prospective teachers towards learning a second foreign language was tried to be described as it was (Büyüköztürk, Kılıç-Çakmak, Akgün, Karadeniz & Demirel, 2016).

2.1. Participants

The participants of the study were composed of the prospective teachers of foreign languages in Gazi University, Gazi Faculty of Education Foreign Language Teaching during the Spring semester of 2018-2019 academic year. As it was easier to reach the students and obtain permission the study was decided to be conducted in Gazi University. Due to the difficulty of reaching out the whole target population and the number of the participants were kept as high as possible to be able to generalize the results. The number of the participants was 300, 206 of whom were female and 94 were male. They were chosen with systematic random sampling method from different grades in three departments of Foreign Language Education namely; English, French and German. This method is used especially in situations which the study population is high. In this sampling method a particular number of units determined are chosen at certain intervals omitted from the study population and according to a systematic. Systematic sampling method was chosen as the study population was high, as choosing the participants was easier than simple random method and as the classroom lists were reached. A total of 1311 prospective teachers are trained in the three departments. So it was seen that with a 5% error margin, 278 prospective teachers out of 1311 were adequate for the study (Çıngı, 1994).

2.2. Data Collection and Analysis

The data in the study was collected via the “attitude scale towards second foreign language learning” developed by Çetin, Budak, Çetin & Arslangilay (2019). The scale is three factor structured consisting of 43 items. The factors are respectively; “positive belief towards learning a second foreign language”, “resistance to learning a second foreign language” and “attaching importance to learning a second foreign language”. The three factor structure about the scale explains the 49.72% of the total variance. Reliability analysis showed that Cronbach alpha

reliability coefficient for the overall scale is .95, for sub-dimensions respectively as .95 and .90 and .76. At the end of the confirmatory factor analysis The adaptive values related with the scale are determined as RMSEA, .076; $\chi 2/df=2.4$; SRMR=.81; NFI=.94; NNFI=.96; IFI=96; CFI=.96; RFI=94. Of the 43 items in the test 17 are negative and 26 are positive. Negative items are calculated reversely in evaluation. The highest score that could be taken from the scale is 215 whereas the lowest score is 43.

The analyses were made with SPSS package program on the data set created after the application of the scale. First, whether the data set met the requirements for parametric test was controlled and as it was found out that the distribution was in a normal structure t test and variance analysis techniques from parametric tests were used. Scheffe test results were conducted in cases where the variances were homogeneous whereas Dunet C test was used when the variances were not homogenous. In addition, effect size values were calculated in order to determine the effect of independent variables on the attitudes towards learning a second foreign language.

3. Findings

Percentage and frequency distributions related with the demographic characteristics of the prospective teachers attending the study are presented in Table 1.

Table 1. *Demographic characteristics of the prospective teachers*

		f	**%**
Gender	Female	206	68.7
	Male	94	31.3
	Total	**300**	**100**
Department	English Language Teaching	181	60.3
	French Language Teaching	41	13.7
	German Language Teaching	78	26.0
	Total	**300**	**100**
Grade	Freshman	94	31.3
	Sophomore	116	38.7
	Sophister	39	13.0
	Final Year	51	17.0
	Total	**300**	**100**
Academic Success	Very good	98	32.7
	Good	145	48.3
	Average	57	19.0
	Total	**300**	**100**
	Very much	126	42.0
	Much	123	41.0

Attaching Importance to Language Learning	Average	51	17.0
	Total	**300**	**100**
Department Perception	Love it very much	68	22.7
	Love it	176	58.7
	Love it a little	56	18.6
	Total	**300**	**100**
Attaching Importance to Learning a Second Foreign Language	Very much	114	38,0
	Much	117	39.0
	Average	69	23.0
	Total	**300**	**100**

When Table 1 is examined it is seen that the study group is consisted of 68.7% female and 31.3% male prospective teachers. 60.3% of the prospective teachers are trained in English Language Teaching, 13.7% in French Language Teaching and 26% in German Language Teaching Department. Of all the prospective teachers 31.3% are freshman, 38.7% are sophomore, 13% are sophister and 17% are final year students. 32.7% of the prospective teachers' academic success is "very good", 48.3% is "good" and 19% is in "average" level. 42% of the prospective teachers attach "very much" importance to second language learning, 41% attach "much" and 17% attach "average" level importance. While 22.7% of prospective teachers stated that they loved their department "very much", 58.7% stated "much" and 18.6% stated they loved their department "a little". 38% of the prospective teachers remarked that they attached "very much" importance to learning a second foreign language whereas 39% stated "much" and 23% stated "average" level.

Distribution of the Attitude Scores the Prospective Teachers Obtained from Attitude Scale Towards Second Language Learning in General Scale and Scale Sub- Dimensions

The distribution of the total attitude scores the prospective teachers obtained from the scale are presented in Table 2.

Table 2. *Distribution of Total attitude scores for the scale general*

	N	$\bar{X}$	ss	Min.	Max.	İtem number	$\bar{X}$ 146,21 – 215,00	
Attitude							f	%
	300	155,79	20,49	89	185	43	214	71,33

"high" (146,21 points and above), "average" (111,81-146,20), "low" (111,80 points and below)

Table 2 presents information on the distribution of the "total" attitude scores of the prospective teachers towards learning a second foreign language obtained from the scale general. It is observed from the table that the average of total attitude scores of prospective teachers is =155,79. When the score scale is taken into account this attitude score value reflects a high attitude score belonging to the prospective teachers and that the prospective teachers who participated in this study are in this 71% score interval. In the light of this finding it could be stated that most of the prospective teachers are in a positive attitude towards learning a second foreign language.

The distribution of the attitude scores of the prospective teachers towards second language learning according to gender variable is presented in Table 3.

Table 3. *T test results of prospective teachers according to gender variable*

Sub-Dimensions of the scale	Gender	n	$\bar{X}$	ss	t	p	Cohens' d
I. Sub-Dimension (Positive belief towards learning a second foreign language)	Female	206	99,17	15,36	2,22	,028	0,27
	Male	94	95,20	13,88			
II. Sub-Dimension (Resistance to learning a second foreign language)	Female	206	58,91	6,63	4,83	,000	0,65
	Male	94	53,23	10,48			
III. Sub-Dimension (Attaching importance to learning a second foreign language)	Female	206	26,47	3,85	3,42	,001	0,42
	Male	94	24,81	4,00			
Scale Total	Female	206	184,54	22,26	4,00	,000	0,49
	Male	94	173,24	23,53			

Table 3 presents the distribution of the attitude scores prospective teachers obtained from the sub-dimensions and general of the scale according to gender variable. When the table is examined it is observed that the attitude score averages of female prospective teachers $\overline{X}$ =184,54 differ than of male prospective teachers $\overline{X}$ =173,24. T test results conducted in order to exhibit the meaningfulness of the difference showed that the difference between the prospective teachers is meaningful [t(298)= 4,00, p<0.05]. With regard to this result it could be stated that female prospective teachers have a higher attitude score towards learning a second foreign language than male prospective teachers. Moreover, it could also be stressed that there is a distribution in favor of female prospective teachers as the distribution showed similarity in terms of sub-dimensions.

On the other hand, in order to determine the effect of gender variable on the attitude scores towards learning a second foreign language size effect values were calculated. The size effect is Cohens'd = 0,49 "average" in the scale general whereas respectively in the sub-dimensions as Cohens'd =0,27 “low”, Cohens'd =0,65 "average", Cohens'd =0,42 “low” level. Based on these values it could be said that gender variable has a “low” and “average” level effect on the attitude scores.

The distribution of attitude scores towards learning a second foreign language according to the department studied in is given in Table 4:

Table 4. *Attitude score variance analysis results of the prospective teachers according to the department variable*

Sub-Dimensions of the scale	Department	n	$\overline{X}$	ss	F	p	Intergroup Difference	Size Effect (η^2)
I. Sub-Dimension (Positive belief towards learning a second foreign language)	ELT	181	100,34	13,86	7,657	,001*	1-3	,049
	FLT	41	97,41	15,03				
	GLT	78	92,58	16,28				
II. Sub-Dimension (Resistance to learning a second foreign language)	ELT	181	58,37	7,49	11,928	,000*	1-3,2-3	,079
	FLT	41	59,00	4,97				
	GLT	78	53,27	10,59				
III. Sub-Dimension (Attaching importance to learning a second foreign language)	ELT	181	26,62	3,83	10,826	,000*	1-3,2-3	,068
	FLT	41	26,24	3,73				
	GLT	78	24,22	3,93				
Scale Total	ELT	181	185,34	21,10	12,849	,000*	1-3,2-3	,085
	FLT	41	182,66	20,70				
	GLT	78	170,06	25,78				

(ELT: English Language Teaching, FLT: French Language Teaching, GLT: German Language Teaching)

Table 4 presents the results of the variance analysis conducted for testing the significance of the difference of the attitude score average of prospective teachers towards learning a second foreign language in terms of the department variable. It is observed form the table that the attitude scores of prospective teachers are differed [F(2-297)= 12,849, p<0.05] according to department variable. In order to determine from which group the difference originated from, the conducted Dunet C test results showed that attitude score average of the prospective teachers study in in English Language Teaching ($\overline{X}$=185,34) and French Language Teaching ($\overline{X}$=182,66) are higher than those of the prospective teachers studying in German Language Teaching ($\overline{X}$=170,06).

When the attitude score distributions regarding the sub-dimensions of the scale it was seen that the distribution showed similarity with the scale general. Size effect values obtained for

determining the effect of department variable on attitude scores towards learning a second foreign language showed this variable revealed “average” in terms of the scale general whereas “average” and “low” level in terms of the sub-dimensions of the scale.

The distribution of the attitude scores of prospective teachers towards learning a second foreign language according to grade variable is given in Table 5:

Table 5. *Attitude score variance analysis results of the prospective teachers according to the grade attended*

Sub-dimensions of the scale	Grade attended	n	$\overline{x}$	ss	F	p	Intergroup Difference	Size Effect (η^2)
I. sub-dimension (Positive belief towards learning a second foreign language)	Freshman	94	99,76	14,43	12,593	,000*	1-3,1-4,	,113
	Sophomore	116	102,26	12,91				
	Sophister	39	91,33	14,95				
	Final Year	51	89,73	15,90				
II. sub-dimension (Resistance to learning a second foreign language)	Freshman	94	57,60	8,38	11,730	,000*	1-4,2-4,3-4	,113
	Sophomore	116	59,27	6,90				
	Sophister	39	57,23	7,17				
	Final Year	51	51,33	10,09				
III. sub-dimension (Attaching importance to learning a second foreign language)	Freshman	94	26,76	4,17	16,008	,000*	1-3,1-4, 2-3,2-4	,140
	Sophomore	116	26,97	3,23				
	Sophister	39	24,69	3,69				
	Final Year	51	23,10	3,79				
Scale total	Freshman	94	184,11	21,97	17,435	,000*	1-4,2-3,2-4	,159
	Sophomore	116	188,49	18,93				
	Sophister	39	173,26	23,46				
	Final Year	51	164,16	24,53				

Table 5 presents the results of the variance analysis conducted for testing the significance of the difference of the attitude score averages towards learning a second foreign language according to grade variable. It was observed that the attitude scores of the prospective teachers differed [$F(3\text{-}296)= 17,435$, $p<0.05$] according to the grade variable. According to Scheffe test results conducted to determine from which group the difference originated from it was seen that freshman ($\overline{x}$ =184,11) and sophomore ($\overline{x}$ =188,49) prospective teachers had higher

attitude score average than sophister ($\overline{X}$ =173,26) and final year ($\overline{X}$ =164,16) prospective teachers. When the attitude score distributions regarding the sub-dimensions of the scale are examined it is seen that the distribution showed similarity with the scale general. Size effect values obtained to determine the effect of the grade on the attitude scores towards learning a second foreign language showed grade variable revealed "high" in terms of the scale general whereas "average" and "high" level in terms of the sub-dimensions of the scale.

The distribution of the attitude scores of prospective teachers towards learning a second foreign language according to academic success variable is presented in Table 6:

Table 6. *Attitude score variance analysis results of the prospective teachers according to academic success variable*

Sub-dimensions of the scale	Academic Success	n	$\overline{X}$	ss	F	p	Intergroup Difference	Size Effect (η^2)
I. sub-dimension (Positive belief towards learning a second foreign language)	Very Good	98	103,26	13,32	10,941	,000*	1-2,1-3	,069
	Good	145	96,30	15,24				
	Average	57	92,88	14,65				
II. sub-dimension (Resistance to learning a second foreign language)	Very Good	98	58,65	6,47	2,411	,091	-	-
	Good	145	56,32	9,78				
	Average	57	56,58	7,50				
III. sub-dimension (Attaching importance to learning a second foreign language)	Very Good	98	27,04	3,33	5,717	,004*	1-2,1-3	,037
	Good	145	25,39	4,40				
	Average	57	25,47	3,46				
Scale total	Very Good	98	188,95	19,84	9,382	,000*	1-2,1-3	,057
	Good	145	178,01	24,64				
	Average	57	174,93	21,59				

When table 6 is examined it was observed that the attitude scores of the prospective teachers differed [F(2-297)= 9,382, p<0.05] according to the academic success variable.

In order to determine from which group the difference originated from, the conducted Dunet C test results showed that attitude score average of the prospective teachers whose academic success is "very good" ($\overline{X}$ =188,95) are higher than those of the prospective teachers whose are "good" ($\overline{X}$ =178,01) and "average" ($\overline{X}$ =174,93). When the attitude score distributions are examined it is seen that it shows similarity with the scale general except for the second sub-dimension.

Size effect values obtained to determine the effect of academic success variable on language learning on the attitude scores towards learning a second foreign language showed that this variable revealed "average" in terms of the scale general whereas "average" and "low" level in terms of the sub-dimensions of the scale.

The distribution of the attitude scores of prospective teachers towards learning a second foreign language according attaching importance to language learning variable is presented in Table 7:

Table 7. *Attitude score variance analysis results of the prospective teachers according to attaching importance to language learning variable*

Sub-dimensions of the scale	Attaching importance to language learning	n	$\overline{x}$	ss	F	p	Intergroup Difference	Size Effect (η^2)
I. sub-dimension (Positive belief towards learning a second foreign language)	Very much	126	106,79	10,89	108,780	,000*	1-2,1-3,2-3	,423
	Much	123	96,72	11,65				
	Average	51	78,94	12,21				
II. sub-dimension (Resistance to learning a second foreign language)	Very much	126	60,96	4,71	26,875	,000*	1-2,1-3	,157
	Much	123	54,79	10,33				
	Average	51	53,31	6,71				
III. sub-dimension (Attaching importance to learning a second foreign language)	Very much	126	27,88	3,37	49,604	,000*	1-2,1-3,2-3	,250
	Much	123	25,48	3,72				
	Average	51	22,29	2,92				
Scale total	Very much	126	195,63	15,25	99,254	,000*	1-2,1-3,2-3	,387
	Much	123	176,98	20,44				
	Average	51	154,55	18,25				

When table 7 is analyzed it was observed that the attitude scores of the prospective teachers differed [F(2-297)= 99,254, p<0.05] according to the attaching importance to learning a language variable. In order to determine from which group the difference originated from, the conducted Dunet C test results showed that attitude score average of the prospective teachers who attached "very much" importance to language learning ($\overline{x}$=195,63) are higher than those of the prospective teachers who attached "much" ($\overline{x}$=176,98) and "average" ($\overline{x}$=154,55) importance whereas those who attached "much" importance had higher scores than those who attached "average" importance.

When the attitude score distributions are examined it is seen that it shows similarity with the scale general. Size effect values obtained to determine the effect of attaching importance

on language learning on the attitude scores towards learning a second foreign language showed that this variable revealed "high" in terms of the scale general and sub-dimensions of the scale.

The distribution of the attitude scores of prospective teachers towards learning a second foreign language according to department perception variable is given in Table 8:

Table 8. *Attitude score variance analysis results of the prospective teachers according to department perception variable*

Attaching Importance to Language Learning	Department Perception	n	$\overline{x}$	ss	F	p	Intergroup Difference	Size Effect (η^2)
I. sub-dimension (Positive belief towards learning a second foreign language)	Much	68	107,44	10,83	20,234	,000*	1-2,1-3	,120
	Average	176	95,51	14,45				
	Low	56	93,95	16,41				
II. sub-dimension (Resistance to learning a second foreign language)	Much	68	60,74	4,62	9,624	,000*	1-2,1-3	,063
	Average	176	55,61	9,43				
	Low	56	57,52	7,42				
III. sub-dimension (Attaching importance to learning a second foreign language)	Much	68	27,44	3,94	7,326	,001*	1-2,1-3	,047
	Average	176	25,32	3,99				
	Low	56	26,09	3,48				
Scale Total	Much	68	195,62	14,75	19,638	,000*	1-2,1-3	,121
	Average	176	176,45	23,65				
	Low	56	177,55	23,35				

Table 8 presents the results of the variance analysis conducted for testing the significance of the difference of the attitude score averages towards learning a second foreign language according to department perception variable. When the table was examined it was observed that the attitude scores of the prospective teachers differed [$F(2\text{-}297)= 19{,}638$, $p<0.05$] according to the department perception variable.

Results of Dunet C test which was conducted for determining from which groups the difference originated from showed that prospective teachers who loved their department "very

much" ($\overline{x}$=195,62) had higher scores than those who "average" love ($\overline{x}$=176,45) and low ($\overline{x}$=177,55) love their departments.

When the attitude score distributions are analyzed it is seen that the distribution shows similarity with the scale general. The effect size values calculated for the aim of determining the effect of department perception variable on the attitude scores showed "average" level effect on the scale general and "average" and "low" level on the sub-dimensions.

The distribution of the attitude scores of prospective teachers towards learning a second foreign language according to attaching importance to learning a second foreign language variable is given in Table 9:

Table 9. *Attitude score variance analysis results of the prospective teachers according to attaching importance to learning a second language*

Sub-Dimensions of the Scale	Attaching Importance to Learning a Second Language	n	$\overline{x}$	ss	F	p	Intergroup difference	Size effect (η^2)
I. sub-dimension (Positive belief towards learning a second foreign language)	Very much	114	107,32	10,30	63,029	,000*	1-2,1-3,2-3	,298
	Much	117	95,63	14,93				
	Average	69	86,28	11,75				
II. sub-dimension (Resistance to learning a second foreign language)	Very much	114	60,78	5,35	30,952	,000*	1-2,1-3,2-3	,171
	Much	117	56,86	7,84				
	Average	69	51,55	10,34				
III. sub-dimension (Attaching importance to learning a second foreign language)	Very much	114	27,86	3,23	33,654	,000*	1-2,1-3,2-3	,185
	Much	117	25,56	3,67				
	Average	69	23,43	4,02				
Scale total	Very much	114	195,96	14,72	73,539	,000*		,319
	Much	117	178,06	21,79				

	Average	69	161,26	20,40	1-2,1-3,2-3

When Table 9 is analyzed it was seen that the attitude scores of the prospective teachers differed [F(2-297)= 73,539, p<0.05] according to attaching importance to learning a second foreign language variable. Results of Dunet C test which was conducted for determining from which groups the difference originated from showed that prospective teachers who attach "very much" ($\overline{X}$=195,96) importance to second language learning had higher scores than those who "much" ($\overline{X}$=178,06) and average($\overline{X}$=161,26) attach importance whereas those who attach "much" importance had higher scores than those who attached "average" importance. When the attitude score distributions related with the sub-dimensions of the scale it was observed that the distribution showed similarity with the general scale. The effect size values calculated for the aim of determining the effect of attaching importance to second language learning variable on the attitude scores showed "high" level effect on the scale general and the sub-dimensions.

4. Results, Discussion and Suggestions

In consideration of the findings in the study, it was found that most of (71.33%) 300 prospective teachers who participated in the study had high attitude score average and have positive attitudes. When the seven different variables in the study were taken into account and the attitude score averages were compared it was seen that there were meaningful differences among the groups.

In this context when the attitude scores were evaluated by taking into account the variables separately, it was found out that there was a meaningful difference in favor of female prospective teachers in gender variable. It was also observed that the effect size regarding the gender variable is Cohens'd=0.49 related with the overall scale and has an "average" effect. It was found out that department variable had differentiated the attitude scores in favor of English and French language teaching prospective teachers and that the attitude score averages of these two departments were higher than those studying in German Language teaching. The effect size regarding the department variable was found as Ƞ2=,085 and had an "average" effect. The grade to be attended variable differentiated the attitude scores in favor of the freshman and sophomore prospective teachers and the effect size for this variable was found as "high" with Ƞ2=,159. Academic success variable was seen to differentiate the attitude scores of the prospective teachers and it was found out that prospective teachers the academic success of whom were "very good" had higher score averages than those with "good" and "average" score averages. The effect size of this variable was observed "average" with Ƞ2=,057.

According to "attaching importance to language acquisition" variable it was seen that the attitude scores of the prospective teachers differed and those who "very much" attach importance to language acquisition had higher score average than those who give attach "much" and "average" importance whereas those who attach "much" importance had higher scores than the prospective teachers who attached "average" importance to language acquisition. The size effect related with this variable was observed as "high" with Ƞ2=,387. The attitude scores were observed as differentiated according to department perception and that prospective teachers who loved their departments "a lot" had higher score average than those who loved their departments "average" and "little" and the size effect for this variable was Ƞ2=,121 and observed as "average" level. Attaching importance to learning a second foreign language variable differentiated the attitude scores of prospective teachers so that the scores of prospective teachers who attached "very much" importance had higher scores than those who attached "much" and "average" importance as well as prospective teachers who

attached “much” importance had higher scores than those attaching “average” importance. The size effect level of this variable was found “high” with Ƞ2= ,319.

Studies conducted on this subject in our country are mainly on “the attitudes of university students towards foreign language courses” and “attitudes of university students on foreign language learning”. However, there are very rare studies on the attitudes towards learning a second foreign language. Foreign literature concentrates on “beliefs of prospective teachers on learning a foreign language”. In this sense, it was seen that the findings obtained in this study on the independent variables show similarity with those study findings with the same variables (Al Bataineh, 2019; Asassfeh, 2015; Aydoslu, 2005; Gürleyik, 2019; Memduhoğlu & Kozikoğlu, 2015; Mudra, 2016; Sadeghi et Abdi,2015; Özel, Konca & Zelyurt, 2016; Uslu & Özek, 2004; Yıldıran, 2016). It is thought that students’ attitudes shape their language learning experiences and generally guide their future teaching practices. Therefore, any wrong attitude could affect the learning and teaching experiences of the teacher candidate for years (Peacock, 2001).

The attitudes of prospective foreign language teachers towards language and language acquisition could be positive or negative. Positive or supportive attitudes help overcome the problems and sustain the motivation in this way whereas negative or unrealistic attitudes could lead to the increase in disappointment and anxiety (Kern, 1995). The attitudes of prospective foreign language teachers towards learning a foreign or a second foreign language in their pre-service training would have a positive or negative effect when they start their service. In this sense, making descriptive studies on their affective readiness would provide a perspective on the existing situation which would lead a solid foundation for studies that could increase the affective readiness in this aspect.

5. Conflict of Interest

The authors declare that there is no conflict of interest.

6. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Al Bataineh, K. B. (2019). English language learning beliefs of Jordanian Students: The effect of gender. *International Journal of English Linguistics, 9*(2), 219-228.

Aslan, K. (2004). Küreselleşmenin eğitim boyutu (Educational perspectives in globalization). *Ege Eğitim Dergisi, (5)*, 1-5.

Asassfeh, S. M. (2015). Prospective EFL teachers: What language learning beliefs do they hold? *Asia-Pacific Edu Res, 24*(1),13–26.

Aydoslu, U. (2005). Öğretmen adaylarının yabancı dil olarak İngilizce dersine ilişkin tutumlarının incelenmesi (B.E.F. Örneği). Unpublished Master Thesis. Isparta: Süleyman Demirel University.

Banks, J. A. (2014). *An introduction to multicultural education*. USA: Pearson Education.

Breckler, S. J., & Wiggins, E. C. (1989). Attitude structure and function (Eds: Pratkanis et.al.) In: *On defining attitude and attitude theory: Once more with feeling*. New York: Psychology Press.

Budak, Y. (2005). "La notion de programme et la formation pedagogique des enseignants de langues vivantes en Turquie". *European Journal of Teacher Education,* 28(1).

Büyüköztürk, Ş., Kılıç-Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2016). *Bilimsel araştırma yöntemleri*. Ankara: Pegem.

Çıngı, H. (1994). *Örnekleme kuramı*. Ankara: H.Ü. Fen Fakültesi Basımevi, Beytepe.

Çetin, Ş., Budak, Y., Çetin, F., & Arslangilay, A. S. (2019). Validity and reliability study of the attitude scale towards second foreign language learning. *Journal of Language and Linguistic Studies, 15*(3), 972-988. Doi: 10.17263/jlls.631541

Deci, E. L. et Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology, 53,* 1024-1037.

Dörnyei, Z. et Schmidt, R. (2002). *Motivation and second language acquisition*. Second language teaching & curriculum center: USA

Du, X. (2009) The affective filter in second language teaching. *Asian Social Science, 5(*8).

Eren, B. (2018). İkinci Yabancı Dil Olarak Almanca Eğitiminde Öğrenme Stillerinin Belirlenmesi. Unpublished Master Thesis. Trakya University.

Garabédian M. (1996). "Apprendre une langue quand on en parle déjà une", Revue internationale d'éducation de Sèvres. Retrieved from: http://journals.openedition.org/ries

Gardner, R. (2007). Motivation and second language acquisition. *Porta Linguarum, 8,* 9-20.

Gardner, R. C. (1985). *Social psychology and second language learning: The role of attitudes and motivation*. London: Edward Arnold Publishers.

Gonzales, R. D. (2011). The effects of aptitude and motivation on the acquisition of EFL in young learners (Unpublished Master Thesis). Barcelona: Universitat de Barcelona.

Gürleyik, S. (2019). Üniversite yabancı dil hazırlık sınıfı öğrencilerinin teknoloji destekli yabancı dil öğrenimine yönelik tutumları. Unpublished Master Thesis. Zonguldak: Zonguldak Bülent Ecevit University.

Heinzmann, S. (2013). *Young language learner's motivation and attitudes, longitudinal, comparatif an explanatory perspective*. Bloomsbury Publishing: USA

Hermans, S. (1997). World Promoting foreign language competence in the European Community. *The LINGUA Programme, Englishes, 16*(1).

İnceoğlu, M. (2004). *Tutum, algı, iletişim*. Ankara: Kesit.

Jain, Y., Sidhu, G. K. (2013). Relationship between anxiety, attitude and motivation of tertiary students in learning English as a second language. *Procedia – Social and Behavioral Sciences, 90,* 114–123.

Kern, R. G. (1995). Students' and teachers' beliefs about language learning. *Foreign Language Annals, 28*(1), 71-92.

Krzyżanowski, M. et Wodak, R. (2011). Political strategies and language policies: The European Union Lisbon strategy and its implications for the EU's language and multilingualism policy. *Language Policy, 10(*2).

Kuşçu, E. (2018) Üniversite öğrencilerinin ikinci yabancı dil olarak Fransızca öğrenme profilleri: Pamukkale Üniversitesi Eğitim Fakültesi ve Fen-Edebiyat Fakültesi örneği. *Kastamonu Eğitim Dergisi, 26,* 1.

Le point (2019) Pourquoi il esttrès important; apprendre des languesé trangères. Retrieved from: https://www.lepoint.fr/societe/pourquoi-il-est-tres-important-d-apprendre-des-langues

Masgoret, A. M. et Gardner, R. C. (2003). Attitudes, motivation, and second language learning: a meta-analysis of studies conducted by Gardner and associates. Retrieved from: https://onlinelibrary.wiley.com/doi.

Memduhoğlu, H. B. & Kozikoğlu, İ. (2015). Üniversite öğrencilerinin yabancı dil derslerine ilişkin tutumları. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, 24, 184-202.

Morgan, C. T. (1980). *Psikolojiye giriş* (Translated by: H. Arıcı et.al). Ankara: Meteksan Ltd. Şti.

Mudra, H. (2016). Prospective EFL teachers` beliefs about language learning and gender differences in a higher education context. *International Journal of Academic Research in Education, 2*(1), 42‐50.

Özbolat, A. (2013) "Küreselleşme ve toplumsal değerler", I. Ulusal Değerler Eğitimi Kongresi. Konya.

Özdamar, K. (2001). *Örnekleme yöntemleri. SPSS ile biyoistatistik*. (4th edition) 261-265.

Özel, E., Konca, A. S., & Zelyurt, H. (2016). Okul öncesi öğretmen adaylarının yabancı dil eğitimine yönelik tutumlarının incelenmesi. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi (KEFAD,17*(1), 331-342.

Öztekin, A. (2013). "Küreselleşmenin eğitim programlarına etkisi", I. Ulusal Değerler Eğitimi Kongresi. Konya.

Peacock, M. (2001). Pre-service ESL teachers' beliefs about second language learning: A longitudinal study. *System, 29*(2), 177-195.

Sadeghi, K. et Abdi, H. (2015). A Comparison of EFL Teachers and Students' Beliefs about Language Learning. *Mextesol Journal, 39*(1).1-14.

Schunk, D.H. et Pajares, F. (2002). The development of academic self-efficacy. Dans A. Wigfieldet J.S. Eccles (dir), *Development of achievement motivation* (p. 16-31). New York: Academic Press.

Tezcan, M. (2002). "Küreselleşmenin eğitim boyutu", *Eğitim Araştırmaları*, 6.

Tolan, B., İsen, G. & Batmaz, V. (1985). *Sosyal psikoloji*. Ankara: Adım Yayıncılık.

Toulmin, S. (1999). The ambiguities of globalization. *Futures*, 31, 905-912.

Uslu, Z. & Özek, Y. (2004). Yabancı dil öğretmeni adaylarının ikinci yabancı dili öğrenmeye ilişkin tutum ve görüşleri. *Hasan Ali Yücel Eğitim Fakültesi Dergisi*, 2, 129-140.

Üstündağ, N. (2001). Müfredat laboratuar okullarında görev yapan yönetici ve öğretmenlerin bilgisayar tutumları ile kaygı düzeyleri arasındaki ilişkinin incelenmesi. Unpublished Master Thesis, Marmara University.

Viau, R. (2008). *La Motivation à apprendre*. Canada: Editions du Renouveau Pedagogique İnc.

Yıldıran, Ç. (2016). Öğrencilerin yabancı dil öğrenimine yönelik tutumlarının incelenmesi: Aksaray Üniversitesi örneği. *Route Educational and Social Science Journal*, *3*(5),181-190.

Wigfield, A., Eccles, J. S., Schiefele, U., Roeser, R. W. et Davis-Kean, P. (2006). Development of achievement motivation. Dans W. Damon, et R.M. Lerner (dir.), *Handbook of child psychology*, vol. 3, 6e édition (p. 933-1002). Hoboken (N.J.): John Wiley & Son.

Wong, L., Nunan, D. C. (2011). The learning styles and strategies of effective language learners. Elsevier. Retrieved from: https://www.sciencedirect.com/science/article/

Duruk, Ü. (2020). Influence of a socially-mediated contextual professional development program on prospective science teachers' understandings of nature of science, and integrating it into their instructional planning. *International Online Journal of Education and Teaching (IOJET), 7*(3). 912-943.
https://iojet.org/index.php/IOJET/article/view/916

Received: 24.03.2020
Received in revised form: 25.05.2020
Accepted: 28.05.2020

INFLUENCE OF A SOCIALLY-MEDIATED CONTEXTUAL PROFESSIONAL DEVELOPMENT PROGRAM ON PROSPECTIVE SCIENCE TEACHERS' UNDERSTANDINGS OF NATURE OF SCIENCE, AND INTEGRATING IT INTO THEIR INSTRUCTIONAL PLANNING

Case Study

Ümit Duruk

Adiyaman University

uduruk86@gmail.com

Ümit Duruk has a PhD Degree in Science Education and works as a research assistant in the College of Education at Adiyaman University. He is interested in metacognition, reflective practice and pedagogical content knowledge for nature of science.

INFLUENCE OF A SOCIALLY-MEDIATED CONTEXTUAL PROFESSIONAL DEVELOPMENT PROGRAM ON PROSPECTIVE SCIENCE TEACHERS' UNDERSTANDINGS OF NATURE OF SCIENCE, AND INTEGRATING IT INTO THEIR INSTRUCTIONAL PLANNING[1]

Ümit Duruk

uduruk86@gmail.com

Abstract

This study, which was conducted in 2016-2017 academic year, scrutinized the impact of a purposefully designed professional development program titled 'NOS-PD' on the understandings of the Nature of Science (NOS) via instructional practices. Specifically, the purpose of this qualitative multiple-case study was to delineate the impact of a NOS program with a socially-mediated contextual support on the prospective science teachers' understandings of NOS and integrating it into their instructional planning. In the study process, 13 prospective science teachers took part in an intensive 9-week program conducted at 3 stages (5 weeks + 3 weeks + 1 week) based on a 6-week explicit-reflective NOS instruction plus three weeks of participants' developing lesson plans with the help of socially-mediated contextual support. Data sources included an open-ended NOS questionnaire and lesson plans. Results indicated that as a result of the NOS instruction, the vast majority of the participants improved their understandings of NOS in an appropriate way. The analysis of the lesson plans revealed three characteristics of participants' instructional planning for teaching NOS after the NOS-PD program, a) NOS was not sufficiently interpreted except for three NOS components, b) some improvements in terms of the instructional and evaluation strategies were observed, but the knowledge of objectives did not show substantial change, and c) few participants exhibited a robust reported PCK by performing NOS integration at a high level.

Keywords: Nature of science translation, professional development program, highly-contextualized nature of science instruction, prospective science teachers

1. Introduction

What is at the core of science education reform efforts is to establish adequate nature of science (NOS) understandings. This is because the NOS is a fundamental component of scientific literacy serving as the vision of reform efforts (Abd-El-Khalick & Lederman, 2000a; Herman & Clough, 2016; Lederman, Antink & Bartos, 2014). In contrast, it has frequently been reported that students possess naive NOS understandings (e.g., Akerson & Donnelly, 2010; Khishfe, 2008; Khishfe & Abd-El-Khalick, 2002). Teachers have an essential role to play in students' gaining desired NOS understandings (Deniz & Adibelli, 2015; Hanuscin, Lee & Akerson, 2011; NGSS Lead States, 2013). Research findings show that teachers, regardless of their experience in practice, do not have views that are in line with the paradigm of contemporary science (Abd-El-Khalick & Lederman, 2000a; Akerson, Abd-

[1] This study was partly presented in ICEMST 2017: International Conference on Education in Mathematics, Science and Technology on May 18-21, 2017 in Kusadasi/Turkey as oral presentation entitled "Both lasting and translated NOS understandings. Is it really possible?: A collaborative intervention by means of instructional planning within highly-contextualized explicit-reflective NOS instruction".

El-Khalick & Lederman, 2000; Abd-El-Khalick, 2005; Akerson & Hanuscin, 2007; Bell, Matkins & Gansneder, 2011; Mulvey & Bell, 2017). In addition, criteria that are accepted internationally in the field of science education require that students have informed NOS understandings (AAAS, 1993; NGSS Lead States, 2013). Teachers with inadequate NOS understandings are unlikely to be able to guide their students to acquire informed ones (Bell et al. 2011). Having informed NOS understandings paves the way for a more purposeful and integrated way of learning scientific concepts (Mulvey & Bell, 2017). Teachers should establish explicit connections between instructional activities and NOS components in order for students to develop desired NOS understandings (Abd-El-Khalick, Bell & Lederman, 1998). In summary, teachers need to be able to translate their informed NOS understandings into teaching at the K-12 level (Abd-El-Khalick, 2005; Akerson, Buzzelli & Donnelly, 2010; Akerson & Volrich, 2006; Bell, Mulvey & Maeng, 2016; Hanuscin et al. 2011; Wahbeh & Abd-El-Khalick, 2014).

Pedagogical Content Knowledge (PCK) has a dynamic structure, and teaching experience is one of the most essential sources of PCK development (Abell, 2008; Davidowitz & Potgieter, 2016). One of the basic assumptions is that teachers who have more teaching experience have more robust PCK. In such a case, experienced teachers are expected to teach NOS more effectively. However, experience may not always enhance PCK (Friedrichsen et al. 2009). This result has raised the question whether prospective teachers who lack the opportunity of teaching experience could develop robust PCK. Since prospective science teachers lack teaching opportunities at first-hand, it is quite difficult to make any substantial claims related to their NOS teaching practices (Bilican, Tekkaya & Çakıroğlu, 2012). Prospective teachers who can develop especially PCK readiness for instructional practices due to lack of teaching experience (Davis, 2003) lack robust PCK in relation to instructional practice (Loughran et al. 2004; Van Driel et al. 1998). While prior research has been successful in identifying ways to support NOS teaching by means of developing teachers' NOS understandings, they have been less successful in developing PCK for NOS instruction (e.g., Akerson & Abd-El-Khalick, 2003; Faikhamta, 2013; Schwartz & Lederman, 2002). A similar situation corresponds to prospective science teachers (Akerson & Volrich, 2006; Demirdöğen, Hanuscin, Uzuntiryaki-Kondakci & Köseoğlu, 2016). Not much is known from research about the process of development in PCK for NOS and specifically about how this development may be facilitated for prospective science teachers. Teacher education programs are a valuable resource with respect to answering this question. This is because prospective teachers who have not had the chance to gain teaching experience can be supported to develop PCK by having them attend pedagogical courses, prepare instructional plans and observe classroom lessons of mentor teachers at the internship schools (Grossman, 1990; Hanuscin, Cisterna & Lipsitz, 2018). Despite institutional constraints, prospective teachers can effectively teach about NOS embedded in a specific science content when they receive the appropriate training (Clough & Olson, 2012). During the design phase of this study, an extensive literature review was conducted based on the assumption that the recommended strategies for effective NOS instruction would also be required for enhancing PCK for NOS. This review highlighted the highly-contextualized explicit-reflective NOS instruction proposed by Clough (2006) among others. Highly-contextualized instruction may support subject matter and help connect students to science knowledge. A potential alternative to the either-or approach is NOS instruction along a context continuum, a combination of highly and non-contextualized NOS instruction including various degrees of contextualization between the aforementioned extremes (Bell et al. 2016). Given that highly-contextualized NOS experiences can be easily affected by inadequate NOS understandings, first explicit-reflective NOS instruction based on a context continuum was implemented in this study by the researcher in order for prospective science teachers to develop their NOS understandings

and PCK for NOS within a teacher education program. That instruction was followed by pedagogical instruction framed by PCK for NOS. The latter predominantly focused on the objectives of science education, instructional strategies and evaluation components in order to teach NOS effectively. As studied by many researchers (e.g., Akerson & Abd-El-Khalick, 2003; Akerson & Volrich, 2006; Bilican et al. 2012; Demirdöğen, 2012), it was ensured that participants received intense pedagogical support through socially-mediated contextual professional support as soon as the highly-contextualized NOS instruction began.

The present study mainly focuses on how highly-contextualized explicit-reflective NOS instruction coupled with socially-mediated contextual professional support influence prospective science teachers' NOS understandings and their NOS translation into instructional planning. Three questions guided the investigation:

1. How does highly-contextualized explicit-reflective NOS instruction influence the development of prospective science teachers' understanding of NOS?
2. To what extent do prospective science teachers integrate the components of reported PCK for NOS into lesson planning following highly-contextualized explicit-reflective NOS instruction?
3. How can the participant prospective science teachers' progress be reported about PCK for NOS as a result of socially-mediated contextual professional support following highly-contextualized explicit-reflective NOS instruction?

2. Theoretical Background and Literature Review

2.1. Nature of Science (NOS)

One of the key priorities of being scientifically literate is to understand the NOS. The NOS is an umbrella concept that hosts the history, philosophy, sociology and psychology of science (Laugksch, 2000; McComas, Almazroa & Clough, 1998). Inquiries in these areas are usually guided by epistemological beliefs about scientific knowledge. As a result, cyclical definitions of the NOS are quite common. Such definitions appear to be constructed at large based on Lederman's (1992) NOS definition, and the NOS appears to be referred to as a dynamic structure based on science and its underlying epistemological foundations as a way of knowing, as well as values and beliefs that are strictly bound to the process of development of scientific knowledge. Because of this dynamic interaction, the NOS can be assumed to have become more frequently influenced by scientific developments. In spite of the existence of views that are contrary, it is seen that especially science educators have reached a general consensus about what the NOS is and they think that the NOS can be taught at the K-12 level. As is the case with learning subject matter or developing science process skills, NOS teaching should be intentionally planned (Abd-El-Khalick & Akerson, 2009). One of the first conceptualizations of the NOS, which is thought to be taught through curricula, is the set of components referred to as the "Lederman Seven" (see Lederman, 1999). These NOS components are constructed on the understanding that scientific knowledge is tentative (subject to change), empirically based, subjective and socially embedded as well as involving explanations produced by human imagination and creativity, revealing the difference between observations and inferences, and finally referring to the relationships between laws and theories. These components are the product of a robust interaction with regard to the NOS. This interaction has an important role to play in the integration of insights relevant to the paradigm of contemporary science that form around the NOS components in the context of student learning. With the help of effective NOS instruction, students can learn that new knowledge is acquired based on the exploration of new evidence that undermines the validity of previous knowledge or the evaluation of

existing data within more comprehensive and reliable theoretical frameworks and that none of the types of knowledge can be conclusively proven even if countless evidence is reached that supports them. They do not defend the argument that scientific knowledge is precise regardless of its being a type of knowledge that is reliable and long-term. On the other hand, they know that our observations about nature are always interpreted by taking into account certain theoretical frameworks, regarding our perceptions and instruments through which observations are conducted. They also know that scientific knowledge is constructed at the end of a process formed by the common influence of a variety of assumptions. Similarly, they realize that scientific results are based on the evidence acquired in this process. Students who understand the role of evidence stemming from the natural world in generating scientific arguments become successful in distinguishing science from other research disciplines, from what is non-scientific and from what is pseudo-scientific. NOS instruction can also keep students from regarding science as a solely logical and sequential activity that is detached from life. Once typical misconceptions about the image of science are eliminated, students understand that science is practiced in a process that depends heavily on imagination and creativity. Another important subject to teach to students is that science never begins with impartial observations. Science and scientific knowledge are unlikely to be considered independently from scientists because scientific knowledge is influenced by scientists' prejudices, experiences, accumulation of knowledge, the values of the society in which they live, their beliefs, the nature of the education they receive and their expectations. Such characteristics about the NOS can be said to have certain similarities to the framework pointed out by AAAS (1990). The fact that the studies in the field of NOS have recently shown significant improvements in terms of content, scope and method draws attention. However, it is claimed that research in this field has a deep-rooted history (Abd-El-Khalick et al. 1998). Indeed, Lederman (1992) has collected the research on the NOS until that date under four headings to illustrate a hierarchical progress. The last of these headings, which is the one that is closest to the present day, is the examination of the relationship between the understandings of the NOS that teachers have and the translation of these understandings into classroom practices (Abd-El-Khalick & Lederman, 2000a). In order for students to understand the aforementioned NOS components, teachers need to improve their PCK about how to teach the NOS. Otherwise, due to regular classroom lecture of science content (explicit instruction), which are the common tendency today, it is likely that NOS components are perceived by students as a list that should be memorized, and therefore students will continue to have naive NOS understandings. This highlights the importance of the urgent need for the conceptualization of PCK for NOS.

2.2. The Reciprocal Interplay Between Nature of Science (NOS) and Pedagogical Content Knowledge (PCK)

Teacher preparation has an invaluable clear impact on the successful implementation of the reform efforts in the science classroom. Today, teachers need much more subject matter knowledge than they already know, which has led to the emergence of PCK, which is, in some way, a mix of such content and pedagogical knowledge (Abell, 2008; Alonzo & Kim, 2016). PCK, which forms the essence of this conceptualization, is a special type of knowledge that distinguishes an effective teacher from a subject matter expert (Shulman, 1986). PCK brings together several knowledge components that work systematically to help teachers represent specific subject matter in a way that make it accessible and comprehensible to students (Magnusson et al. 1999). Such teaching knowledge base, more often called as the lost paradigm, has become a kind of facilitator for understanding the complex relationship between pedagogy and subject matter through an integrated process rooted in classroom practices (Van Driel, Verloop & de Vos, 1998). Consequently, content

knowledge about the NOS can be examined under instructional subject matter that is a sub-dimension of general PCK (Hanuscin et al. 2011; Lederman, 1999). Once placed within the context of national standards for science education, it is indicated that teachers should choose some suitable instructional content and transform it to fit the goals set out in the curricula (e.g., NRC, 1996). The fact that there are a variety of ways to teach the NOS is one of the characteristics that distinguishes PCK for teaching the NOS from general PCK. The value attached to this concept stems from the fact that it empowers teachers to have the opportunity to translate their NOS understandings to their classroom practices through this kind of pedagogical knowledge (Akerson & Volrich, 2006; Hanuscin et al. 2011; Wahbeh & Abd-El-Khalick, 2014). A teacher who has sufficient PCK to teach the NOS can translate his or her informed NOS understandings into a way that students can learn in-depth in a meaningful way, and he or she can conduct the lessons in that way (Akerson & Hanuscin, 2007; Hanuscin et al. 2011). In order to teach the NOS content, one needs to have informed NOS understandings, but this does not guarantee effective NOS instruction (Akerson & Abd-El-Khalick, 2003; Akerson & Volrich, 2006). Moreover, it is common for teachers to be unable to translate their understandings of the NOS to classroom practice and to need pedagogical support in this regard (Akerson & Abd-El-Khalick, 2003; Abd-El-Khalick, 2005; Park & Chen, 2012; Wahbeh & Abd-El-Khalick, 2014; Bilican, 2014). Studies reveal that even experienced teachers who have informed NOS understandings and motivated to teach their students these understandings need support for classroom practices during their lessons (Akerson & Abd-El-Khalick, 2003; Hanuscin et al. 2011; Wahbeh & Abd-El-Khalick, 2014). In this respect, even in the best case, NOS translation into classroom practices is limited, and this mechanism is mediated through a variety of variables (Abd-El-Khalick et al. 1998; Abd-El-Khalick & Lederman, 2000b; Bell et al. 2000; Southerland et al. 2006). Teachers, especially prospective teachers, may have difficulty in embracing the relevance of PCK for NOS and their science teaching (Demirdöğen et al. 2016). Moreover, prospective teachers' content knowledge may be less structured and can contain inaccuracies (Käpylä, Heikkinen & Asunta, 2009). Because of its crucial role in this process, PCK is regarded as a key criterion for teacher effectiveness by many scholars (Van Driel et al. 1998; Mazibe, Coetzee & Gaigher, 2018).

Most science teacher education programs are not successful at improving prospective teachers' PCK as a whole through integrating courses on subject matter, pedagogy and field experiences (Van Driel et al. 2002). Joining this lively debate, Mellado et al. (2008) have advocated that teacher education that teachers receive along teacher education programs is not effective in helping them develop PCK for NOS. Accordingly, it can be said that science education programs alone may not improve all PCK components due to various restrictive conditions (Magnusson et al. 1999). Abd-El-Khalick (2005) found that the prospective science teachers who participated in a science philosophy-based science curriculum not only had more intention to design explicit NOS instruction but also began to include it in their lesson plans at the PCK level. One of these variables is teachers' informed understandings about NOS components. Teachers should know basic subject matter knowledge as well as examples, demonstrations, and historical links associated with it. They should be able to talk seamlessly about the components, to teach content in the context of examples from the history of science, and to develop new science-based activities in this direction. In brief, teachers should have PCK that is unique to the NOS. More importantly, teachers must be able to integrate those components into PCK coherently to effectively plan and enact instruction in a specific science context (Loughran, Berry & Mulhall, 2006; Van Driel et al. 2002).

PCK may offer science teachers a purposive way to represent a plenty of scientific practices within their teaching (Van Dijk, 2014). For this reason, PCK is an academic

framework that can be adapted to a highly-contextualized setting because it is connected to a specific grade, students and teaching events (Berry, Loughran & Van Driel, 2008; Loughran et al. 2001). Such a highly-contextualized setting mandates that the professional development of prospective teachers who are likely to teach science should be planned through a consistent PCK theoretical framework that is embraced in the field on the basis of various professional development programs. Hence, professional development programs should be aware of idiosyncratic style of PCK in order to promote student teachers' professional development in a meaningful way (Rozenszajn & Yarden, 2014). Understanding teachers' practices for the process of student learning necessitates an understanding not only of the instructional methods they use but also of what content they use the methods through (Park & Oliver, 2008). NOS instruction should be planned by taking into account instructional objectives, instructional strategies, and measurement and evaluation techniques, just like any other contents, and the NOS components should explicitly be emphasized during science teaching (Schwartz & Lederman, 2002). It is worthy of note that an explicit-reflective approach is often used to improve NOS understandings of teachers and prospective teachers throughout these programs, and that there is plenty of evidence for the appropriateness of this approach (e.g., Abd-El-Khalick & Lederman, 2000a; Bell et al. 2011; Abd-El-Khalick & Akerson, 2004a; Abd-El-Khalick & Akerson, 2009; Akerson & Hanuscin, 2007; Khishfe, 2013; Khishfe & Abd-Khalick, 2002; Matkins & Bell, 2017). This approach should not be mistaken with didactic instruction, as this approach offers an effective context for students to construct their NOS understandings under teacher guidance (Deniz & Adibelli, 2015). Recent research seems to corroborate that explicit-reflective NOS instruction has more effective results when taught in a context or contexts. With regard to NOS instruction, it is widely seen that researchers prefer either towards decontextualized NOS instruction without any instructional content (e.g., Akerson et al. 2000; Bell et al. 2011; Khishfe & Lederman, 2006) or towards contextualized NOS instruction with instructional content (e.g., Abd-El-Khalick & Lederman, 2000b; Matkins & Bell, 2007). Activities used during decontextualized NOS instruction are intended to address concepts that may seem complex at first glance, instead of internalization of NOS components. By this means, students have the opportunity to trigger their prior knowledge of NOS components (Abd-El-Khalick, 2001). It is known that decontextualized NOS instruction creates a limited effect (Abd-El-Khalick & Akerson, 2004a; Akerson & Hanuscin, 2007; Akerson et al. 2000). To date, contextualized NOS instruction has been conducted in contexts such as inquiry (Khishfe & Abd-El-Khalick, 2002; Akerson & Hanuscin, 2007), conceptual change (Abd-El-Khalick & Akerson, 2004a; Mulvey & Bell, 2017), history of science/current reading texts (Abd-El-Khalick ve Lederman, 2000b; Abd-El-Khalick, 2005; Duruk, 2017; Rudge & Howe, 2009; Kim & Irving, 2010), and instructional content/socio-scientific issues (Matkins & Bell, 2007; Bell et al. 2016). However, it is recommended that decontextualized and contextualized activities be combined for the NOS instruction to be effective (Mulvey & Bell, 2017). Clough (2006) took this argument one step further and recommended that a "context continuum" be used to contextualize NOS instruction (see Bell et al. 2016). The concept of contextualizing at varying levels relating to decontextualized as well as contextualized instruction has taken pivotal role in this approach. A context continuum is organized in a way that ranges from decontextualized contextualization to highly-contextualized contextualization. In the steps other than the first step, subject matter knowledge is arranged in an interconnected way. It is thought that teachers' PCK can be a valuable source for them to be able to teach the NOS in contexts that is also rich in content (Wahbeh & Abd-El-Khalick, 2014). Indeed, it has been pointed out that teachers with strong PCK are able teach in a more balanced way, between instruction for students' subject matter knowledge and skills that are desired to be taught (Bayram-Jacops et al. 2019). As noted earlier, the NOS content can also be seen as a type of

content knowledge addressed under PCK components. As a matter of course, teachers' ability to develop NOS understandings is strongly linked to their PCK. Put differently, teachers must improve their PCK for NOS so that they can teach such NOS content. It can be argued that NOS instruction deprived of a context can only make a small contribution to the improvement of prospective teachers' NOS understandings and their development of PCK for NOS (Abd-El-Khalick, 2001; Clough, 2006). The importance of the final step of the continuum in particular is also due to its promising significant opportunities for teachers' development in PCK for NOS. Therefore, the context continuum played a part within the conceptual framework of this study in a way to guide the implementation process.

Recent research has highlighted the significance of the distinction between declarative/dynamic (Alonzo & Kim, 2016) and reported/enacted (Mazibe et al. 2018) PCK. Specifically, these two conceptual frameworks are based on the idea that declarative and reported PCK does not guarantee dynamic and enacted PCK in any case, respectively. Developing teachers' PCK for NOS is considered as a challenge for science teacher educators. Teachers who exhibit robust dynamic PCK appear to focus heavily on their declarative or reported PCK when judging different spontaneously occurring examples of student thinking and related pedagogical maneuvers (Alonzo & Kim, 2018). Therefore, we developed a specialized highly-contextualized explicit-reflective NOS course to improve both prospective science teachers' NOS understandings and their PCK for NOS planning (Demirdöğen et al. 2016).

3. Method

3.1. Research Design

This study was conducted as a qualitative multiple-case study taking into account the specified cases. Case studies are valuable in offering in-depth information about cases related to participants' real-life experiences (Hancock, 2002; Creswell, 2003; Stake, 2010). In this study, which was also based on the assumptions of interpretive paradigm with its qualitative aspect (Merriam, 2009), PCK for the NOS was considered as the analysis unit of a limited system (Marshall & Rossman, 2011). During this research, prospective science teachers who participated in the specifically contextualized explicit-reflective NOS instruction constituted the case through activities conducted in the course titled "Nature and History of Science".

3.2. Participants and Instructional Context

Instructional practices were carried out in the 3-credit hour mandatory course of "Nature and History of Science". The participants were a group of 13 student science teachers (12 females, 1 male) enrolled in Science Education Department of the Faculty of Education at a public university in the south east of Turkey. The participants were seeking bachelor's degree in Science Education. Prior to NOS instruction, they completed such courses as Foundations of Education, Educational Psychology, and Teaching Methods in Literacy and Social Studies. In other words, all participants had similar background such that they completed the same number of credit hours of mandatory field courses of science as well as the educational courses. They were in their sixth semester in the program and their main responsibility was to teach science to their students from grades 5 to 8 after graduation. They were introduced all the process they were likely to encounter voluntarily and supposed to do during the study. All the participants were assured about the confidentiality of the research, and their autonomy of withdrawal at any time during the implementations.

The instructional context was based on pedagogical instruction framed by PCK for NOS. Within the scope of the previously mentioned program, the researcher taught explicit-reflective NOS instruction in the context of certain instructional content that more

contextualized over time, by focusing specifically on NOS components. This instruction was shaped under the assumptions of the conceptual change in general. The instruction was based on the idea presented by Clough (2006) on the monitoring and modification of the levels of differentiation of contexts during the course of the study. According to this framework, the activities used during any explicit-reflective NOS instruction should be addressed in a way that goes from basic to complex, in other words, from generic activities to highly-contextualized activities. The researcher noted that this process comprised of four consecutive stages. Within this scope, a modular teaching process was designed. This instructional process was carried out as three modules. The first two modules were carried out as in-class activities, and the other was carried out as an extracurricular activity. The first module lasted five weeks and a total of 15 class hours. It consisted of non-contextualized (one week), minimally-contextualized (two weeks) and moderately-contextualized (two weeks) NOS instruction. The first of these stages was the stage that included just generic activities related to NOS components that had no context of instructional content. The instruction at this stage was based on analogies and directly targeted the instructional objectives of the NOS. A review of the findings of recent research has shown that, in most cases, the NOS instruction taught solely through generic activities is insufficient. In the current study, the following generic activities were used to teach the components of the NOS: "Young and Old," "Mysterious Box," "New Society," and "Tangram." These activities included seven NOS components introduced by Lederman (1992). The next stage was the stage in which the least contextualized NOS instruction was taught. What distinguishes this stage from the first one is that it establishes links or relationships between the activities carried out and a specific instructional content. A primary goal is the NOS instruction in this stage. Instructional content is also taken into account, although only slightly. In the current study, the activity called "Milk" was used. Following the completion of this activity, a general framework was established for a discussion on the distinction between science and pseudoscience by discussing whether the processes and methods used for this activity were scientific. Through these discussions, the prospective teachers' views on the criteria for being scientific were captured, and they were asked to reflect on that. The stage at which the context of instructional content makes its effect felt more strongly is the moderately-contextualized NOS instruction stage. The instructional objectives about the NOS components remain a priority at this stage as in the previous stages. However, at this stage, the instructional content is contextualized under inquiry-based activities. Some of the case studies taken from the history of science — "Boyle and Torricelli" (Matthews, 1994) and "Discussion on the extinction of dinosaurs" (Alvarez & Azaro, 1990) — and various reading texts were selected in the current study. These reading texts, which were addressed under inquiry-based instruction throughout the instruction, were employed by integrating with the instructional content of "Gas Laws and Molecular Kinetic Theory" and "Natural Selection," respectively.

Upon completion of the first module, which lasted five weeks, the implementation process of the second module began. The second module was planned in the form of highly-contextualized NOS course, and the implementation took three weeks and a total of 9 hours. The first week of these three weeks was devoted to highly-contextualized NOS instruction, and the remaining two weeks were devoted to PCK for NOS activities. Possible improvements that can be provided by the second module can be achieved through effective integration of activities at this stage with the activities at the previous stage. For the first time at this stage, it is the main goal to achieve the instructional objectives related to the instructional content. Examples of the history of science or contemporary science in general were given at this stage. It was the main goal for participants to reflect through these examples and to establish explicit links to the NOS components. Through this way,

participants had the ability to reexamine their NOS understandings as well as building confidence in how to teach the NOS components (Mulvey & Bell, 2017). Various activities were used at this stage in the current study. These activities were addressed in the instructional content about friction force, historical development of the atomic theory, electricity, ways of heat transfer and genetics. This instructional content included hands-on activities, exemplary reading texts selected from the history of science, presentations and simulations. Moreover, the participants were offered the chance to superficially review ready-made lesson plans based on two units, friction force and ways of heat transfer, prepared according to the 5E learning model. This instructional content targeted the instructional objectives about empirical, tentative, inferential and finally socio-cultural NOS. In the practice section of the second module, the prospective teachers in the classroom were assigned into thirteen groups, each consisting of five participants. Then, following the modular instruction, a participant who had adequate NOS understandings and had motivation to teach NOS was randomly selected and named as the practitioner of his or her group. Each group leader was asked to design a draft lesson plan. There was no constraint with respect to subjects or NOS components that could be chosen during the preparation of the lesson plans. Thus, they were given the opportunity to choose freely, and they were encouraged to do so. For the next two weeks, the group leaders were asked to present their lesson plans in the classroom. During the discussions that took place throughout these presentations, the participants in other groups provided feedback on each of the lesson plans and the group leaders noted them. After the completion of the group presentations, the participants handed their lesson plans to the researcher. Pedagogical instruction framed by PCK for NOS was supported by feedback obtained as a result of the presentation of the lesson plans. This is because the stage mentioned above is a stage that allows participants to reflect on how to teach NOS and gives them a new insight into it, as well as improving their NOS understandings. The participants joined the discussions on the components of knowledge of science teaching orientation, knowledge of instructional strategies and knowledge of evaluation. This stage can be seen as the starting stage for the pedagogical instruction framed by PCK for NOS. This is because at this stage, as mentioned in the data analysis, three components of pedagogical content knowledge were highlighted. The discussions at this stage were guided by the open-ended questions asked by the researcher to get insight about the level of PCK for these components. After the general class discussion, the participants discussed the ideas within their groups and then shared them by presenting them to the other groups.

Once the first two modules were completed, a third module was implemented for a period of one week. This module was designed to offer socially-mediated contextual professional support where 13 participants would be able to conduct more in-depth pedagogical inquiries, share experiences of the practitioners, and reflect more critically on PCK for NOS through close contact with the researcher. The third module was carried out in the form of two workshops scheduled to be completed in a week. Accordingly, the researcher and the participants came together first. The participants attended a 2-day workshop regarding the implementation of PCK for NOS. The researcher interacted with them on a continuous basis. Throughout these workshops lesson debriefings, researcher- or teacher-initiated questions, clarifications, reflections and self-critiques were implemented, and the researcher delivered model lessons (Akerson & Abd-El-Khalick, 2003). Moreover, the participants were given the opportunity to discuss the criteria for the parts to be included in the lesson plans and to reflect on the NOS components they were considering to be included in the lesson plans. In other words, they were expected to integrate NOS understandings into all parts of the lesson plan, including objectives, instructional strategies and evaluation. In the objectives section of the lesson plans, they were asked to write instructional objectives that included both the

instructional content they discussed and the relevant NOS components. In the activities section, they were asked to cover the strategies to use in order to integrate the two. In the evaluation section, they were asked to write about how to assess whether the targeted instructional objectives were fulfilled. The researcher informed the participants that following the focus group interviews that were planned to involve the participants two times during the workshop week, the participants were informed that they could revise and re-submit their lesson plans. With that, many of the participants were satisfied with this situation, and stated that they were excited to be able to finalize the parts that they had wanted to change in their previous version of the lesson plans. Thus, the participants had the opportunity to explore the structure of PCK components including knowledge of science teaching orientation, knowledge of instructional strategies and knowledge of evaluation within the NOS-PD.

3.3. Data Collection

Data sources included an open-ended questionnaire and the participant-generated artifacts as lesson plans. First, the participants were asked to fill out the Views of Nature of Science Questionnaire (Lederman et al. 2002). They completed it as a pre-test and a post-test at the beginning and end of the course, respectively. The data collected through the questionnaire were used to track the changes in NOS understandings of the participants who participated in NOS-PD, as well as to determine the participants who improved their NOS understandings as a result of this program. The primary method of data collection was to analyze the participants' lesson plans. These lesson plans represented the second and main data collection instrument of the study. The lesson plans gave the opportunity to identify the explicit connections the participants established about the NOS (Abd-El-Khalick et al. 1998).

3.4. Data Analysis

The data obtained were analyzed in two phases. In the first phase, the data collected through the Views of Nature of Science Questionnaire were analyzed. This analysis included the determination of NOS categories of participants who were chosen to be practitioners during the study. The participants' NOS understandings were analyzed and categorized as either informed, transitional, or naive (Khishfe & Lederman, 2006). Following, the participants' NOS profiles were created. In the second phase, the lesson plans prepared by the participants were analyzed. Consequently, NOS objectives, explicit-reflective NOS instructional strategies and evaluation were investigated during the analysis of lesson plans. These analyses were based on the lesson plan categories put forward by Bilican (2014), because the analyses focused on examining the participants' PCK for NOS as reported by themselves (see Table 1). These categories were collected under the following terms: objectives, evaluation and integration with respect to the course designed for the NOS instruction. What was expected of the participants in the objectives category was that the components of the NOS would be explicitly addressed in the lesson plan they prepared. Indirect connections established for the components were coded under this category as "needs development." The lack of any associations or connections was coded as the "poor" category. In the evaluation category, which had its own section in the lesson plan, if any evaluation was explicitly associated with NOS components or connections were established with it, this was coded as "exemplary". The part of the analysis that is considered to be the most important is the integration category that is frequently associated with PCK, with which the components of the NOS are integrated. For the participants to be coded in the "exemplary" category, they must ask specific questions about the NOS tailored to each unit in the lesson plan, make explicit connections between the instructional content of the unit and the NOS components, and finally maintain consistency between the instructional practices for the components and the objectives determined in the lesson plan. The "needs improvement"

category, which described the participants' intentions of integration rather than explicit NOS instruction, points that this instruction, where the participants chose direct instruction, may not provide adequate pedagogical characteristics and that there were discrepancies between instructional practices and instructional objectives. Support was obtained from an expert working in the field of NOS during the data analysis process. The framework used for the analysis of the data from the lesson plans was explained to the coder. He was asked to assess the units in the lesson plans and code them in accordance with the relevant categories. After that, the researcher and the coder came together and discussed the units of the all analysis. Discussions continued until consensus was reached on the categories that were undecided. In order to resolve the discrepancies in opinions during the analysis, the coders came together once again. The discussion continued until a compromise was reached. The aim was therefore to avoid possible biases on the part of the researcher who is a NOS-PD practitioner.

Table 1. *Lesson plans analysis' categories*

	Instructional planning for NOS components	Categorization
Objectives	Inclusion of NOS explicitly	Exemplary
	Implicit NOS reference in objectives	Needs development
	No explicit NOS reference in objectives	Poor
Evaluation	Reference to NOS explicitly in evaluation part	Exemplary
	No NOS evaluation specifically	Poor
NOS integration	No explicit-reflective reference	Poor
	Intent for NOS integration: •Explicit but direct NOS instruction •Lack of coherence between NOS objective and NOS specific instructional prompts	Needs development
	Explicit–reflective NOS instruction: •Specific NOS questions •Clear connection between NOS and science content •Coherence between NOS objectives and NOS specific instructional prompts	Exemplary

4. Results and Discussion

The main purpose of the study was to explore the impact of NOS-PD on prospective science teachers' NOS understandings and instructional planning. Following is a presentation of results given in three separate sections in relation to the research questions previously given. All participant names are pseudonyms. Insights into science teacher education program were discussed and further recommendations for future research provided.

4.1. Impact of the Highly-Contextualized Explicit-Reflective NOS Course on Participants' NOS Understandings

This section includes highly-contextualized explicit-reflective NOS understandings of 13 participants before and after the NOS course who were willing to prepare lesson plans and were motivated to teach NOS to students. Table 2 shows the categorical changes in NOS understandings of these participants. The section also provides illustrative excerpts from participants' informed NOS understandings in relation to NOS aspects.

A review of Table 2 points to substantial changes in the participants' understandings of seven NOS components. Before the highly-contextualized explicit-reflective NOS course, the vast majority of the participants were found to have naïve NOS understandings. These results stand in line with the studies in the specific context of explicit-reflective NOS instruction (e.g., Abd-El-Khalick, 2005; Abd-El-Khalick & Akerson, 2009; Akerson & Volrich, 2006; Khishfe & Abd-El-Khalick, 2002).

Table 2. *NOS understandings before and after highly-contextualized explicit-reflective NOS course*

NOS components	Before NOS Course			After NOS Course		
	Naïve	Transitional	Informed	Naïve	Transitional	Informed
Empirical	8 (61.54%)	5 (38.46%)	0	2 (15.39%)	1 (7.69%)	10 (76.92%)
Tentative	13 (100%)	0	0	1 (7.69%)	1 (7.69%)	11 (84.62%)
Inferential	10 (76.92%)	3 (23.08%)	0	3 (23.08%)	4 (30.77%)	6 (46.15%)
Theory/law	13 (100%)	0	0	3 (23.08%)	1 (7.69%)	9 (69.23%)
Theory/laden	10 (76.92%)	2 (15.39%)	1 (7.69%)	2 (15.39%)	6 (46.15%)	5 (38.46%)
Socio-cultural	7 (53.85%)	5 (38.46%)	1 (7.69%)	0	4 (30.77%)	9 (69.23%)
Creativity	1 (7.69%)	12 (92.31%)	0	0	9 (69.23%)	4 (30.77%)
Total	68.13%	27.67%	2.20%	12.09%	28.57%	59.34%

The participants were identified to have mostly naïve (68.13%), then transitional (27.67%) and least frequently informed understandings (2.20%) in terms of all components. After the NOS course, the participants' inadequate understandings (naïve and transitional) decreased by about 56%, while their informed views increased by 57%. In other words, nearly all of the transitions were from inadequate to informed NOS understandings. In brief, the participants were overall found to have inadequate NOS understandings in all components before the course. This inadequacy is concentrated particularly in the empirical, tentative, inferential, theory/law, and theory-laden components. Following the NOS course, the components where informed understandings were improved the most were the empirical, tentative, theory/law and socio-cultural NOS. There was not as much increase as expected in informed understandings in the inferential and theory-laden NOS components which were intense in terms of inadequate understandings before the NOS course. When examined in terms of socio-cultural and creative NOS components, where inadequate understandings were relatively low prior to the course, there was not as much increase as expected in creative NOS. Limited and naïve NOS understandings can be discussed through various points of

view. Participants with naïve empirical NOS understandings may not be aware enough that evidence plays a significant role in the construction of scientific knowledge. It was seen that the participants had reached informed understandings after the NOS course, except for three participants. Before the NOS course, more than half of the participants were found to have inadequate understandings in the inferential NOS component. In this component, what is expected of the participants is that they should know that observations address senses, while inferences are interpretations about observations. Inferences should be logical and consistent with the observations they are based on. In contrast, the participants who had naïve NOS understandings had the opinion that "seeing is believing." These participants could believe that observations instead of inferences were subjective. More than half of them achieved informed understandings in this component after the implementation. Before the NOS course, all participants were found to have inadequate views in the tentative NOS component. The participants pointed out that scientific knowledge had been proven and therefore would not change, and that laws would not change while theories would change since laws had been proven. After the NOS course, all but two participants had informed understandings in this component. It can be useful to give the participants' illustrative excerpts directly to better understand the change in the components. The participant codenamed Arzu prepared lessons plans for the empirical and inferential components. The participant's transitional understandings in the empirical NOS and her naïve understandings in the inferential NOS prior to the implementation were found to translate into informed ones:

"*In scientific fields such as physics and biology, one focuses on factual data rather than subjective opinions. In fields such as religion and philosophy, factual quality is not a matter of discussion. Factual data are mediated by observations and experiments*" (empirical NOS, post-test).

"*Scientists used a variety of observation data to decide the structure of the atom. Scientists who interpret the data obtained through observations, through their own perspectives make inferences depending on these observations. The shape of the atom is also a product of such inferences. As the boundaries of our imagination expand, so do our inferences*" (inferential NOS, post-test).

When her opinions were examined, it was observed that Arzu turned to factual data as a scientific measure and referred primarily to observations and experiments as the way through which such data were obtained. And, when discussing the structure of the atom, the participant was aware of the significance of observational data. She claimed that these observations were theory-laden, that inferences had been reached through observations, and that this process had continued in a loop of imagination-based creativity. Another participant, Begüm, had an informed understanding after the implementation in the empirical, tentative, and inferential components that she included in her lesson plan:

"Our imagination is, of course, effective when assuming the physical characteristics of dinosaurs, but our claims that we generate under the influence of our imagination have to be based on evidence. By studying fossils, we can learn about the true shape of dinosaurs" (empirical NOS, post-test).

"*If science is the matter of discussion, I think that no certainty can be the topic of conversation. Just like theories, laws are open to change. This is because scientific information can change by being reinterpreted through new evidence. Theories are helpful for us when generating new explanations*" (tentative NOS, post-test).

"*Even if we use an electron microscope, we can't be sure of what an atom actually looks like because our perceptions of the atomic phenomenon make sense through our inferences.*

Scientists are not capable of seeing atoms, contrary to what is known. Because they are human beings like us" (inferential NOS, post-test).

Begüm emphasized that fossils can be good evidence, noting that imagination-based creativity is carried out in an empirical manner. She pointed out that we cannot talk about the accuracy of knowledge even if it is based on evidence. She effectively explained the link between inferences through the structure of atoms and the tentativeness of the knowledge. The participant codenamed Defne had informed understandings after the implementation only in the first two of the empirical, tentative, inferential, and creative components that she included in her lesson plan:

"*We cannot get knowledge through experimentation all the time. Experiments are a form of observation after all. Scientific knowledge continues to be produced through observations in areas where experiments are not able to be conducted*" (empirical NOS, post-test).

"*Scientific knowledge may change as a consequence of new evidence and technological advances. For example, atomic theory or classical physics has changed over the course of time in this way. Certain scientific knowledge may also change with the reinterpretation of the evidence that is available. Later on, we may realize that the evidence at hand means much more, so we might also interpret it through other theories. This is because our mental competence while assessing the evidence is also important*" (tentative NOS-post-test).

Defne tended to reject the reductive interpretation and argued that evidence may not be collected through experimentation all the time. She implied that any experiment is another type of observation, and that its purpose is to gather evidence of certain facts only, rather than showing the truth. She argued that interpreting evidence in this process may also be constrained by the human factor. Duygu had an informed understanding after the implementation only in the first two of the empirical, tentative, and creative components — similar to Defne — that she included in her lesson plan:

"*Empirical NOS differentiates science from other research disciplines. Science makes observations on natural phenomena that function by displaying a specific pattern in the objective sense, and it bases its results on evidence*" (empirical NOS, post-test).

"*As the number of pieces of evidence that supports a scientific theory increases, that theory improves its explanatory power. In other words, the purpose of a theory is to explain facts of the natural world with its advanced explanatory and predictive characteristics, and it has tentativeness in the presence of new evidence and interpretations. Laws voice patterns of those facts descriptively. For this reason, these two are as different as apples and pears*" (tentative NOS, post-test).

Duygu, like Arzu, clearly expressed the empirical NOS component by claiming that the results are reached based on evidence. She emphasized that a theory would become a more reliable theory with more and more evidence. She is aware of the explanatory power and prediction of a theory. Providing an effective analogy, she explained that theories would not translate into scientific laws. Finally, while her understandings of all components were naïve, Yeşim, who had informed understandings in all of them following the course, did not refer to the tentative and inferential NOS components in her lesson plan. The participant's understandings in these components are as follows:

"*What can be given as good examples of the change of scientific knowledge are Thomas Kuhn's reinterpretation of the theses championed by the positivist scientific community and the claim that the accuracy and value of scientific knowledge have a meaning only in the paradigm to which it belongs. Paradigms change; everything changes!*" (tentative NOS, post-test).

"*Scientists should identify organisms in one way or another. This is because in order to figure out what a species is, we must be able to talk about it first. We cannot observe everything in an absolute certain way. Inferences are one of the scientists' greatest helpers, along with theories in this manner*" (inferential NOS, post-test).

In line with the first research question, the findings of the present study support research findings claiming that explicit-reflective NOS instruction (Abd-El-Khalick & Akerson, 2004; Akerson et al. 2000; Alan & Erdogan, 2018; Bell et al. 2011; Schwartz et al. 2004) as well as specifically explicit-reflective NOS instruction along a NOS context continuum are effective (Bell et al. 2016; Herman, Clough & Olson, 2013; Mulvey & Bell, 2017; Mulvey et al. 2016). More specifically, in studies on explicit-reflective NOS instruction, improvements have been reported in the following NOS components: empirical (Aglarcı, Sarıcayir & Sahin, 2016; Akerson et al. 2007; Khishfe & Abd-El-Khalick, 2002), tentative (Abd-El-Khalick & Lederman, 2000; Akerson et al. 2007; Khishfe & Abd-El-Khalick, 2002), inferential (Akerson et al. 2007; Williams & Rudge, 2016), socio-cultural (Aglarcı et al. 2016; Akerson et al. 2007; Williams & Rudge, 2016), and theory-laden (Aglarcı et. 2016; Abd-El-Khalick & Akerson, 2004; Akerson et al. 2007). After the highly-contextualized explicit-reflective NOS course, these improvements were found to be accomplished in all NOS components, both quantitatively and statistically (Bell et al. 2016). Improvements were observed in a few other studies in terms of empirical, theory/law and scientific method (Mulvey & Bell, 2017), tentative, theory/law and creative (Mulvey et al. 2016) NOS components. In comparison, as noted above, in the current study, there were substantial improvements in the empirical, tentative, theory/law and socio-cultural NOS components, whereas there was not sufficient improvement in the inferential, theory-laden and creative NOS. These findings were found to show similarities with (Bell et al. 2016) and differences from (Mulvey et al. 2016) the findings from some studies carried out in accordance with the context continuum approach. As the level of contextualization changes, the content-generic or content-embedded properties of instruction is represented at different rates. As a result, the reason why positive findings were achieved in different directions in the studies may be the level of contextualization of NOS instruction (Mulvey & Bell, 2017).

4.2. Impact of the Highly-Contextualized Explicit-Reflective NOS Course on Participants' NOS Instructional Planning

Various findings were attained as a consequence of detailed analysis of the draft lesson plans. First, it was observed that the participants created lesson plans by taking into consideration the following course content: heat transfer, periodic system, friction force, the structure of atom, digestion of nutrients, electricity, solar system and beyond, cell structure, physical and chemical digestion, propagation of light and sound, and finally physical and chemical change. This gave us the ability to simultaneously analyze the pedagogical content knowledge about plenty of course content through the lesson plans. A review of the relevant literature shows that studies on PCK concentrate on the subjects of the amount of substance and chemical equilibrium (Rollnick et al. 2008; Akin & Uzuntiryaki-Kondakci, 2018), photosynthesis and plant growth (Käpylä et al. 2009; Park & Chen, 2012), cell division (Sen, Oztekin & Demirdöğen, 2018), ozone layer depletion (Kaya, 2009), genetics (Mthethwa-Kunene et al. 2015), heritable variation (Friedrichsen et al. 2009), and electrochemical cells and nuclear reactions (Aydin et al. 2014). In most of these studies, PCK practices of experienced teachers have been examined. Another important finding of the study is that the participants prepared their lesson plans specifically for NOS components in which they developed transitional or informed understandings. This was not a surprising finding because most prospective teachers need some comfort in NOS understandings to teach NOS (Demirdöğen et al. 2016). This view is supported by the fact that only 3 of the NOS

components that were referred to by the participants 30 times in total had inadequate NOS understandings (10%). For example, these understandings were tried to be translated by Defne in the unit of the structure of atom in the inferential NOS component, by Beyza in the unit of digestion in the inferential NOS component, and finally by Mine in the unit of physical and chemical digestion again in the inferential NOS component, although they had inadequate understandings. For NOS translation, the components of the inferential NOS (11/13), creative NOS (7/13) and empirical NOS (7/13) were found to stand out in the order given. However, the theory/law, social-cultural NOS and theory-laden NOS (excluding Ceyda) components were found not to be reflected in the participants' lesson plans. This situation is confirmed by the fact that none of the participants turned their attention into translate the theory/law component.

A review of Table 3 shows that a total of 10 participants could not write clear NOS objectives and therefore were in the poor category with regard to objectives. Only the participant codenamed Duygu was found to have specific NOS objectives in the teaching of the empirical NOS, tentative NOS and creative NOS components. In terms of the tentative NOS component, she described the objective of the lesson as "*discusses the transformation of views put forward in relation to the structure of cells from the past to the present in the light of technological developments.*" In line with this objective, she used a documentary film titled "Einstein and Eddington," an example of the history of science as an instructional strategy. When her lesson plan was reviewed, the participant was found to indicate that she intended to ensure that students first watched the film individually and then established groups and held discussions. Close to all participants classified as poor in terms of instructional objectives were found to be independently addressing instructional objectives for the course content and instructional objectives for NOS instruction in the course plans. In addition, the participants put to use various NOS teaching strategies during planning. When reviewed for the use of NOS teaching strategies, the participants were found to be planning to take advantage of generic activities, experiments, cases, specific NOS questions, poster presentations, drama and HOS-based reading texts. Beyza, one of the participants who was different from others in this regard, raised inferential NOS-specific questions in a case that she planned to use when teaching the digestive system. And after asking which animals would eat the food she brought to the classroom, she asked students the following question after discussions: "*You all talked about different animals eating the food that I hold in my hand. Well, why did you suggest different animal names even though you observed the same food?*" Dilara asked the students to prepare a poster describing the difference between astronomy and astronomers based on the framework of the inferential NOS within the scope of the teaching of the solar system and beyond unit. Following that she planned that the students portrayed lives of astronomers through a drama.

Table 3. *The overall view of participants' draft lesson plans*

Participant	Grades	Science content	NOS components	NOS instruction strategies	NOS objective	Explicit-reflective NOS instruction
Arzu	6	Heat transfer	Empirical	Lecture	Poor	Poor
			Inferential	Lecture	Poor	Poor
Aslı	6	Heat transfer	Creative	Generic Activity	Poor	Needs development
			Inferential	Generic Activity	Poor	Needs development
Ceyda	8	Periodic system	Theory-laden	Lecture	Poor	Poor

			Creative	Generic activity	Poor	Needs development
Begüm	5	Friction force	Empirical	Experiment	Poor	Needs development
			Tentative	Experiment	Poor	Needs development
			Inferential	Generic activity	Poor	Needs development
Defne	8	The structure of atom	Tentative	Lecture	Needs development	Poor
			Empirical	Lecture	Needs development	Poor
			Inferential	Lecture	Needs development	Poor
			Creative	Lecture	Needs development	Poor
Beyza	5	Digestion	Inferential	NOS question Case	Poor	Needs development
Ali	6	Electricity	Empirical	Lecture	Poor	Poor
			Inferential	Lecture	Poor	Poor
			Creative	Lecture	Poor	Poor
Dilek	6	Solar system and beyond	Empirical	Lecture	Poor	Poor
			Inferential	Nos question	Poor	Needs development
Duygu	6	The structure of cell	Empirical	HOS-based reading text	Exemplary	Exemplary
			Tentative	HOS-based reading text	Exemplary	Exemplary
			Creative	Lecture	Exemplary	Needs development
Mine	7	Physical and chemical digestion	Inferential	Case	Poor	Needs development
			Creative	Lecture	Poor	Poor
Sıla	5	Propagation of light and sound	Empirical	Lecture	Needs development	Poor
			Inferential	Lecture	Needs development	Poor
			Creative	Lecture	Needs development	Poor
Yeşim	6	Physical and chemical change	Tentative	Lecture	Poor	Poor
			Inferential	Lecture	Poor	Poor
Dilara	5	Solar system and beyond	Inferential	Poster Presentation Drama	Poor	Needs development

In data analysis of this study, robust PCK for NOS both refers to exemplary explicit-reflective NOS instruction and exemplary NOS integration. Most studies that address PCK practices in the context of NOS indicate that prospective teachers do not have robust PCK for NOS (Abd-El-Khalick, 2005; Abd-El-Khalick et al. 1998; Akerson & Volrich, 2006; Demirdöğen et al. 2016; Van Driel et al. 1998). The findings from this study are similar to those found in the literature. An example of explicit-reflection requires that NOS instructional objectives and relevant instructional strategies be discussed together in compliance with the scoring key used in the study. This categorical scoring is valuable for the determination of the explicit-reflective category of the participants. This is because in compliance with data analysis, a lesson plan in the poor category in terms of instructional objectives should be placed in the "needs development" category at best in terms of explicit-reflection, even if it is in the exemplary category in terms of instructional strategies (see Bilican, 2014). For this reason, as of the initial lesson plans, it was observed that almost none of the participants, except Duygu, were in the exemplary category in terms of explicit-reflection. Participants in this category were found to have failed, especially in empirical NOS, inferential NOS and creative NOS translation. In the draft lesson plans, only one participant was found to design exemplary explicit-reflective NOS instruction (Duygu) in the empirical and tentative NOS components, and only two participants were found to be able to achieve exemplary NOS integration (Aslı and Yeşim, see Table 5). What was effective in this is that both participants included specific NOS questions required for NOS integration, explicit connections between NOS components and course content, and ensured consistency between NOS objectives and NOS teaching strategies. Nevertheless, these two participants were found to be unable to plan for an exemplary explicit-reflective NOS teaching. This is directly associated with how lesson plan analysis categories were addressed. This is because for explicit-reflective NOS instruction, exemplary NOS objectives and NOS teaching strategies need to be present together (see Table 3).

4.3. Impact of the Socially-Mediated Contextual Professional Support on Participants' NOS Instructional Planning

Socially-mediated contextual professional support was predominantly discussed within the scope of the third module in this study. A variety of findings were attained as a consequence of the analysis of the final lesson plans prepared by the participants with the completion of the third module. A review of Table 4 shows that 9 participants could not write clear NOS objectives and therefore were in the poor category with regard to objectives. Unlike the previous lesson plans, in addition to Duygu, Defne was in the tentative NOS component, and Sıla in the empirical, inferential and creative NOS components in the exemplary category in terms of instructional objectives. These two participants were found to incorporate these exemplary instructional objectives throughout generic activities and history of science reading texts. Unlike the previous lesson plans where the direct instruction strategy based on lecture was intense, the participants were found to more frequently include instructional strategies such as generic activities, NOS specific questions, history of science reading texts, experiments, story completions, dramas, concept maps. The findings suggest that the participants substantially enhanced themselves in the NOS teaching strategies category but failed in the instructional objectives category after the socially-mediated contextual professional support. In terms of explicit-reflective NOS instruction, the participants were generally seen transitioning from the poor category to the needs development category. Defne and Duygu in tentative NOS component, Sıla in the inferential NOS component, and Duygu in the empirical NOS component were in the exemplary category. On the basis of this, the participants were found to have limited progress in terms of explicit-reflective NOS instruction. In terms of NOS integration, Aslı, Duygu and Yeşim were in the exemplary

category. Compared to the previous NOS integration, Duygu showed progress by shifting from the poor category to the exemplary category. After the socially-mediated contextual professional support, most of the participants (9/13) were found to be in the needs development category in terms of NOS integration (Table 6).

Table 4. *The overall view of participants' final lesson plans*

Participant	Grade	Science content	NOS components	NOS instruction strategies	NOS objective	Explicit-reflective NOS instruction
Arzu	6	Heat transfer	Empirical	Generic activity	Poor	Needs development
			Inferential	Generic activity	Poor	Needs development
Aslı	6	Heat transfer	Creative	Generic activity	Poor	Needs development
			Inferential	Generic activity NOS question	Poor	Needs development
Ceyda	8	Periodic system	Theory-laden	Lecture	Needs development	Poor
			Creative	Lecture	Needs development	Poor
Begüm	5	Friction force	Empirical	Experiment	Needs development	Needs development
			Tentative	HOS-based reading text	Needs development	Needs development
			Inferential	HOS-based reading text	Needs development	Needs development
Defne	8	The structure of atom	Tentative	HOS-based reading text	Exemplary	Exemplary
			Empirical	Lecture	Needs development	Poor
			Inferential	Generic activity	Needs development	Needs development
			Creative	Generic activity	Needs development	Needs development
Beyza	5	Digestion	Inferential	NOS question Story Completion Generic activity Drama	Poor	Needs development
Ali	6	Electricity	Empirical	Lecture	Poor	Poor
			Inferential	Lecture	Poor	Poor
			Creative	Lecture	Poor	Poor

Dilek	6	Solar system and beyond	Empirical	NOS question Generic activity	Poor	Needs development
			Inferential	NOS question Generic activity	Needs development	Needs development
Duygu	6	The structure of cell	Empirical	HOS-based reading text NOS question	Exemplary	Exemplary
			Tentative	HOS-based reading text NOS question	Exemplary	Exemplary
			Creative	Lecture	Exemplary	Needs development
Mine	7	Physical and chemical digestion	Inferential	Case	Needs development	Needs development
			Creative	Case	Needs development	Needs development
Sıla	5	Propagation of light and sound	Empirical	Lecture	Exemplary	Needs development
			Inferential	Generic activity	Exemplary	Exemplary
			Creative	Lecture	Exemplary	Needs development
Yeşim	6	Physical and chemical change	Tentative	Lecture	Needs development	Poor
			Inferential	Lecture	Needs development	Poor
Dilara	5	Solar system and beyond	Inferential	Generic activity Concept map	Needs development	Needs development

Based on the study, it was understood that the participants' lesson plans became more integrated in terms of NOS instruction (5/13), and only the participant codenamed Dilara could not show substantial progress in terms of integration.

When examined in terms of the coherence between instructional objectives and activities, which is one of the subcomponents of integration, it was observed that more than half of the participants showed progress in terms of instructional objectives for various NOS components (Table 6). To put it another way, these participants were able to integrate the instructional objectives for the NOS into activities in a content-embedded manner. Only four participants were able to achieve it before the support. However, only three of the 8 participants were able to simultaneously integrate into the activities specific NOS questions, clear/explicit connections between NOS and science content, and the coherence/consistency between NOS objectives and NOS components. Only 3 participants were able to do this before the support. After the support, there was a substantial change in the subcategories of clear connections between NOS and science content, and the coherence between NOS

objectives and NOS instruction. In summary, it was understood that the participants demonstrated signs of development in terms of clear connections between NOS and science content (Abd-El-Khalick et al. 1998) and coherence between NOS objectives and NOS instruction, rather than using specific NOS questions. Prior research confirms the result that NOS pedagogical support is needed both by in-service teachers and prospective teachers (Akerson & Abd-El-Khalick, 2003; Demirdöğen et al. 2016; Hanuscin et al. 2011; Park & Chen, 2012; Wahbeh & Abd-El-Khalick, 2014).

Table 5. *Findings on participants' NOS integration level prior to support*

Participant	NOS objective	Evaluation	Integration			Integration Level
			Specific NOS question	Explicit connection	Consistency	
Arzu	Poor	Poor	-	-	-	Poor
Aslı	Poor	Exemplary	+	+	+	Exemplary
Ceyda	Poor	Poor	-	-	-	Poor
Begüm	Poor	Exemplary	-	+	-	Needs development
Defne	Needs development	Poor	-	-	+	Needs development
Beyza	Poor	Exemplary	+	+	+	Needs development
Ali	Poor	Poor	-	+	-	Needs development
Dilek	Poor	Exemplary	+	-	-	Needs development
Duygu	Exemplary	Exemplary	-	-	-	Poor
Mine	Poor	Exemplary	-	-	-	Poor
Sıla	Needs development	Poor	-	-	-	Poor
Yeşim	Poor	Poor	+	+	+	Exemplary
Dilara	Poor	Exemplary	-	-	-	Poor

It is widely acknowledged that lacking PCK for NOS hinders NOS translation (Hanuscin, 2013; Hanuscin et al. 2011; Supprakob et al. 2016; Wahbeh & Abd-El-Khalick, 2014; Ward & Haigh, 2016). Similarly, in the present study, there was limited progress in terms of PCK for NOS. This limited progress was described in terms of explicit-reflective NOS instruction as well as NOS integration before and after the support. In contrast, Bilican (2014) found that all prospective science teachers planned explicit-reflective lessons after a science methods course. History of science examples, feedbacks and the analysis of lesson plans were shown as the source of this progress. These contributed to the development of both NOS understandings and NOS translation. According to her, through the chance to prepare lesson plans, participants were offered opportunities to learn how to design an explicit-reflective NOS instruction and how to assess the impact of it on instructional objectives. Demirdöğen et al. (2016) found that prospective chemistry teachers had advanced from the knowledge level to the application level through lesson plans after two semesters of PCK for NOS instruction. One of the successful participants conducted the explicit-reflective NOS instruction in a content-embedded manner in the scientific method, theory-laden and creative NOS components. When the PCK for NOS maps were reviewed, it was observed that knowledge of orientation and knowledge of instructional strategies were at the core of integration and that these components were the only components commonly reflected by all participants in

their lesson plans. Pedagogical instruction framed by PCK for NOS made sure that the prospective teachers internalized that NOS was an important learning outcome and that it was available to students. By this means, all participants were found to develop knowledge of instructional strategies. In the findings of the present study, a more modest development was detected in contrast to the previous two studies, and it was seen that different components could be integrated at the exemplary level. It was common that knowledge of instructional strategies improved, whereas contrasting findings were attained in the improvement of knowledge of evaluation. Hanuscin et al. (2011) and Hanuscin (2013) also found that a prospective teacher's knowledge of instructional strategies has improved. Knowledge of instructional strategies is known to develop more easily than other PCK components (Hanuscin, 2013).

Table 6. *Findings on participants' NOS integration level after support*

Participant	NOS objective	Evaluation	Integration			Integration Level
			Specific NOS question	Explicit connection	Consistency	
Arzu	Poor	Exemplary	-	+	+	Needs development
Aslı	Poor	Exemplary	+	+	+	Exemplary
Ceyda	Needs development	Exemplary	-	-	+	Needs development
Begüm	Needs development	Exemplary	-	+	-	Needs development
Defne	Exemplary	Exemplary	-	+	+	Needs development
Beyza	Poor	Exemplary	-	+	+	Needs development
Ali	Poor	Poor	-	+	-	Needs development
Dilek	Needs development	Exemplary	+	+	-	Needs development
Duygu	Exemplary	Exemplary	+	+	+	Exemplary
Mine	Needs development	Exemplary	+	-	-	Needs development
Sıla	Exemplary	Exemplary	-	+	+	Needs development
Yeşim	Needs development	Poor	+	+	+	Exemplary
Dilara	Needs development	Exemplary	-	-	-	Poor

In the present study, it was observed that the knowledge of evaluation of most of the participants improved. Similar findings have been found in the relevant literature (Demirdöğen et al. 2016). However, what is reflected in research findings is that the knowledge of evaluation of prospective teachers is more difficult to improve than that of experienced teachers. This is because prospective teachers do not teach regularly, nor does knowledge of learners improve. This raises the uncertainty about what they should evaluate.

It can be argued that the developments reflected in these findings were shaped by a variety of factors. As noted earlier, it is highly important to provide pedagogic support in terms of

PCK for NOS instruction (Akerson & Abd-El-Khalick, 2003). Support provided in terms of NOS instruction may be considered under two main categories as individual and social support for assisting and modelling the professional development process of prospective science teachers. In the development of NOS views, when considered in the sense of individual support, the instruction performed in line with the first module was found to improve particularly the NOS understandings. It can be said that with the help of the highly-contextualized explicit-reflective NOS instruction conducted in the first week of the second module, the participants both had the opportunity to deepen their NOS learning processes and were motivated about NOS translation during the discussions on lesson planning in the last week of this module. In addition, the participants received highly-contextualized explicit-reflective NOS instruction, which may have been instrumental to make them recognize the importance of informed NOS understandings that are essential for an exemplary NOS translation. Indeed, the draft lesson plans prepared by the participants showed traces of contemporary scientific examples they designed and especially NOS materials composed of generic activities, rather than the examples of the history of science used for the first 5 weeks. This suggests that the explicit-reflective NOS instruction performed in line with the context continuum can boost the development of PCK for NOS reported by prospective teachers, particularly in terms of knowledge of instructional strategies (Bell et al. 2016). Given that the participants reviewed exemplary lesson plans in line with the second module together with their classmates, and that they discussed what qualifications they should have for lesson plans offered them social support through peer feedback. In this way, the participants can be said to have raised their awareness of what kind of lesson plans they should prepare during their actual practice in the future. It was seen that on the basis of this awareness, the core science concepts implemented in the exemplary course plans presented to them were explicitly reflected in the process of preparing the course content of their own lesson plans. It was ensured that the participants received support both individually and predominantly socially in the third module, which is the most important module for NOS translation. This process, which was planned in the form of workshops that lasted for two sessions, was enriched through reviews of lesson artifacts for NOS lessons modeled by researchers, teacher-generated specific NOS questions, reflections and self-critiques, as recommended by Akerson and Abd-El-Khalick (2003). Prior to the sessions, they were reminded that they must integrate NOS to all sections (objectives, activities and evaluations) of lesson plans. In addition, the participants were frequently encouraged to check the conformity of their own lesson plans with the curriculum through peer evaluations during the discussions. The participants were found to improve their knowledge of instructional strategies and knowledge of evaluation in terms of PCK for NOS, with the help of this social support, which was offered in an intensified way over a period of two weeks. In terms of knowledge of objectives, however, the expected progress was not accomplished. As noted earlier, it is easier to improve knowledge of instructional strategies than to enhance other PCK components. Therefore, the improvement in terms of this component can be misleading. Knowledge of objectives did not show substantial progress, which may be because this type of knowledge is linked to the science teaching orientations of the participants. This is because science teaching orientations accommodate educational beliefs in issues such as why science education is valuable and why it should be done. It is expected that science teaching beliefs would not develop only during a NOS-PD professional program that lasted only approximately 2 months. Orientations also accommodate decisions on teaching in the classroom. However, prospective teachers are deprived of the opportunity to teach and their teaching decisions do not develop spontaneously. Therefore, it can be argued that it is acceptable the participants' knowledge of objectives did not improve.

5. Conclusion

The following conclusions — which were limited to the participating prospective science teachers, the Nature and History of Science Course they attended, and the practices implemented in the course — were obtained in line with the study following the discussion:

- Prospective science teachers who did not receive explicit-reflective NOS instruction had naïve understandings in terms of several NOS components.
- It is hard to reach a common conclusion about which NOS components improved better after the explicit-reflective NOS instruction, because many contexts can easily affect NOS understandings.
- NOS understandings, which are improved following explicit-reflective NOS instruction, do not guarantee an effective NOS translation.
- Explicit-reflective NOS instruction based on the context-continuum approach can offer a variety of opportunities to enhance understandings of NOS components that are especially difficult to enhance.
- Compared to experienced teachers, prospective science teachers need more comfort in their improved NOS understandings and commitment to teaching NOS on a continuous basis before teaching the NOS as they are likely to teach science in the near future.
- Even though the prospective science teachers took part in an intensive program like NOS-PD, very few of them demonstrated the ability to achieve a high level of NOS translation.
- Socially-mediated contextual support contributed most to the development of knowledge of instructional strategies and knowledge of evaluation in terms of reported PCK.

6. Recommendations

In line with the conclusion, this section presents several recommendations for the improvement of science teacher education programs specifically in terms of NOS instruction. To begin with, explicit NOS instruction taught at universities to enhance prospective teachers' NOS understandings should be made more inquiry-based by drawing the learner's attention to key NOS components through discussions and through written work following engagement in hands-on activities. Prospective teachers may thus have the opportunity to face NOS understandings that comprise fallacies about science. As frequently indicated in the relevant literature, understandings of some NOS components appear to be more difficult to improve. In order to resolve this challenge, future NOS courses may concentrate on improving naïve NOS understandings in relation to challenging NOS components by providing introductory sessions in which these NOS components are explicitly and reflectively introduced to prospective teachers before core NOS activities. Specific NOS questions, examples from the history of science or contemporary history of science or use of concept maps may be useful in this respect. Explicit-reflective NOS instruction needs to be conducted under a variety of contexts known to be effective. Explicit-reflective NOS instruction, especially that conducted within the context of course content, can offer opportunities for prospective teachers to gain experiences in preparing content-embedded lesson plans. Considering the challenges faced by teachers and the importance of contexts when conducting highly-contextualized NOS courses, the use of activities that have varying levels of context can provide prospective teachers with an effective context for NOS

teaching. The idea of a context continuum may be helpful to prevent limitations that arise from the context itself. An effective NOS translation requires consideration of many factors at the same time, but it does not always guarantee effective results by definition. NOS courses should therefore be based on PCK models widely acknowledged in the relevant field, especially those taught in teacher education programs. The pentagon and hexagonal models of PCK (Park & Oliver, 2008) can be said to offer effective scaffolding in terms of addressing the interaction between the PCK components in question in a cycle based on reflective thinking skills, as well as covering all these components at the middle school science teaching level. Implementing these complex PCK models requires educative curriculum materials (Beyer & Davis, 2009; Davis & Krajcik, 2005). It may therefore be recommended that researchers working in the field of NOS instruction and teaching these courses participate in the processes of developing educative and curricular NOS materials together with prospective teachers and work collaboratively with them to offer them socially-mediated contextual support.

7. Conflict of Interest

The author declares that there is no conflict of interest.

8. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

(AAAS) American Association for the Advancement of Science (1990) Science for all Americans (New York: Oxford University Press).

(AAAS) American Association for the Advancement of Science (1993) Benchmarks for Science Literacy: A Project 2061 Report. (New York: Oxford University Press).

Abd-El-Khalick, F. (2001). Embedding nature of science instruction in preservice elementary science courses: Abandoning scientism, but... *Journal of Science Teacher Education, 12*(3), 215-233.

Abd-El-Khalick, F. (2005). Developing deeper understandings of nature of science: The impact of a philosophy of science course on preservice science teachers' views and instructional planning. *International Journal of Science Education*, *27*(1), 15-42.

Abd-El-Khalick, F., & Akerson, V. L. (2004a). Learning as conceptual change: Factors mediating the development of preservice elementary teachers' views of nature of science. *Science Education*, *88*(5), 785-810.

Abd-El-Khalick, F., & Akerson, V. (2009). The influence of metacognitive training on preservice elementary teachers' conceptions of nature of science. *International Journal of Science Education, 31*(16), 2161-2184.

Abd-El-Khalick, F., Bell, R. L., & Lederman, N. G. (1998). The nature of science and instructional practice: Making the unnatural natural. *Science Education, 82*(4), 417-436.

Abd-El-Khalick, F., & Lederman, N. G. (2000a). Improving science teachers' conceptions of nature of science: A critical review of the literature. *International Journal of Science Education, 22*(7), 665-701.

Abd-El-Khalick, F., & Lederman, N. G. (2000b). The influence of history of science courses on students' views of nature of science. *Journal of Research in Science Teaching, 37*(10), 1057-1095.

Abell, S. K. (2008). Twenty years later: Does pedagogical content knowledge remain a useful idea?. *International Journal of Science Education, 30*(10), 1405-1416.

Aglarcı, O., Sarıçayır, H., & Şahin, M. (2016). Nature of science instruction to Turkish prospective chemistry teachers: The effect of explicit-reflective approach. *Cogent Education, 3*(1), 1213350.

Akerson, V. L., & Abd-El-Khalick, F. (2003). Teaching elements of nature of science: A yearlong case study of a fourth-grade teacher. *Journal of Research in Science Teaching, 40*(10), 1025-1049.

Akerson, V. L., Abd-El-Khalick, F., & Lederman, N. G. (2000). Influence of a reflective explicit activity-based approach on elementary teachers' conceptions of nature of science. *Journal of Research in Science Teaching, 37*(4), 295-317.

Akerson, V. L., Buzzelli, C. A., & Donnelly, L. A. (2010). On the nature of teaching nature of science: Preservice early childhood teachers' instruction in preschool and elementary settings. *Journal of Research in Science Teaching, 47*(2), 213-233.

Akerson, V., & Donnelly, L. A. (2010). Teaching Nature of Science to K-2 Students: What understandings can they attain?. *International Journal of Science Education, 32*(1), 97-124.

Akerson, V. L., & Hanuscin, D. L. (2007). Teaching nature of science through inquiry: Results of a 3-year professional development program. *Journal of Research in Science Teaching*, *44*(5), 653-680.

Akerson, V. L., Pongsanon, K., Rogers, M. A. P., Carter, I., & Galindo, E. (2017). Exploring the use of lesson study to develop elementary preservice teachers' pedagogical content knowledge for teaching nature of science. *International Journal of Science and Mathematics Education*, *15*(2), 293-312.

Akerson, V. L., & Volrich, M. L. (2006). Teaching nature of science explicitly in a first-grade internship setting. *Journal of Research in Science Teaching*, *43*(4), 377-394.

Akin, F. N., & Uzuntiryaki-Kondakci, E. (2018). The nature of the interplay among components of pedagogical content knowledge in reaction rate and chemical equilibrium topics of novice and experienced chemistry teachers. *Chemistry Education Research and Practice*, *19*(1), 80-105.

Alan, Ü., & Erdoğan, S. (2018). Of course scientists haven't seen dinosaurs on the beach: Turkish kindergartners' developing understanding of the nature of science through explicit–reflective instruction. *Early Childhood Education Journal*, *46*(6), 695-706.

Alonzo, A. C., & Kim, J. (2016). Declarative and dynamic pedagogical content knowledge as elicited through two video-based interview methods. *Journal of Research in Science Teaching*, *53*(8), 1259-1286.

Alvarez, W., & Azaro, F. (1990). An extraterrestrial impact. *Scientific American*, 263, 78-84.

Aydin, S., Friedrichsen, P. M., Boz, Y., & Hanuscin, D. L. (2014). Examination of the topic-specific nature of pedagogical content knowledge in teaching electrochemical cells and nuclear reactions. *Chemistry Education Research and Practice*, *15*(4), 658-674.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report*, *13*(4), 544-559.

Bayram-Jacobs, D., Henze, I., Evagorou, M., Shwartz, Y., Aschim, E. L., Alcaraz-Dominguez, S., ... & Dagan, E. (2019). Science teachers' pedagogical content knowledge development during enactment of socioscientific curriculum materials. *Journal of Research in Science Teaching*, 1-27.

Bell, R. L., Lederman, N. G., & Abd-El-Khalick, F. (2000). Developing and acting upon one's conception of the nature of science: A follow-up study. *Journal of Research in Science Teaching: 37*(6), 563-581.

Bell, R. L., Matkins, J. J., & Gansneder, B. M. (2011). Impacts of contextual and explicit instruction on preservice elementary teachers' understandings of the nature of science. *Journal of Research in Science Teaching*, *48*(4), 414-436.

Bell, R. L., Mulvey, B. K., & Maeng, J. L. (2016). Outcomes of nature of science instruction along a context continuum: preservice secondary science teachers' conceptions and instructional intentions. *International Journal of Science Education*, *38*(3), 493-520.

Berry, A., Loughran, J., & van Driel, J. H. (2008). Revisiting the roots of pedagogical content knowledge. *International Journal of Science Education*, *30*(10), 1271–1279.

Beyer, C., & Davis, E. A. (2009). Supporting preservice elementary teachers' critique and adaptation of science lesson plans using educative curriculum materials. *Journal of Science Teacher Education*, *20*(6), 517.

Bilican, K. (2014). *Development of pre-service science teachers' nature of science views and nature of science instructional planning within a contextualized explicit reflective approach*. Unpublished doctoral dissertation, METU, Ankara.

Bilican, K., Tekkaya, C., & Cakiroglu, J. (2012). Pre-service science teachers' instructional planning for teaching nature of science: a multiple case study. *Procedia-Social and Behavioral Sciences, 31*, 468-472.

Clough, M. P. (2006). Learners' responses to the demands of conceptual change: Considerations for effective nature of science instruction. *Science & Education*, *15*(5), 463-494.

Clough, M. P., & Olson, J. K. (2012). Impact of a nature of science and science education course on teachers' nature of science classroom practices. In *Advances in nature of science research* (pp. 247-266). Springer, Dordrecht.

Creswell, J.W. (2003) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (2nd edition). Thousand Oaks, CA: Sage.

Davidowitz, B., & Potgieter, M. (2016). Use of the Rasch measurement model to explore the relationship between content knowledge and topic-specific pedagogical content knowledge for organic chemistry. *International Journal of Science Education*, *38*(9), 1483-1503.

Davis, E. A. (2003). Knowledge integration in science teaching: Analysing teachers' knowledge development. *Research in Science Education*, *34*(1), 21-53.

Davis, E. A., & Krajcik, J. S. (2005). Designing educative curriculum materials to promote teacher learning. *Educational Researcher*, *34*(3), 3-14.

Demirdöğen, B. (2012). *Development of pre-service chemıstry teachers' pedagogical content knowledge for nature of science: An intervention study.* Unpublished doctoral dissertation, METU, Ankara.

Demirdöğen, B., Hanuscin, D. L., Uzuntiryaki-Kondakci, E., & Köseoğlu, F. (2016). Development and nature of preservice chemistry teachers' pedagogical content knowledge for nature of science. *Research in Science Education*, *46*(4), 575-612.

Deniz, H., & Adibelli, E. (2015). Exploring how second grade elementary teachers translate their nature of science views into classroom practice after a graduate level nature of science course. *Research in Science Education*, *45*(6), 867-888.

Duruk, U. (2017). *The effect of metacognitive strategies embedded in contextualized nature of science instruction on preservice science teachers' understandings of nature of science and the retention of these understandings*. (Unpublished PhD thesis). Adiyaman University, Adiyaman.

Faikhamta, C. (2013). The development of in-service science teachers' understandings of and orientations to teaching the nature of science within a PCK-based NOS course. *Research in Science Education*, *43*(2), 847-869.

Friedrichsen, P. J., Abell, S. K., Pareja, E. M., Brown, P. L., Lankford, D. M., & Volkmann, M. J. (2009). Does teaching experience matter? Examining biology teachers' prior knowledge for teaching in an alternative certification program. *Journal of Research in Science Teaching*, *46*(4), 357-383.

Grossman, P. L. (1990). The making of a teacher: Teacher knowledge and teacher education. New York: Teachers College Press.

Hancock, B. (2002). Trent focus group: An introduction to qualitative research. Nottinghom: University of Nottinghom.

Hanuscin, D. L., Cisterna, D., & Lipsitz, K. (2018). Elementary teachers' pedagogical content knowledge for teaching structure and properties of matter. *Journal of Science Teacher Education, 29*(8), 665-692.

Hanuscin, D. L., Lee, M. H., & Akerson, V. L. (2011). Elementary teachers' pedagogical content knowledge for teaching the nature of science. *Science Education, 95*(1), 145-167.

Herman, B. C., & Clough, M. P. (2016). Teachers' longitudinal NOS understanding after having completed a science teacher education program. *International Journal of Science and Mathematics Education, 14*(1), 207-227.

Herman, B. C., Clough, M. P., & Olson, J. K. (2013). Teachers' nature of science implementation practices 2–5 years after having completed an intensive science education program. *Science Education, 97*(2), 271-309.

Hume, A., & Berry, A. (2013). Enhancing the practicum experience for pre-service chemistry teachers through collaborative CoRe design with mentor teachers. *Research in Science Education, 43*(5), 2107-2136.

Kaya, O. N. (2009). The nature of relationships among the components of pedagogical content knowledge of preservice science teachers: 'Ozone layer depletion' as an example. *International Journal of Science Education, 31*(7), 961-988.

Khishfe, R. (2008). The development of seventh graders' views of nature of science. *Journal of Research in Science Teaching, 45*(4), 470-496.

Khishfe, R. (2013). Transfer of nature of science understandings into similar contexts: Promises and possibilities of an explicit reflective approach. *International Journal of Science Education, 35*(17), 2928-2953.

Khishfe, R., & Abd-El-Khalick, F. (2002). Influence of explicit and reflective versus implicit inquiry-oriented instruction on sixth graders' views of nature of science. *Journal of Research in Science Teaching, 39*(7), 551-578.

Khishfe, R., & Lederman, N. (2006). Teaching nature of science within a controversial topic: Integrated versus nonintegrated. *Journal of Research in Science Teaching, 43*(4), 395-418.

Kim, S. Y., & Irving, K. E. (2010). History of science as an instructional context: Student learning in genetics and nature of science. *Science & Education, 19*(2), 187-215.

Käpylä, M., Heikkinen, J. P., & Asunta, T. (2009). Influence of content knowledge on pedagogical content knowledge: The case of teaching photosynthesis and plant growth. *International Journal of Science Education, 31*(10), 1395-1415.

Laugksch, R. C. (2000). Scientific literacy: A conceptual overview. *Science Education, 84*(1), 71-94.

Lederman, N. G. (1992). Students' and teachers' conceptions of the nature of science: A review of the research. *Journal of Research in Science Teaching, 29*(4), 331-359.

Lederman, N. G. (1999). Teachers' understanding of the nature of science and classroom practice: Factors that facilitate or impede the relationship. *Journal of Research in Science Teaching, 36*(8), 916-929.

Lederman, N. G., Abd-El-Khalick, F., Bell, R. L., & Schwartz, R. S. (2002). Views of nature of science questionnaire: Toward valid and meaningful assessment of learners' conceptions of nature of science. *Journal of Research in Science Teaching*, *39*(6), 497-521.

Lederman, N. G., Antink, A., & Bartos, S. (2014). Nature of science, scientific inquiry, and socio-scientific issues arising from genetics: A pathway to developing a scientifically literate citizenry. *Science & Education*, *23*(2), 285-302.

Loughran, J., Berry, A., & Mulhall, P. (2006). Understanding and developing science teachers. *Pedagogical content knowledge. Monash University, Clayton, Austrália: Sense*.

Loughran, J., Milroy, P., Berry, A., Gunstone, R., & Mulhall, P. (2001). Documenting science teachers' pedagogical content knowledge through PaP-eRs. *Research in Science Education*, *31*(2), 289-307.

Loughran, J., Mulhall, P., & Berry, A. (2004). In search of pedagogical content knowledge in science: Developing ways of articulating and documenting professional practice. *Journal of Research in Science Teaching*, *41*(4), 370-391.

Magnusson, S., Krajcik, J., & Borko, H. (1999). Nature, sources, and development of pedagogical content knowledge for science teaching. In *Examining pedagogical content knowledge* (pp. 95-132). Springer, Dordrecht.

Marshall, C., & G. Rossman. 2011. *Designing qualitative research*. Thousand Oaks, CA: Sage.

Matkins, J. J., & Bell, R. L. (2007). Awakening the scientist inside: Global climate change and the nature of science in an elementary science methods course. *Journal of Science Teacher Education*, *18*(2), 137-163.

Matthews, M. R. (1994). *Science Teaching: The Role of History and Philosophy of Science* (New York: Routledge).

Mazibe, E. N., Coetzee, C., & Gaigher, E. (2018). A comparison between reported and enacted pedagogical content knowledge (PCK) about graphs of motion. *Research in Science Education*, 1-24.

McComas, W. F., Almazroa, H., & Clough, M. P. (1998). The nature of science in science education: An introduction. *Science & Education*, *7*(6), 511-532.

Mellado, V., Bermejo, M. L., Blanco, L. J., & Ruiz, C. (2008). The classroom practice of a prospective secondary biology teacher and his conceptions of the nature of science and of teaching and learning science. *International Journal of Science and Mathematics Education*, *6*(1), 37-62.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation* (3rd ed). San Francisco, CA: Jossey-Bass.

Mthethwa-Kunene, E., Onwu, G. O., & de Villiers, R. (2015). Exploring biology teachers' pedagogical content knowledge in the teaching of genetics in Swaziland science classrooms. *International Journal of Science Education*, *37*(7), 1140-1165.

Mulvey, B. K., & Bell, R. L. (2017). Making learning last: teachers' long-term retention of improved nature of science conceptions and instructional rationales. *International Journal of Science Education*, *39*(1), 62-85.

NGSS Lead States. (2013). Next generation science standards: For states, by states. Washington, DC: The National Academy Press.

Park, S., & Chen, Y. C. (2012). Mapping out the integration of the components of pedagogical content knowledge (PCK): Examples from high school biology classrooms. *Journal of Research in Science Teaching*, *49*(7), 922-941.

Park, S., & Oliver, J. S. (2008). Revisiting the conceptualisation of pedagogical content knowledge (PCK): PCK as a conceptual tool to understand teachers as professionals. *Research in Science Education*, *38*(3), 261-284.

Rollnick, M., Bennett, J., Rhemtula, M., Dharsey, N., & Ndlovu, T. (2008). The place of subject matter knowledge in pedagogical content knowledge: A case study of South African teachers teaching the amount of substance and chemical equilibrium. *International Journal of Science Education*, *30*(10), 1365-1387.

Rozenszajn, R., & Yarden, A. (2014). Expansion of biology teachers' pedagogical content knowledge (PCK) during a long-term professional development program. *Research in Science Education*, *44*(1), 189-213.

Rudge, D. W., & Howe, E. M. (2009). An explicit and reflective approach to the use of history to promote understanding of the nature of science. *Science & Education*, *18*(5), 561-580.

Schwartz, R. S., & Lederman, N. G. (2002). "It's the nature of the beast": The influence of knowledge and intentions on learning and teaching nature of science. *Journal of Research in Science Teaching*, *39*(3), 205-236.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, *15*(2), 4-14.

Southerland, S. A., Johnston, A., & Sowell, S. (2006). Describing teachers' conceptual ecologies for the nature of science. *Science Education*, *90*(5), 874-906.

Şen, M., Öztekin, C., & Demirdöğen, B. (2018). Impact of content knowledge on pedagogical content knowledge in the context of cell division. *Journal of Science Teacher Education*, *29*(2), 102-127.

Stake, R. E. (2010). *Qualitative research: Studying how things work*. Guilford Press.

Supprakob, S., Faikhamta, C., & Suwanruji, P. (2016). Using the lens of pedagogical content knowledge for teaching the nature of science to portray novice chemistry teachers' transforming NOS in early years of teaching profession. *Chemistry Education Research and Practice*, *17*(4), 1067-1080.

Wahbeh, N., & Abd-El-Khalick, F. (2014). Revisiting the translation of nature of science understandings into instructional practice: Teachers' nature of science pedagogical content knowledge. *International Journal of Science Education*, *36*(3), 425-466.

Ward, G., & Haigh, M. (2017). Challenges and changes: developing teachers' and initial teacher education students' understandings of the nature of science. *Research in Science Education*, *47*(6), 1233-1254.

Williams, C. T., & Rudge, D. W. (2016). Emphasizing the history of genetics in an explicit and reflective approach to teaching the nature of science. *Science & Education*, *25*(3-4), 407-427.

Van Dijk, E. M. (2014). Understanding the heterogeneous nature of science: A comprehensive notion of PCK for scientific literacy. *Science Education, 98*(3), 397-411.

Van Driel, J. H., & Berry, A. (2012). Teacher professional development focusing on pedagogical content knowledge. *Educational Researcher*, *41*(1), 26-28.

Van Driel, J. H., Jong, O. D., & Verloop, N. (2002). The development of preservice chemistry teachers' pedagogical content knowledge. *Science Education, 86*(4), 572-590.

Van Driel, J. H., Verloop, N., & De Vos, W. (1998). Developing science teachers' pedagogical content knowledge. *Journal of Research in Science Teaching*, *35*(6), 673-695.

Önalan, O., & Gürsoy, E. (2020). EFL teachers' demands and preferences on in-service training in Turkey. *International Online Journal of Education and Teaching (IOJET), 7*(3). 945-958. https://iojet.org/index.php/IOJET/article/view/878

Received: 01.04.2020
Received in revised form: 05.05.2020
Accepted: 07.05.2020

EFL TEACHERS' DEMANDS AND PREFERENCES ON IN-SERVICE TRAINING IN TURKEY

Research Article

Okan ÖNALAN

Independent Researcher

okanonalan@gmail.com

Esim GÜRSOY

Bursa Uludağ University

esim@uludag.edu.tr

Okan ÖNALAN received his B.A. at Hacettepe University, his M.A. at METU, and his PhD at Gazi University in English Language Teaching (ELT). He has offered methodology courses at various universities as a visiting instructor. He continues to publish his academic work in international journals and delivers teacher-training courses, workshops and seminars at different levels.

Esim Gürsoy is a professor at the ELT Department of Bursa Uludağ University, Turkey. She has many published research articles in international journals. She has authored and edited books and also is the author of several book chapters. Her research interests include, teaching English to young learners, pre- and in-service teacher education, teaching practice, and integrating socially responsible teaching to ELT.

EFL TEACHERS' DEMANDS AND PREFERENCES ON IN-SERVICE TRAINING IN TURKEY

Okan ÖNALAN
okanonalan@gmail.com

Esim GÜRSOY
esim@uludag.edu.tr

Abstract

One of the significant means of ensuring quality instruction in language classrooms is establishing an effective program of continuing professional development for language teachers. When conducted efficiently as a part of CPD, in-service training (INSET) proves to be a key component in improving teachers' instructional skills as well as keeping their methodological knowledge up-to-date. Nonetheless, both state-led and private-held INSET efforts in Turkey receive considerable criticism regarding their inefficiency and insufficiency. One of the reasons for any ineffectiveness might be INSET program developers' negligence in taking into consideration teachers' actual needs. Thus, more empirical research that explores language teachers' demands and preferences on in-service training should be carried out in various contexts. Consequently, this study aims to investigate English teachers' demands and preferences on an INSET program. Descriptive in nature and following a quantitative research design, the present study collected data from 985 state and private school teachers via a scale developed by the researchers. Having ensured construct validity via factor analysis, the scale consisted of three sub-factorial groups: demands on INSET, preferences regarding the content and the trainers, and personal preferences. The findings displayed some statistically significant differences between state and private schools, novice and experienced teachers, and between teachers who had previous INSET experience and those who do not at different sub-factorial groups. The study has implications for policymakers, who are in the process of designing an INSET model for Foreign Language Teachers, as well as teacher trainers who carry out INSET.

Keywords: in-service training needs, INSET, professional development, EFL teachers, scale

1. Introduction

Considering the ever-changing nature of educational ecosystems, teaching is a dynamic profession that requires continuous development. Starting from the early phases of pre-service education, teaching is usually characterized by constant questioning one's own instructional knowledge and skills as it is ideally a continual pursuit of improvement. However, any theoretical pre-service course offered to teacher candidates at educational faculties principally falls short in providing the true nature of actual teaching because of two main reasons. First of all, mere theory is unable to reflect the complexities of instructional settings in general. Secondly, teacher candidates are optimistically still at the phase of discovering the necessities of many instructional challenges they will possibly face. Besides, they generally have limited view on what knowledge and skills they actually need to better operate in the classroom. It is the in-service phase of the profession that these needs become more obvious to teachers as they learn from experience and hone their teaching skills. Therefore, it is essential that teachers

participate in continuing professional development (CPD) activities during their career not only to obtain certain professional standards with an informed approach based on their needs, but also to keep up-to-date with recent advances in their field through active involvement (Çimer, Çakır & Çimer, 2010; Sokel, 2019).

When conducted efficiently as a part of CPD, in-service training (INSET) proves to be a key component in improving teachers' instructional skills as well as keeping their methodological knowledge up-to-date. In that sense, INSET programs play a critical role in ensuring quality instruction in classrooms through the development of teachers (Hustler, McNamara, Jarvis, Londra & Campbell, 2003; Saiti & Saitis, 2006). They also bring about long-term educational and institutional benefits through positive change in teacher behavior (Hayes, 1995; 2000; Richards & Farrell, 2005). This crucial function that INSET serves has led researchers investigate the effectiveness of such programs, in the course of which numerous studies have produced contradictory results. Whereas some researchers have concluded that both teachers and students benefit from INSET programs (see Gibbs & Coffey 2004; Grieve & McGinley 2010, Rajabi, Kiany & Maftoon, 2012), some other studies have reported that INSET courses may show a certain degree of inefficiency in producing the desired outcomes (see Atay 2008, Emery, 2012; Hamid 2010; Kennedy 2016).

These conflicting results put the effectiveness of INSET programs in different contexts under scrutiny. One of the reasons of ineffectiveness may be the significant discrepancy between teacher expectations and outcomes (Emery, 2012; Yan, 2005). In other words, INSET program developers' negligence in taking into consideration teachers' actual needs may be an important cause of any possible inefficiency. This issue, in particular, is the primary motivation behind the current study. Drawing attention to the premise that teachers become more aware of their actual needs after they start teaching, more empirical research that explores in-service teachers' demands and preferences on INSET should be carried out in various contexts. By accounting for teachers' stated needs, it is hoped that a deeper understanding will be built for effective INSET programs. Therefore, the present study aims at investigating English teachers' demands and preferences on INSET programs in the Turkish context.

2. Literature Review

2.1. Effectiveness of INSET Programs

Literature specifies several factors that determine the effectiveness of INSET programs. For instance, Vukelich and Wrenn (1999) provide a list of such factors maintaining that INSET programs should be subject-specific, they should focus on the teachers' needs, and they should have a continuing nature. Additionally, INSET that provides teachers real-life solutions with meaningful engagement through collaborative relationships where teachers are given reflective opportunities proves to be highly effective (Burns & Richards 2009, Uysal 2012).

In a recent meta-analysis, Sokel (2019) summarizes the factors that maximize INSET effectiveness as "coherence, active participation and collaboration" (pp. 410-411). First of all, coherence can be perceived as a key factor not only at its general sense, where national objectives of a country are reflected in the program (Desimone, 2009; Desimone & Garet, 2015), but also as a more context-specific asset, where content is centered around authentic and explicit challenges that teachers face (Bayar, 2014; Ponanski, 2002; Şahin & Yıldırım 2016). Secondly, research shows that INSET sessions lose efficiency when they are delivered using traditional techniques where only theoretical knowledge is transmitted through lecturing (Gökmenoğlu, 2012; Elyas & Al Grigri, 2014; Koç, 2016). Thus, successful INSET programs are recognized to include trainees in the learning process via active participation opportunities using a variety of methods such as kinesthetic practice and reflection (Joyce & Showers 1980;

Sandholtz, 2002). Finally, collaboration as a part of professional development proves to be significant in enhancing the effectiveness of INSET since collaborative work during sessions promote reflection and discovering new perspectives (Garet, Porter, Desimone, Birman & Yoon, 2001; Guskey, 2003; Guskey & Yoon, 2009). Besides, collaboration is one of the four C's of 21st-century skills (namely communication, collaboration, critical thinking, creativity). Therefore, any instructional setting that aims for active learning benefits from some form of collaborative work, such as pair or group activities, and INSET programs are no exception.

Another important consideration in increasing the effectiveness of INSET is the necessity to conduct a thorough needs analysis. Investigating what teachers actually need and want helps developers focus on teachers' actual instructional challenges (Gökmenoğlu, Clark & Kiraz, 2016; Hayes, 2000; John & Gravani 2005; Özen, 2006). Similarly, Roberts (2008) highlights that understanding teachers' needs and preferences as a part of the INSET cycle is a vital stage that increases their relevance. Thus, empirical research on teachers' demands and preferences that preferably inform INSET practices can help develop programs that are more tangible and sensitive to teachers' actual classroom needs. Otherwise, when teachers' needs and preferences are neglected in their professional development, they tend to become cynical, over-critical, demotivated and unwilling to participate (Groves, 2015; Hoş & Topal, 2013; Uztosun, 2018; Yan & He, 2015).

2.2. INSET Programs in Turkey

INSET activities in Turkey are primarily organized by *In-service Teacher Training Unit* under the Ministry of Education (MoE). Additionally, some other private educational institutions and publishing companies offer training to in-service teachers (Özer, 2004; Şentuna, 2002). Recently, however, both state-led and private-held INSET efforts in Turkey receive considerable criticism regarding their inefficiency and insufficiency. According to Aydın and Başkan (2005), for example, INSET activities in Turkey fail to entail coordination and cooperation and they have limited emphasis on practical knowledge. Similarly, Bayrakcı (2009) asserts that in-service training in Turkey usually lacks collaboration, technology use, proper evaluation or sufficient practice. Comparably, Altun (2011) suggests that participant teachers are easily overwhelmed by the content of state-held INSET due to the fact that trainers only transfer theoretical information, failing to attach necessary emphasis on the practical aspect of instruction. Turkish language teachers would rather take part in INSET programs which focus on their specific instructional challenges and which present practical ideas via need-oriented, authentic instructional activities in an atmosphere where participants reflectively share experiences (Arslan, Mirici, & Öz, 2019).

As a reflection of the big picture, INSET programs for EFL teachers are prone to similar criticisms. One of the main problems with language teacher professional development efforts at in-service level in Turkey is the lack of an established form or framework (Balbay, Pamuk, Temir & Doğan, 2018; Daloğlu, 2004). Thus, it might be argued that this problem results from abundance rather than scarcity in quantity, where content has long been repetitive around similar and currently monotonous topics with limited quality. More importantly, Daloğlu (2004, p.677) states that "topics for in-service development programs are selected by people other than the teachers for whom the in-service is intended", resulting in the programs' inefficiency to address teachers' needs and challenges. A number of other studies in Turkish context have also pinpointed some common problems as follows: INSET efforts for EFL teachers in Turkey (a) are unsystematic, (b) mostly focus on transferring theoretical knowledge, (c) neglect teachers' needs, opinions and specific challenges, (d) are unable to sustain teachers' willingness due to dull and repetitive content, (e) employ incompetent and ill-prepared trainers, (f) conflict with teachers' schedules and routines (Küçüksüleymanoğlu, 2006; Öztürk & Aydın,

2019; Uysal, 2012; Uztosun, 2018). Consequently, considering the challenges stated above, it can be argued that INSET programs for EFL teachers in Turkey rarely address their needs and concerns. Thus, this study explores Turkish EFL teachers' demands and preferences on INSET programs so that their perceptions and insights might help overcome some of the existing inefficiencies and stated problems in the Turkish context.

3. Method

Continuous professional development (CPD) has crucial value for all teachers. One of the ways to enhance CPD is via attending in-service trainings (INSET). Although it is one of the indispensable features of professional development, how the INSET is organized, conducted, and carried out has a role on its effectiveness. In addition to the organizational aspects, the practitioners' needs and expectations also come in sight as another determiner of INSET's success. Designed as a descriptive study, this study aims to answer the following research questions:

1. What are the perceptions of EFL teachers on INSET?
   - Are there any differences between groups in their perceptions according to variables such as gender, school type, teaching experience and having an INSET experience before?
2. What are the demands of practicing EFL teachers from an INSET?
   - Are there any differences between groups in their demands according to variables such as gender, school type, teaching experience and having an INSET experience before?
3. What are the EFL teachers' preferences with regards to the content and the trainers?
   - Are there any differences between groups in their content and trainer preferences according to variables such as gender, school type, teaching experience and having an INSET experience before?
4. What are EFL teachers' personal expectations from an INSET activity?
   - Are there any differences between groups in their personal preferences according to variables such as gender, school type, teaching experience and having an INSET experience before?

3.1. Data Collection Instrument

The data for the study was collected quantitatively via a scale developed by the researchers. First of all, an item pool was formed to find out EFL teachers' perceptions of INSET. The item pool was prepared via extensive literature and EFL teachers' earlier feedback on INSET provided by the researchers themselves. The instrument was then sent to five experts for content validity. Experts rated each item as necessary, relevant but not necessary and unnecessary. In addition, for face validity, each expert rated each item according to the extent it represents the construct. As a result of the expert opinions, the survey items were decreased from 25 to 21 as four of the items' content validity ratios were lower than .99 (Yurdugül, 2005). The experts also evaluated the items according to their reader-friendliness. As a next step, the questionnaire was given to five English teachers to check the comprehensibility of the items. After final modifications, the questionnaire was checked for construct validity.

For construct validity, factor analysis was conducted. First, Keiser-Meier-Olkin value was found to be .86, and the Bartlett test was found to be significant (The value of the Bartlett's). Thus, factor analysis was implemented. The direct oblimin method was used for rotation. Nine items of the instrument were discarded as a result of the analysis. Remaining 12 items divided

into three factors as: demands on INSET (i6, i8, i18, i19), content and trainer preferences (i2, i3, i4, i5), and personal preferences (i1, i13, i15, i17). The scale was found to be reliable with a .80 alpha value. The reliability of the factorial groups was also acceptable with .74, .76, and .70 alpha values consecutively.

3.2. Participants and Data Collection

The study was carried out with 985 EFL teachers (Female n = 881; Male n = 104) working at different cities of Turkey. The majority of the participants worked at private schools (n= 827), and 158 of the participants work at state schools. The EFL teaching experiences of the participants were also varied. Accordingly, 405 of the participants were novice teachers (0-5 years of experience), 339 of the teachers had an experience between 6-11 years, and finally, 241 of the teachers were experienced teachers with more than 12 years of experience.

Initially, the convenience sampling method was used to reach at participants all over Turkey. For this, the researchers posted information on the research on their social media and also sent an online link of the survey to teachers of their acquaintance. Later on, the participants were asked to share the link with other teachers as well. The purpose was to reach as many EFL teachers as possible to increase the generalizability of the results and also to have a more comprehensive understanding of teacher perceptions. The data collection phase took place between October 2018 and June 2019. Due to the sampling strategy, the groups in different variables were not homogenous. Moreover, the sample group represented the Turkish context in terms of gender since EFL teaching in Turkey is mostly carried out by females than males. Thus, the results of the study should be interpreted accordingly.

3.3. Ethical Considerations

Research ethics were strictly taken into consideration throughout the study. The anonymity of the participants and their workplaces were assured so as to reach at sincere responses. As the research instrument was distributed via social media only, those who responded to the online form gave their consent by participated voluntarily in the research.

3.4. Data Analysis

Descriptive statistics were used in the analysis. The data was found to be normally distributed as the skewness and kurtosis values were between -1,5 and + 1,5 (Tabachnick & Fidell, 2013) in all factorial groups as well as the whole scale. Thus, parametric tests were used. Independent samples t-test was implemented for dual comparisons and one-way ANOVA for multiple comparisons.

4. Results

The current study aimed at identifying EFL teachers' perceptions on INSET via a scale which was developed by the researchers and which consisted of three factors. The findings are presented in light of the research questions asked.

The first research question (RQ) inquired about teachers' perceptions on INSET. According to the item-total mean of the instrument (M = 4.16) it can be said that the participants (N = 985) have positive perceptions (Factor 1 M = 4.13; Factor 2 M = 4.54; Factor 3 M = 3.81) towards INSETs. When we look at the effect of variables such as gender, school type, and having attended an INSET before, statistically significant differences are observed. Consequently, there is a statistically significant difference between males (M = 4.29, SD = .59) and females (M = 4.19, SD = .56) (t (983) = -2,45, p = .014) on behalf of males.

There are also statistically significant differences between teachers working in private schools (M = 4.12, SD = .57) and state schools (M = 4.35, SD = .48) (t (983) = -4,62, p = .000)

on behalf of state schools. The third variable, having attended an INSET before or not, also indicates differences. Thus, there are statistically significant differences between teachers who have attended an INSET before (*M* = 4.12, SD = .57) and those who have not attended (*M* = 4.26, SD = .53) (t (983) = -2,51, p = .012). In this group, perceptions of non-attendees seem to be more positive.

In terms of the demands of teachers from an INSET as asked in RQ 2, no statistically significant differences were found in gender, school type or having an INSET experience before. Descriptive statistics of factor 1 (demands from INSET) are given in Table 1.

Table 1. *Descriptive statistics of factor 1*

Items	*M*	SD	N
I would like discussions on theoretical topics.	4.05	.97	985
I think there should be an evaluation of the training in the end.	4.16	1	985
I think in-service training should be regular.	4.06	1.04	985
I would like to attend in-service trainings.	4.25	.92	985

The third RQ looked for differences in preferences regarding the content and the trainers. Similar to the first factorial group, there were no differences in terms of gender, type of school, or former INSET experience. Descriptive statistics of factor 2 (content and trainer preferences) are given in table 2.

Table 2. *Descriptive statistics of factor 2*

Items	*M*	SD	N
I think practical information should be integrated in the content of the in-service trainings.	4.46	.76	985
I need to see examples of how theory can be implemented in the classroom.	4.52	.74	985
The instructors of the in-service trainings should be experts in their fields.	4.60	.70	985
I would like the instructors to share in-service trainings materials.	4.60	.68	985

Regarding the personal preferences in RQ four, there are differences in gender, school type and INSET experience. There is a statistically significant difference between males (*M* = 4.08, SD = .83) and females (*M* = 3.77, SD = .90) (t (983) = -3,30, p = .001) on males' behalf; between private school (*M* = 3.73, SD = .93) and state school (*M* = 4.21, SD = .61) teachers (t (983) = -6,26, p = .000) with state school teachers having more positive views, and finally between teachers who attended an INSET before (*M* = 3.74, SD = .93) and have never attended one before (*M* = 4.16, SD = .63) (t (983) = -5,40, p = .000) on behalf of non-attendees. Descriptive statistics of factor 3 (demands from INSET) are given in table 3.

Table 3. *Descriptive statistics of factor 3*

Items	*M*	SD	N
I think in-service trainings help me renew my theoretical knowledge.	3.47	1.57	985
I prefer group work in the in-service trainings.	3.71	1.20	985
I enjoy kinesthetic activities in-service trainings.	3.72	1.25	985
I think the in-service trainings are essential for professional development.	4.32	.85	985

A close look at the means of items in factor three indicates that the participants are dubious regarding the extent to which INSET helps renewing their theoretical knowledge. Moreover, perceptions regarding collaborative activities such as group work and kinesthetic activities seem to be favored at a moderate level.

Multiple comparisons were also made via one-way ANOVA when comparing groups with different teaching experiences. Except for the first factor (demand on INSET), there are statistically significant differences between groups with regards to their perceptions in general [$F(2, 982) = 6.98$, $p = .001$] as well as their content and trainer preferences (factor 2) [$F(2, 982) = 5.24$, $p = .005$] and personal preferences (factor 3) [$F(2, 982) = 7.83$, $p = .000$]. Post Hoc comparisons were made by using the Bonferroni test.

In factor 2 the difference is between novice teachers (0-5 years of experience) ($M = 4.51$, SD = .56) and experienced teachers (12+ years of experience) ($M = 4.64$, SD = .54) and between less experienced teachers (6-11 years of experience) ($M = 4.51$, SD = .53) and experienced teachers (12+ years of experience) ($M = 4.64$, SD = .54). In factor 3, the difference is between novice teachers ($M = 3.71$, SD = .94) and experienced teachers ($M = 4.00$, SD = .78) and between less experienced teachers ($M = 3.78$, SD = .92) and experienced teachers ($M = 4.00$, SD = .78).

When the total scale is concerned, we see differences with the same groups as well. Likewise, there are statistically significant differences between novice teachers ($M = 4.12$, SD = .56) and experienced teachers ($M = 4.28$, SD = .53) and between less experienced teachers ($M = 4.13$, SD = .57) and experienced teachers ($M = 4.28$, SD = .53).

5. Discussion

The study aimed to identify the INSET needs and preferences of EFL teachers working in private and state schools. The results pointed out some important considerations that might be a result of the educational context. The findings, in general, show that males, state school teachers, and experienced teachers have stronger needs and more positive perceptions regarding INSETs. However, some of the indicated needs and perceptions also seem to fall apart from the previous literature. The results will be discussed according to the RQs posed.

The first RQ aimed to find out the needs and views of teachers on INSET. Although the first two factors: demands on INSET and views regarding the content and trainers showed high agreement, teachers' personal preferences as listed in factor three were only moderately accepted. In dual and multiple comparisons, the differences were between genders, state and private school teachers as well as participants with previous INSET experiences. It can be argued that males, state school teachers and participants without any INSET experience have more positive views than their counterparts. One interesting issue in this finding is that of the teachers without any INSET experience. Considering the fact that INSETs in Turkey created a

considerable depreciation on the trainees in terms of their outcomes (see Küçüksüleymanoğlu, 2006; Öztürk & Aydın, 2019; Uysal, 2012; Uztosun, 2018), it is quite meaningful that teachers who lack such a negative experience have more positive views on such trainings.

The second RQ was concerned with the participants' views and demands from an INSET. Lack of differences between groups is an indication that the participants have a common understanding of their demands. One positive result is that the participants agree that INSETs should be provided regularly for their professional development and that they would like to attend those trainings despite the criticism towards the INSETs in Turkey. However, considering that the majority of the participants worked at private institutions and that the INSETs they attend to are organized by parties other than the state, their experiences might be different from those who only received state-organized INSETs. Thus, the results need to be interpreted according to the participants' profiles in the present study. Another promising view coming from the teachers is that they think that there should be an evaluation of the training program. This demand is related to the outcomes of the learning. In order for any instruction to be successful, the participants need to be actively involved in the learning process, there should be clear outcomes, and the trainer and the trainee should be able to evaluate the extent the outcomes are met. Thus, it can be argued that the participants pay attention to the content objectives and outcomes of the training for evaluation and assessment. Considering that assessment is a form of feedback both for the trainer and the trainees, with appropriate methods of assessment, not only the trainees' success but also the training can be evaluated. Self and peer assessment, as well as the trainer assessment, can provide valuable feedback to increase cognitive engagement as well as to build a bridge between the intended theoretical content and practical implementation. In relation to this, teachers also stated that they would like discussions on theoretical topics, which is another indication of the desire to become an active learner to bridge the gap between theory and practice.

The third RQ was related with the teachers' views on the content of the training and the qualifications of the trainers. Regarding these views, there were no statistically significant differences between the groups. The participants showed high agreement on their need for practical information provided in INSETs as well as their demand to integrate theory and practice. This has been stated by other researchers (see, Altun, 2011; Aydın & Başkan 2005), in the Turkish context earlier. These studies showed that there is an overwhelming amount of theoretical information, which lack a practical component. Hence, it is compulsory that any INSET program should diverge from a one-way dissemination of information that considers participants as "empty buckets" to be filled and enhance active participation by helping teachers find their own ways to integrate theory in their classroom practice (Joyce & Showers 1980; Sandholtz, 2002).

With regards to the qualifications of the trainers, the participants claimed that they give importance to the expertise of the person providing the training. Similarly, the previous literature also underlined the importance of qualified trainers as one of the prerequisites of success. It has been emphasized that in the Turkish context trainers are sometimes incompetent and/or ill-prepared (Öztürk & Aydın, 2019). As learning is a way of forming new experiences and it is a mutual process between the trainer and the trainee, it is essential that there is a relationship built on trust. Unless the learner believes in the expertise and qualifications of the trainer, their engagement in the process will decrease. Thus, in addition to the content of the training that is prepared according to the needs of the learners with relation to classroom implementation, how this is communicated, and who communicates it also matter.

The results from the last factor related to the participants' personal views and preferences are noteworthy. For one, this factorial group had the lowest means and some of the participants'

views were contradictory to what they claimed earlier. For instance, although they claimed that they would like discussions on theoretical topics in factor 1, they were not sure whether INSETs help them to renew their theoretical knowledge. Moreover, earlier literature in the Turkish context also claimed that INSETs primarily focus on transferring theoretical knowledge (Gökmenoğlu, 2012; Koç, 2016). The situation points out an irony that, although the INSETs primarily focus on theoretical information, the participants of the study seem to be dubious about the positive effects of this information for the renewal of their existing knowledge. Moreover, the earlier literature claims that the theory is shared as a way of "transfer" of knowledge coming from one direction, "the trainer". However, the participants stated that they would like to discuss theoretical concepts, which shows willingness to share information as happens in a "mutual give and take" during discussions. Thus, traditional methods used during trainings do not help the participants to reach the desired outcomes.

There were differences between the groups (gender, school type, INSET experience and teaching experience) with regards to their personal preferences. These differences were in favor of males, state school teachers, experienced teachers and those with no INSET experience. The male participants in this study constitute nearly 1/8th of the sample group. The result proves to be interesting because although males are fewer in number than the females, they are inclined towards more positive views regarding the effectiveness of the theoretical content, activity types and organization suggested in the instrument. Similarly, more experienced teachers favored these more than the in-experienced and less experienced teachers. This might be due to the fact that we tend to appreciate the importance and value of professional development as we develop our experiences in our profession. Thus, it is meaningful that experienced teachers have more positive views regarding INSETs. Moreover, lack of INSET experience may also result in a willingness to participate and having positive views. On the other hand, private school teachers may have more opportunities for focused and frequent INSETs. Hence state school teachers' stronger views might be a result of irregular trainings and their need for professional development.

Another issue that is worth discussing is the participants' preferences for collaborative group work and kinesthetic activities. The agreement with these items was only at a moderate level and the results may have several interpretations. First of all, the hesitance to be involved in group work and kinesthetic activities might be an outcome of the educational context that these teachers were brought up. In traditional educational environments, learning is a passive process in which learners are passive recipients of knowledge, where the interaction is usually from the teacher to the student. There are multiple factors that affect the learning environment, such as teacher's skills and qualifications, physical conditions of the classroom (e.g., population, fixed desks, lack of technology), expectations of the administration and the parents. Turkey, trying to move away from an oriental and traditional education system, fell behind the needs of the teachers and students for a long time. Thus, it is possible that these teachers experienced traditional learning. Studies related to teacher cognition (Borg, 2003; Gürsoy, 2013) claim that teachers tend to teach the way they have learned since experiences are stronger than newly learned information. Secondly, 21st-century skills (communication, collaboration, critical thinking, and creativity) offer a new set of skills in addition to those of the language skills to survive in this century. Teachers are asked to integrate these skills to their lessons to prepare their students. However, as with any other skill, the transfer of 21st-century skills to the classroom is dependent on the teacher's use of these skills themselves. The participants' moderate agreement with group work and kinesthetic activities might be considered as an indication of the limited use of such activities in their classes. Consequently, the results are two folds: (a) Teachers, consciously or unconsciously, are still in favor of activities that they feel comfortable with that are not in line with contemporary approaches; (b) Teachers may not

possess the 21st-century skills and may not feel comfortable with being engaged in activities that require them. At either extreme, an indirect result of the study might be that teachers need effective, focused, needs-based, systematic INSET to compensate their professional development.

6. Conclusion and Implications

INSETs are, no doubt, an indispensable component of professional development. As teachers develop their expertise in their field, they need continuous support that involves new practical information blended with theory, alternative and effective ways of teaching that would match with their classroom reality, developing experiences with new ideas and form beliefs, or change older beliefs. Although sustainability is the key issue, it is hardly possible to argue that the INSETs provided in the Turkish context are regular or structured toward a bigger and wider goal. It is because of this reason that academic studies conducted in the Turkish content pointed out to the many features of the process as ineffective such as the delivery method of the training, expertise of the trainers, content (whether needs-based or not) of the training, organization of the process. According to the Higher Education Council's (HEC) database, there is not another topic more studied that INSET in Turkey in M.A or Ph.D. theses. The situation highlights the concerns of academia on the issue. Upon the concerns of the government, teachers and teacher trainers, Teacher Training and Development Unit of the Ministry of National Education (MoNE) signed an agreement with the British Council (BC) in September 2019. The agreement involves the planning and organization of INSETs on the professional needs of English language teachers and the development of four language skills (British Council, 2019; NTV, 2019). Accordingly, the organization of 'train the trainer' INSETs, practice, and activity-based trainings in Edinburgh, Scotland, for teachers to develop four language skills, preparing print and visual educational content and distance education opportunities will be provided (British Council, 2019). As an initial step, 22 English teachers were sent to Edinburgh for a two-week training. As the second step, 150 teachers will take an INSET in Ankara in November. In relation with this, the contribution of 2400 English teachers in 422 schools in Ankara in INSETs was planned. As stated in the agreement, these trainings will be provided by language teachers themselves with academic and expert support. Although the content of the trainings and the model to be implemented during these trainings were not released, it is hoped that this incentive meets the needs of the teachers to reach the governmentally stated goals necessary for teacher development.

The findings from the study strongly suggest that the aforementioned or other INSET opportunities are regular and consistently provided by field experts with practical content related to theory. The higher demands and more positive perceptions coming from state school teachers and experienced teachers suggest that such professional support is needed, especially for these groups. Although organized with good intentions, it is clear that the irregular, inconsistent, theory-based INSETs do not meet the needs of the teachers. It appears that experienced teachers need support more than the inexperienced, which is sound because as we gain experience, we fall apart from the theory that we learned during our initial professional education. Thus, teachers might need new theories and ideas in relation to classroom implementation. State school teachers, on the other hand, might need INSET more than private school teachers since they have fewer opportunities as these are provided randomly in terms of their content and time.

Another conclusion from the study is the teachers' reluctance in being a part of kinesthetic and collaborative group activities. Such activities are usually what is required from the teachers to be used in the classroom as they provide communicative opportunities, increased cognitive involvement, apply with young students' characteristics, are a part of 21st-century skills . In

order for teachers to be able to use non-traditional activities, it is not adequate to tell them how much they are effective but help them see the effects by actually experiencing them while learning themselves. Traditional classroom environments, which quite a lot of teachers might have experienced in the past, play a role in their beliefs about teaching and learning. Therefore, it emphasizes the need for non-traditional content and application in INSETs.

In conclusion, as MoNE is in the process of developing INSETs for foreign language teachers, it seems that desired outcomes can be reached on condition that the organization is needs-specific, localized, providing applicable content, encouraging active participation and cognitive involvement, supported with activities aiming to develop experiences with the new ideas, providing opportunities for reflection and evaluation, but at the heart of it all, provided by field experts who have the knowledge and skills themselves.

The study is not without its limitations. Due to the data collection method, groupings of participants were not homogenous. Hence the results of the study should be interpreted accordingly. Moreover, for generalizability issues, the study used a quantitative methodology to reach as many participants as possible. Yet, future studies might focus on qualitative research designs to have an in-depth understanding of teachers' needs, perceptions, demands, and preferences.

7. Conflict of Interest

The authors declare that there is no conflict of interest.

8. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Altun, T. (2011). INSET (In-service Education and Training) and professional development of teachers: A comparison of British and Turkish cases. *Online Submission. US-China Education Review A6*. 846-858.

Arslan, S., Mirici, İ. H., & Öz, H. (2019). In-service training needs of EFL teachers in non-formal education settings. *SEFAD, 42,* 223-244.

Atay, D. (2008). Teacher research for professional development. *ELT Journal, 62*(2), 139–147.

Aydin, A., & Baskan, G. A. (2005). The problem of teacher training in Turkey. *Biotechnology & Biotechnological Equipment, 19*(2), 191-197.

Balbay, S., Pamuk, İ., Temir, T., & Doğan, C. (2018). Issues in pre-service and in-service teacher training programs for university English instructors in Turkey. *Journal of Language and Linguistic Studies, 14*(2), 48-60.

Bayar, A. (2014). The components of effective professional development activities in terms of teachers' perspective. *International Online Journal of Educational Sciences, (6)*2, 319–27.

British Council. (2019). *İngilizce öğretmenlerinin mesleki gelişimini desteklemek üzere, Millî Eğitim Bakanlığı Öğretmen Yetiştirme ve Geliştirme Genel Müdürlüğü ile British Council arasında Mutabakat Beyanı imzalandı.* Retrieved March 08, 2020, from https://www.britishcouncil.org.tr/press-office/meb-letter-of-aggrement

Borg, S. (2003). Teacher cognition in language teaching: A review of research on what language teachers think, know, believe, and do. *Language Teaching, 36,* 81-109.

Burns, A., & Richards, J. C. (Eds.). (2009). *The Cambridge guide to second language teacher education*. NY: Cambridge University Press.

Çimer, S. O., Çakır, I., & Çimer, A. (2010). Teachers' views on the effectiveness of in-service courses on the new curriculum in Turkey. *European Journal of Teacher Education, 33*(1), 31–41.

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher, (38)*3, 181–9.

Desimone, L.M., & Garet, M. S. (2015). Best practices in teacher's professional development in the United States. *Psychology, Society and Education, (7)*3, 252–63.

Elyas, T., & Al Grigri, W. H. (2014). Obstacles to teaching English in Saudi Arabia public schools: Teachers' and supervisors' perceptions. *International Journal of Language Teaching, 2*(3), 74-89.

Emery, H. (2012). A global study of primary English teachers' qualifications, training and career development. (ELT Research Paper No.12-08). British Council. Retrieved from https://www.teachingenglish.org.uk/sites/teacheng/files/B487_ELTRP_Emery_ResearchPaper_FINAL_web_V2.pdf

Garet, M., Porter, A. C., Desimone, L., Birman B. F., & Yoon K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, (38)*4, 915–45.

Gibbs, G., & Coffey, M. (2004). The impact of training of university teachers on their teaching skills, their approach to teaching and the approach to learning of their students. *Active Learning in Higher Education, 5*(1), 87–100.

Gökmenoğlu, T. K. (2012). *Teachers' reports of their in-service training needs and design preferences*. (Unpublished doctoral dissertation). Middle East Technical University, Ankara, Turkey.

Gökmenoğlu, T. K., Clark, C. M., & Kiraz, E. (2016). Professional development needs of Turkish teachers in an era of national reforms. *Australian Journal of Teacher Education, 41*(1). Retrieved from http://ro.ecu.edu.au/ajte/vol41/iss1/7

Grieve, A. M., & McGinley, B.P. (2010). Enhancing professionalism? Teachers' voices on continuing professional development in Scotland. *Teaching Education, 21*(2), 171–184.

Groves, T. (2015). A foreign model of teacher education and its local appropriation: The English teachers' centers in Spain. *History of Education, 44*(3), 355–370.

Guskey, T. R. (2003). What makes professional development effective? *Phi Delta Kappan, (84)*10, 748–50.

Guskey, T. R., & Yoon, K. S. (2009). What works in professional development? *Phi Delta Kappan, (90)*7, 495–500.

Gürsoy, E. (2013). What is effective in forming our beliefs: Experience or education? *Procedia - Social and Behavioral Sciences 70*, 763 – 770.

Hamid, O. (2010). Globalization, English for everyone and English teacher capacity: Language policy discourses and realities in Bangladesh. *Current Issues in Language Planning, 11*(4), 289–310.

Hayes, D. (1995). In-service teacher development: Some basic principles. *ELT Journal, 49(*3), 252–61.

Hayes, D. (2000). Cascade training and teachers' professional development. *ELT Journal, 54*(2), 135–45.

Hoş, R., & Topal, H. (2013). The current status of English as a foreign language teachers' professional development in Turkey: A systematic review of literature. *Anthropologist, 16*(1–2), 293–305.

Hustler, D., McNamara, O., Jarvis, J., Londra, M., & Campbell, A. (2003). Teachers' perceptions of continuing professional development (Department of Education and Skills, Research Report No. 429). Retrieved from http://dera.ioe.ac.uk/4754/1/16385164-58c6-4f97-b85b-2186b83ede8c.pdf

John, P. D., & Gravani, M. N. (2005). Evaluating a 'new' in-service professional development programme in Greece: The experiences of tutors and teachers. *Journal of In-service Education, 31*(1), 105–130.

Joyce, B. R., & Showers, B. (1980). Improving in-service training. *Educational leadership, 37*(5), 379–385.

Karagiorgi, Y., & Symeou, L. (2007). Teachers' in-service training needs in Cyprus. *European Journal of Teacher Education, 30*(2), 175-194.

Kennedy, M. (2016). How does professional development improve teaching? *Review of Educational Research, 86*(4), 945–80.

Koç, E. M. (2016). A general investigation of the in-service training of English language teachers at elementary schools in Turkey. *International Electronic Journal of Elementary Education, 8*(3), 455–466. Retrieved from https://files.eric.ed.gov/fulltext/EJ1096582.pdf

Küçüksüleymanoğlu, R. (2006). In service training of ELT teachers in Turkey between 1998-2005. Uludağ Üniversitesi Eğitim Fakültesi Dergisi, 19(2), 359-369.

NTV. (2019). *MEB'den İngilizce öğretmenlerinin eğitimi için iş birliği.* Retrieved March, 08, 2020, from https://www.ntv.com.tr/egitim/mebden-ingilizce-ogretmenlerinin-egitimi-icin-is-birligi,8v7BzDAz_EeX9Vd1lwBidg

Özen, R. (2006). Perceptions of teachers on improving the quality of Inset programs. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 6*(1), 97-111.

Özer, B. (2004). In-service training of teachers in Turkey at the beginning of the 2000s. *Journal of In-service Education, 30*(1), 89-100.

Öztürk, G., & Aydın, B. (2019). English language teacher education in Turkey: Why do we fail and what policy reforms are needed? *Anadolu Journal of Educational Sciences International, 9*(1), 181-213.

Posnanski, T. J. (2002). Professional development programs for elementary science teachers: An analysis of teacher self-efficacy beliefs and a professional development model. *Journal of Science Teacher Education, (13)*2, 189–220.

Rajabi, P., Kiany, G. R., & Maftoon, P. (2012). ESP in-service teacher training programs: Do they change Iranian teachers' beliefs, classroom practices and students' achievements? *Ibérica, 24*, 261-282.

Richards, J. C., & Farrell, T. S. C. (2005). *Professional development for language teachers.* New York, NY: Cambridge University Press.

Roberts, J. (2008). *Language teacher education.* London: Routledge.

Saiti, A., & Saitis, C. (2006). In-service training for teachers who work in full-day schools – evidence from Greece. *European Journal of Teacher Education, 29*(4), 455–470.

Sandholtz, J. H. (2002). In-service training or professional development: contrasting opportunities in a school /university partnership. *Teaching and Teacher Education, 18*(7), 815–830.

Sokel, F. (2019). The effectiveness of a professional development course: teachers' perceptions. *ELT Journal, 73(*4), 409–418.

Şahin, I., & Yıldırım, I. (2016). Transforming professional learning into practice. *ELT Journal, (70)*3, 241–52.

Şentuna, E. (2002). *The interests of EFL instructors in Turkey regarding INSET content*. (Unpublished doctoral dissertation). Bilkent University, Ankara, Turkey.

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Boston, MA: Pearson Education.

Uysal, H. H. (2012). Evaluation of an in-service training program for primary-school language teachers in Turkey. *Australian Journal of Teacher Education, 37*(7). Retrieved from http://ro.ecu.edu.au/ajte/vol37/iss7/2

Uztosun, M. S. (2018). In-service teacher education in Turkey: English language teachers' perspectives. *Professional Development in Education, 44*(4), 557-569, Doi: 10.1080/19415257.2017.1374989

Vukelich, C., & Wrenn, L. C. (1999). Quality professional development: What do we think we know? *Childhood Education, 75*(3), 153-160.

Yan, C. (2005). INSET participation and certification: A case study from China. *Journal of In-Service Education, 31*(3), 471-484.

Yan, C., & He, C. (2015). Short courses shouldn't be short-lived!' Enhancing longer-term impact of short English as a foreign language INSET initiative in China. *Professional Development in Education, 41*(5), 759-776.

Yurdugül, H. (2005, September). *Ölçek geliştirme çalışmalarında kapsam geçerliği için kapsam geçerlik indekslerinin kullanılması.* Paper presented at the 14th National Conference on Educational Sciences, Pamukkale University Faculty of Education, Denizli, Turkey. Retrieved from http://yunus.hacettepe.edu.tr/~yurdugul/3/indir/PamukkaleBildiri.pdf

İnce Aka, E., & Taşar, M. F. (2020). Prospective science teachers' views on career planning and their self-efficacy levels for career decision-making. *International Online Journal of Education and Teaching (IOJET)*, *7*(3). 960-975. https://iojet.org/index.php/IOJET/article/view/947

Received: 01.06.2020
Received in revised form: 10.06.2020
Accepted: 20.06.2020

PROSPECTIVE SCIENCE TEACHERS' VIEWS ON CAREER PLANNING AND THEIR SELF-EFFICACY LEVELS FOR CAREER DECISION-MAKING

Research article

Elvan İnce Aka

Gazi University

elvanince@gazi.edu.tr

Mehmet Fatih Taşar

Gazi University

mftasar@gazi.edu.tr

Elvan İnce Aka is working as a research assistant in Department of Secondary Science and Mathematics Education at Gazi University. He is interested in studies related career planning and teacher education.

Professor Mehmet Fatih Taşar is in the Department of Secondary Science and Mathematics Education at Gazi University. His research interest includes Physics Education, misconceptions and conceptual change, history and nature of Science.

PROSPECTIVE SCIENCE TEACHERS' VIEWS ON CAREER PLANNING AND THEIR SELF-EFFICACY LEVELS FOR CAREER DECISION-MAKING

Elvan İnce Aka
elvanince@gazi.edu.tr

Mehmet Fatih Taşar
mftasar@gazi.edu.tr

Abstract

The aim of this survey study was to determine prospective science teachers' competency levels in making career decisions and to determine their views on career planning. The participants were 88 prospective middle school science teachers enrolled at the Science Teaching Program of a state university during the spring 2018. The data were collected through the Career Decision-Making Self-Efficacy Scale (CDSS) (Ulaş & Yıldırım, 2016) and open-ended, written extended response questions prepared by the researcher. The findings revealed that for career decision-making, the participants had high efficacy levels; they were predominantly doing their own career planning; and that they were influenced by their family members' views. They envisioned career planning as a long-term process starting at birth and encompassing the whole school and professional lives. The majority thought that their career decisions affected every aspect of their lives.

Keywords: social cognitive career theory; career planning; career decision self-efficacy; prospective science teachers

1. Introduction

In Turkey, vocational decisions are taken either after graduating from high school or obtaining a university degree if an individual pursues a career depending on education (Kırdök & Harman, 2018, p.243). In order to be able to have a job as a teacher at state schools, one must have a related degree from a university and obtain a qualifying score from what is called 'The Public Personnel Selection Examination' as senior university students. The significance of this exam is that there is no other certification method that evaluates teacher candidates according to their interest in and competencies for teaching. However, at this period, teacher candidates make decisions and plans for their careers, since it coincides with the "exploration stage" as defined by Super in his theory of career development for ages between 14-25 (Super, 1953 and Super, 1957 as cited in Salomone, 1996).

Super (1957) developed the life-span, life-space theory and named his career stages as growth, exploration, establishment, maintenance, and disengagement. For Super (1990) career development is a lifelong process. However, for (Ginzberg, Ginsberg, Axelrad, & Herma, 1951) it ends in young adulthood (Super, 1957 and Ginzberg et al., 1951 as cited in Eryılmaz & Mutlu, 2017).

An individual's career decision-making competency influences her/his career decisions and ultimately career development process and career selection (Ulaş & Yıldırım, 2016). On top of

these, several researchers suggest that senior university students need to be considered by taking into account specific features of the period they are in and by studies about that period can reveal important findings (Lent, Hackett, & Brown, 1999; Luzzo, 1991).

A Career Decision-Making Self-Efficacy (CDMSE) Scale (Taylor & Betz, 1983) and its short form (Betz, Klein, & Taylor, 1996) were developed in order to measure university students' career decision-making self-efficacies. However, due to controversies regarding its factor structure Ulaş and Yıldırım (2016) developed the 'Career Decision-Making Self-Efficacy Scale' (CDSS) with five factors: "occupational information", "self-appraisal", "goal selection", "planning", "problem solving". These areas were originally based on Crites' career maturity theory (Lo Presiti et. al., 2012)

Our choice of using CDSS for the current study is based on its cultural sensitiveness in Turkey and the five factors given above. The significance of the current study is that there exist only a few studies conducted on prospective teachers' career decision-making self-efficacies, although, as suggested by the literature, it may have an impact on making career plans, evaluating job offers, preparing themselves for the job market, exploring career opportunities, etc. (Ulaş & Yıldırım, 2016). Besides, career self-efficacy is critical for successful job performance, and regardless of knowledge and skill, it can greatly influence work behaviours (Nasta, 2007, p.6). Individuals with high self-efficacy in career decisions making reflect higher confidence when they need to choose an appropriate career path for themselves (Ogutu, Odera, & Maragia, 2017).

A literature review by Gallo (2017, p.12) reveals two findings: i) career decision-making is not a single step action, but rather a complex and multi-faceted series of experiences that involves exploration and refining understanding of the world of work. ii) as opposed to career decision-making difficulty, self-efficacy can lead to career decisiveness.

Social Cognitive Career Theory (SSCT) was developed by Lent, Brown and Hacket (1994) and is based on Bandura's Social Cognitive Theory. Self-efficacy, outcome expectations and goals are the cornerstones of SCCT and Bandura defines self-efficacy as the belief of individuals in their ability to successfully complete the tasks required to reach a conclusion (Lent, Brown, & Hackett, 2002). Bandura's social cognitive career theory emphasizes the role of self-efficacy and outcome expectations in setting career-related goals (Dickinson, Abrams, & Tokar, 2017). Self-efficacy is one of the variables of SCCT (Segal, Schoenfeld, & Borgia, 2002) and regarded "as the bridge between adaptability and optimism" (McLennan, McIlveen, & Perera, 2017). SSCT has been researched extensively from various points of view. Recently researchers examined the issues of prospective teachers' career planning (Ertem, Engin Demir, & Gökalp, 2017), career decision-makings (Eryılmaz & Kara, 2018), strategies to deal with career indecisions (Mutlu, Owen, Korkut, Özdemir & Kılıç-Ulaş, 2019), career adaptations (Erus & Zeren, 2017), and attitudes toward their profession (Tezcan, & Genç, 2015). However, to the best of our knowledge of the current literature, prospective science teachers' views and self-efficacy levels about career planning still remains to be investigated.

Self-efficacy is considered as one of the remarkable concepts in the career literature (Chen, 1998) and since it is an important variable in individuals' career decisions (Ulaş & Yıldırım, 2019), self-efficacy of making career decisions as a variable is discussed in the current study. Betz and Voyten (1997) also stressed the important role self-efficacy plays in determining career decision-making intentions and behaviours. In addition, since recruitment and employment of newly graduated teacher candidates constitutes a big problem in Turkey, determining prospective teachers' career decision making self-efficacies and views regarding career planning becomes a necessity beyond being a pure research topic. Therefore, it is important to determine the state of affairs concerning prospective science teachers' career

decisions and to investigate their views on career planning in order to find out existing deficiencies in the field. More importantly, revealing prospective teachers' career decision-making self-efficacies, especially in the last year of their university education, may enable them to become aware of their qualifications and competencies. In this respect, the present study offers important insights for initial teacher education and provides useful guidance for future research and teacher preparation programs.

2. Method

2.1. Research aims and questions

Within the framework of the social cognitive career theory, we aimed to determine self-efficacy levels of prospective science teachers in a public university's faculty of education. Hence, we sought answers to the following research questions:

- How are the levels of proficiency in terms of decision making towards career decisions determined among prospective science teachers?
- What are the views of prospective science teachers about career planning?

2.2. Participants

This study was conducted with 88 prospective science teachers enrolled in the science education program of a state university in the fall semester of 2017-2018 academic year. A criterion sampling method was employed in order to determine the study group. Criterion sampling requires examining all cases fitting to a predetermined criterion in order to be able to reach information rich cases (Patton, 2002, p. 238). The criterion for selecting the sample for the current study was having taken the course entitled 'Career Planning in Science Education.' This criterion is both meaningful and necessary, since the participants are senior year students and hence they are in the process of evaluating the career alternatives in front of them.

2.3. Research design

Since the purpose in this study is to find out the career decision-making self-efficacy levels of prospective science teachers, a descriptive survey model has been employed. Such models are intended to reveal the particular features of a group in accordance with the actual situation (Karasar, 2000). Fraenkel, Wallen, & Hyun (2012) describe the general screening study as an information gathering process conducted by asking questions to the selected sample at a certain period of time to reveal the characteristics of a predetermined universe. Within the scope of this model, 20 prospective teachers who were enrolled in the "Career Planning in Science Teaching" course responded to the career decision-making scale developed by Ulaş and Yıldırım (2016). They were also asked to answer 4 open-ended questions prepared by the researcher. Since this study focuses on descriptive aspects rather than testing the effectiveness of the "career planning in science teaching" course, the data collection instruments were given at the beginning of the semester. The first author created the content of the course by considering available resource books on the subject (e.g. Niles & Bowlsbey, 2013 and Yesilyaprak, 2016). The course schedule is given in Table 1.

Table 1. *The course schedule*

Week	The "Career Planning in Science Teaching" Course Topics
1. Week	What is a career? What is career planning?
2. Week	What is career developing?
3. Week	The administrative structures of universities and Ministry of National Education
4. Week	Methods for preparing a CV, a cover letter and a letter for thanking.

5. Week	Qualifications required for graduates in the private sector
6. Week	Introducing job opportunities in other fields
7. Week	Introducing graduate education, graduate research fields and the faculty member raising programs
8. Week	Investigations and researches in national and international fields
9. Week	Investigations and researches in national and international fields (continued)
10. Week	How to interview effectively?
11. Week	Learning about the most successful individuals in our profession and their success stories
12. Week	The ethical rules of the profession
13. Week	The ethical rules of the profession (continued)
14. Week	Performance and time management

2.4. Instrument

2.4.1. Career Decision-Making Self-Efficacy Scale (CDSS)

Career Decision-Making Self -Efficacy Scale developed by Ulaş and Yıldırım (2016) was used in this study as the data collection instrument. With this scale, it is aimed to measure the level of university students' ability to make career decisions and in other words, at which level they believe that they can successfully complete the tasks required to make a career decision. The scale is comprised of 45 items and five sub-scales which measure job/occupation knowledge, self-knowledge, career choice, forming a career plan, following vocational subjects. The scale is five-graded (I am quite sufficient = 5, I am sufficient = 4, I am Partially Adequate = 3, I am not Sufficient = 2, I am not Sufficient at all = 1), and individuals respond by selecting the appropriate degree corresponding the items. The total score which can be obtained from CDSS varies between 45 and 225; the total score which can be obtained from job/occupation knowledge is in between 11 and 55, 10 and 50 for self-knowledge, 6 and 30 for career choice, 14 and 70 for forming a career plan, 4 and 20 for following vocational subjects which respect to occupational issues. The high score obtained from the scale shows that university students are proficient in their career decision making levels and therefore they see themselves competent in making career decisions by themselves.

2.4.1.1. The Administration Procedure of CDSS

Before the administration, prospective teachers were informed about the purpose of the research. It was confirmed that the information received from the participants would be kept confidential and course grades would not be effected, and that the participation was on a voluntary bases. A suitable class environment was preferred to enable participants to respond the questions easily. Administration of the scale took about 20-25 minutes.

2.4.2. Open-ended questions

In the qualitative dimension of the study, a questionnaire consisting of four open-ended questions was applied in order to determine the participants' thoughts about their career planning. During the preparation of the survey questions, literature review was conducted, and a draft form was prepared based on the discussions. The draft form was examined and finalized by a different researcher who is specialized in the field of science education. The open-ended questions are as follows:

- Who planned your career?
- When does career planning start?

- How long does career planning take?
- What aspects of your life were affected by your career decisions?

2.5. Data analysis

In the study, the scale was scored as strongly agree=5, agree=4, indecisive=3, disagree=2, strongly disagree=1. There are no reverse-scored items in the CDSS. We analyzed the data by using SPSS 18.0. The descriptive statistics values (i.e. minimum, maximum, arithmetic mean, and standard deviation) of the scale and the sub-scales are calculated. In the qualitative dimension of the research, we used a descriptive analysis technique by first summarizing the data and subsequently interpreting according to previously determined themes. Qualitative findings can be expressed by using quantitative expressions to clarify the analysis and to increase reliability (Chi, 1997, Yıldırım & Şimşek, 2008, p. 242). Coded names were assigned to each participant as P.T. 1, P.T. 2, ... P.T. 20 in the analysis for anonymity purposes.

3. Results and discussion

3.1. Findings obtained from the analysis of quantitative data

The scores obtained from CDSS applied for determination of prospective science teachers' career decisions were calculated based on arithmetic means and standard deviation values in correspondence with the scale in general and with the sub-scales. Besides, since sub-scales do not have equal number of items, their average values were calculated separately. Tekin (1993) previously put self-efficacy levels into intervals as follows: "1.00–1.80: Very low", "1.81–2.60: Low", "2.61– 3.40: Medium", "3.41–4.20: High", "4.21–5.00: Very high". These intervals are used in Table 2 for the categorization of arithmetic means to determine participants' levels of making career decisions.

Table 2. *Descriptive data regarding prospective teachers' career decision-making self-efficacy scale and sub-scale divisions*

Sub-Scale Divisions	*N*	Minimum	Maximum	*X*	*SD*
Job/occupation knowledge	88	2	5	3.67	.618
Self-knowledge	88	2	5	4.03	.590
Career choice	88	2	5	3.78	.596
Forming a career plan	88	1	5	3.55	.762
Following vocational subjects	88	2	5	4.00	.556
Scale-Wide	88	1	5	3.81	.522

Table 2 shows that pre-service teachers have the highest mean score (X=4.03) in the self-knowledge dimension and the lowest mean score (X=3.55) in the ways of forming a career plan. In general, participants' mean scores for the sub-scale divisions are found to be high. Likewise, their scores for 'self-knowledge' (X=4.03) and 'following vocational subjects' (X=4.00) were higher and followed by 'career choice' (X=3.78) and 'job/occupation knowledge' (X=3.67).

3.2. Findings obtained from the analysis of qualitative data

Participants' views about career planning (the second research question) were obtained according to their answers to open-ended questions given above. Below we present 4 tables in order to display participants' views for each open-ended question.

3.2.1. Person planning the career

Participants' responses to the question "who planned your career?" are analyzed and grouped into 3 categories (see Table 3) by frequency values as follows: myself (f: 12), my family (f: 7) and my tutor (f: 1).

Table 3. *Prospective teachers' responses to the open-ended question "Who planned your career?"*

Theme	Categories	*f*	%	Examples of Prospective Teacher Statements
Who planned your career?	Myself	12	60	P.T-2: The person plans it by herself/himself. In this process, the person is influenced by the views of her/his family members and close friends. P.T-4: The person makes a plan and aims at that objective. P.T-5: The person should plan this on her/his own. Because the person is responsible for her/his own life. P.T-6: I planned it myself. I have always wanted to be a teacher. P.T-8: I decided but I got into this department in accordance with my university admission exam score. P.T-14: I planned my career. However, in the planning process, the schools I studied, the things that I experienced at that time, the people I met, and my family had influenced me. P.T-15: Although I am the main factor in this planning process, family, environment, and friends are also effective. P.T-17: We have to plan this by ourselves.
	Family member	7	35	P.T-3: My parents planned it. P.T-19: I plan my career according to my family. P.T-11: According to the results of the exam, I planned it with my family by making the appropriate university selection. P.T-7: My brother and I. P.T-10: I got support from my sister in planning my career. Because I trusted her experience and knowledge as she was working in this profession.
	My tutor	1	5	P.T-1: According to my score I received [from the university entrance examination], I planned it with my private tutor.

3.2.2. Beginning to plan the career

Participants' responses to the question "'"when does career planning start?" are analyzed and grouped into 4 categories (see Table 4) by frequency values as follows: school (f: 7), at birth (f: 6), occupation (f: 4) and 3-6 ages (f: 3).

Table 4. *Prospective teachers' responses to the open-ended question "When does career planning start?"*

Theme	Categories	*f*	%	Examples of Prospective Teacher Statements
When does career planning start?	At birth	8	40	P.T-5: It starts when the person is born. P.T-7: It starts after the Birth of the individual.
	School	6	30	P.T-1: It starts from secondary school. P.T-6: It starts when we start to go to school. P.T-11: It starts with the school life. P.T-12: It starts at high school. Because those are the years that we shape our future. P.T-18: In high school, with the mathematic-science, verbal and equal weighted sections, vocational consciousness begins to form. P.T-15: I think it's during secondary school. Because the professional aptitude is shaped in that period.
	Occupation	4	20	P.T-10: It starts after you have a job. P.T-14: After I knew the professions, I had choices. P.T-19: It starts when you have to get a job.
	3-6 ages	3	15	P.T-8: The basis of this process is laid in kindergarten. P.T-9: It starts from the first childhood stage.

3.2.3. Elapsing time for career decision-making

Participants' responses to the question "how long does career planning take?" are analyzed and grouped into 3 categories (see Table 5) by frequency values as follows: lifelong (f: 13), throughout the career (f: 4), as long as interest, desire, and expectation continue (f: 3).

Table 5. *The views of the prospective teachers regarding the theme "How long does career planning take?"*

Theme	Categories	*f*	%	Examples of Prospective Teacher Statements
How long does career planning take?	Lifelong	13	65	P.T-2: Career planning is a process that continues from birth to death. P.T-13: As an individual is constantly improving herself/himself, her/his career can change according to the plan and career planning ends when the person is dead. P.T-9: It starts in childhood and continues throughout life. P.T-1: Career planning never ends.
	Throughout the career	4	20	P.T-10: Career planning starts when you have a job and ends when you retire. P.T-18: It covers the period of taking up a career and the subsequent periods.

	As long as interest, desire and expectation continue	3	15	P.T-19: Career planning continues as long as you have enough time and motivation. P.T-6: It ends whenever we want. P.T-7: It ends when the individual has no expectations for life.

3.2.4. Influence of career decisions on life

Participants' responses to the question "what aspects of your life were influenced by your career decisions?" are analyzed and grouped into 5 categories (see Table 6) by frequency values as follows: every aspect (*f*: 11), social circle (*f*: 5), financial and - morale satisfaction (*f*: 4), occupation (*f*: 3), and family (*f*: 2).

Table 6. *Prospective teachers' responses to "What aspects of your life were influenced by your career decisions?"*

Theme	Categories	*f*	%	Examples of Prospective Teacher Statements
What aspects of your life were influenced by your career decisions?	Every aspect	11	55	P.T-3,4,5,12,13,14,17,18,19,20: My career decisions influence every aspect of my life (Social circle, spouse, income status) P.T-2: It influences us in educational, psychological, social, health, and economical areas.
	Social circle	5	25	P.T-10: It is affecting my life socially. Because I can communicate with people.
	Financial and morale Satisfaction	4	20	P.T-1: It has affects in terms of respectability in a community and mood of an individual. P.T-11: It provides material and nonmaterial satisfaction in life.
	Occupation	3	15	P.T-8: It affects how much of my life I will devote to this profession. P.T-16: It affects the self-development of a person related to his / her profession. P.T-1: It influences the position I will be in the future in terms of career.
	Family	2	10	P.T-4: It has effects on family, marriage, spouse selection.

4. Conclusion and Suggestions

In this study, we aimed to determine prospective science teachers' self-efficacy levels of career decision-making. Participants (88 prospective science teachers) responded to CDSS (Ulaş and Yıldırım, 2016) and a questionnaire with four open-ended questions.

Findings revealed that participants, on the average, have had a high level of career decision-making self-efficacy. It is suggested that individuals with higher career decision-making self-efficacy are better able to prepare themselves for their careers and to persist in their career pursuits (Bandura et al., 2001). Likewise, related studies show that students with high levels of career decision-making self-efficacy have low levels of career instability (Taylor & Betz, 1983; Taylor & Popma, 1990) and have high career maturity levels (Lee, 2007). Individuals with high self-efficacy beliefs experience less career instability and make healthy career choices

(Lent & Brown, 2006). Pre-service teachers regard themselves competent the most in the "self-knowledge" dimension. This can be attributed to being aware of their personal qualities. At the very least, they consider themselves competent in the dimension of "creating a career plan." In other words, it can be claimed that teacher candidates feel less competent in carrying out steps to reach their career goals. This suggests that they may need help from a guidance service. A recent study (Yerin Güneri, Owen, Tanrıkulu, Dolunay Cuğ, & Büyükgöze Kavas, 2016) revealed the career development needs of education faculty students' as followings: getting information about the business world, getting support from the university for transition to the business life, getting to know themselves better, creating a career plan, and dealing with stress. Another study (Akoğlan, Kozak, & Dalkıranoğlu, 2013) concluded that university students were not adequately guided in their career decision-making processes. Moreover, university students experience indecision in their career problems, especially regarding their career choices (Yıldız Akyol & Bacanlı, 2019). Research data shows that almost half of the prospective teachers want to continue their postgraduate education after graduation and one third of them want to work in the public sector and one fifth of them in the private sector (Ertem, Engin Demir & Gökalp, 2017). In Turkey, finding a job after graduating from a university continues to be a mounting problem as the unemployment rate among the young population tends to be high for decades. That is also true for education faculty graduates, although hiring new graduates for public schools have been improving since early 2000's. Therefore, the high level of proficiency of these teacher candidates in making career decisions in the current study indicates the importance of making appropriate career decisions for them. In this respect, we assert that prospective teachers with high levels of career decision-making skills will have advantageous employment opportunities upon graduation and make more appropriate decisions regarding their careers. In this framework, career decision-making self-efficacy is viewed as a causal antecedent to making a career decision. Therefore, effective career decision-making, firstly, involves the ability to accurately assess one's own skills and preferences. Students who have never gone through the stages of career decision making will most probably have lower self-efficacy beliefs in career decision-making. Career decision-making self-efficacy levels of university students can be examined by using different variables (e.g. gender, class standing, department, education background) and reasons for students' having specific career decision-making self-efficacy levels can be investigated.

In this research, according to the question "Who planned your career?", it is seen that prospective teachers and their families are predominantly effective in career planning. Individual career planning includes the steps of assessing one's own abilities and interests, examining career opportunities, and planning appropriate activities in line with the career goals (Gürüz & Yaylacı, 2005). In this respect, we can say that it is important for the individual to recognize himself/herself correctly and to become aware of his/her interests and abilities during the career planning stage. On the other hand, in a study conducted by Sağdıç and Demirkaya (2009) on the career planning of university students, it was concluded that students did not have a career plan and that there was a lack of consultants for the career planning. Some studies on the subject show that the family plays an important role in the career development of children (Mickelson & Velasco, 1998; Otto, 2000). There is a need for other individuals in career planning that help the individual to analyze herself/himself (Anafarta, 2001). In the study conducted by Khasawneh (2010), it was concluded that students were affected by their parents during the career planning stage. In the study conducted by Wolfe and Betz (2004), it was seen that the self-efficacy levels regarding the career decision-making of university students were significantly predicted by the family variable. Similarly, Salami (2006) stated in a study that the family was the most determinant factor in career choice, whereas Kniveton (2004) reported that individuals were directly or indirectly influenced by the family in career choices.

According to results of this research, one of the prospective teachers stated that her tutor was effective in this planning. According to the studies conducted by Chope (2005), Dick and Rallis (1991) it was stated that family, teacher and society factors were effective in high school students' career choices. In another study of African American high school students, parental and teacher support were positively related to career decision-making self-efficacy (Gushue & Whitson, 2006). In addition, prospective teachers expressed their views on this issue and stated that profession of an immediate family (e.g. parents and siblings) was effective in career planning. Some studies (Blau 1992; Conroy, 1997) have found a close relationship between father and child profession. In the light of this study, it can be said that the choice that the individual makes by revealing her/his abilities, interests and values enables her/him to create a good career planning process. It can be said that there is a need for education counselors to support prospective teachers in career planning during their undergraduate education.

As a reply to the question "When does career planning start?" the prospective teachers stated that career planning started at birth as well as school life and professional life. The career choice, which is thought to start with the professional life, is actually a process shaped from younger ages (Özdemir & Mazgal, 2012). According to Super (1990) Life-span, Life-space theory, career development is considered as a process starts at the moment the individual is born and ends at the time of death. Career development is a lifelong endeavor that starts in childhood and usually ends in old age after retirement from paid work (Kracke, 2011). Career development takes place over a person's entire life span, but there are specific developmental stages where people need more targeted interventions (Super, 1980). In this respect, we can say that career development is particularly important and effective for senior university students who are in the transition period from school to work.

In this study, prospective science teachers think that career planning lasts for a lifetime in response to the question "How long does career planning take?". Some prospective teachers stated that career planning continues lifelong, namely until the retirement, whereas others stated that career planning will continue as long as their interests, demands and expectations continue. Career life does not end with the decision of retirement. At the time of their professional life, some people decide to start a new career after their retirement (Gökdeniz, 2017). Ginzberg et al. (1951) state that career development ends in young adulthood. Super (1990) argues that career development is a lifelong process. Therefore, career development can be considered as a dynamic and lifelong process. In this study, career development was discussed within the scope of the Professional Development Theory of Ginzberg et al. (1951) and Super's life-span, life-space (Super 1957) theory.

In response to the question "What aspects of your life were influenced by your career decisions?", the majority of the participants stated that their career decisions affected every aspect of their lives. In fact, career development process varies from person to person. Factors such as gender, talent, personality, ethnicity, socio-economic status are important in a person's career development (Patton & McMahon, 2006). Career choices not only provide income for an individual, but also provide an opportunity to get job satisfaction and success, to choose a friend, to have a good social circle and working environment (Bakırcıoğlu, 2005). In a study conducted by Büyükbayraktar et al., the factors affecting the career life are listed as living space, job and career choice, psychological needs, professional opportunities (educational level, material factors, professional benefits), spouse selection, and leisure time/recreational activities (Büyükbayraktar et al. 2018). Personality, environmental factors and contextual supports have been bound to affect the career decision-making self-efficacy of high school students as well as their performance in relation to the career decision-making process (Charokopaki, 2012). The career chosen by the individual affects her/his success and satisfaction in the field of work, the amount of earnings, where she/he lives and her/his hobbies

(Aydemir, 1995). In the transition period from school to work, individuals make decisions in which they can both achieve job satisfaction and success and be happy in their lives. Therefore, we can say that career planning is a factor that covers a significant part of life and affects the quality of life. In addition, the qualitative part of this study was conducted with pre-service teachers who took the course "Career planning in science education". Considering that these candidates better understand the importance of career choice in individual life, it can be asserted that they will be aware of career awareness in their professional life. Therefore, the emphasis of career awareness in the 2013 science curriculum (MEB, 2013) and the '2023 Vision for Education' (MEB, 2018) documents proves the important and necessity of this study conducted with prospective science teachers.

5. Conflict of interests

The authors declare that there is no conflict of interest.

6. Ethics committee approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Akoglan Kozak, M. & Dalkıranoglu, T. (2013). Mezun öğrencilerin kariyer algılamaları: Anadolu Üniversitesi örneği (Graduate students' perceptions of career: The case of Anadolu University). *Anadolu Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 13*(1), 41-52.

Anafarta, N. (2001). Orta düzey yöneticilerin kariyer planlamasına bireysel perspektif (Individual perspective to the career planning of middle level managers). *Akdeniz İ.İ.B.F. Dergisi*, 1-17.

Aydemir, N. (1995). *2000'li yıllara doğru özel imalat sanayiinde insan kaynakları yönetimi ve kariyer arayışları (Human resources management and career seeking in private manufacturing industry towards 2000s)*. İstanbul: Tügiad Yayıncılık.

Bakırcıoğlu, R. (2005). *İlköğretim, ortaöğretim ve yükseköğretimde rehberlik ve psikolojik danışma (Guidance and psychological counseling in primary, secondary, and higher education)*. Ankara: Anı Yayıncılık.

Bandura, A., Barbaranelli, C., Caprara, G.V., & Pastorelli, C. (2001). Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child Development, 72*, 187-206. http://dx.doi.org/10.1111/1467-8624.00273.

Betz, N. E., Klein, K. L., & Taylor, K. M. (1996). Evaluation of a short form of the career decision-making self-efficacy scale. *Journal of Career Assessment, 4*, 47–57.

Betz, N. E., & Voyten, K. K. (1997). Efficacy and outcome expectations influence career exploration and decidedness. *The Career Development Quarterly, 46*(2), 179–189. https://doi.org/10.1002/j.2161-0045.1997.tb01004.x

Blau P. (1992). Mobility and status attainment. *Contemporary Sociology, 21*, 596–598.

Charokopaki, K. A. (2012). *Career decision-making self-efficacy of secondary education students: The role of personality, environmental factors and contextual supports* (Unpublished doctoral dissertation). University of Thessaly, Greece.

Chen, C.P. (1998) Understanding career development: A convergence of perspectives. *Journal of Vocational Education and Training, 50*(3), 437-461. doi: 10.1080/13636829800200053

Chi, M. T. H. (1997). Quantifying qualitative analyses of verbal data: A practical guide. *The Journal of the Learning Sciences, 6*(3), 271-315. doi: 10.1207/s15327809jls0603_1

Chope, R. C. (2005). Qualitatively assessing family influence in career decision making. *Journal of Career Assessment, 13*, 395–414.

Conroy, C. A. (1997, March). Predictors of occupational choice among rural youth: Implications for career education and development programming. Paper presented at the *Annual Meeting of the American Educational Research Association*. Chicago, Illinois.

Dick, T.P., & Rallis, S.F. (1991). Factors and influences on high school students' career choices. *Journal for Research in Mathematics Education, 4*, 281–292.

Dickinson, J., Abrams, M. D., & Tokar, D. M. (2017). An examination of the applicability of social cognitive career theory for African American college students. *Journal of Career Assessment, 25*(1), 75-92.

Ertem, H. Y., Engin-Demir, C., & Gökalp, G. (2017). *Öğretmen adaylarının kariyer planlaması: bir ihtiyaç analizi çalışması (Prospective teachers' career planning: A study*

of needs assessment). 12th International Congress on Educational Administration, Ankara, Turkey.

Erus, S. M., & Zeren, Ş. G. (2017). Öğretmen adaylarının öğretmenlik mesleğine yönelik kariyer uyumları (Preservice teachers' career adaptability towards teaching profession). *Yükseköğretim ve Bilim Dergisi, 7*(3), 657-668. doi: 10.5961/jhes.2017.242

Eryılmaz, A., & Kara, A. (2018). Pre-service teachers' career adaptabilities: It's relationships with career decision making self-efficacy and career barriers. *International Online Journal of Educational Sciences, 10*(2), 235-244.

Eryılmaz, A., & Mutlu, T. (2017). Yaşam boyu gelişim yaklaşımı perspektifinden kariyer gelişimi ve ruh sağlığı (Career development and mental health from the perspective of life-span development approach). *Psikiyatride Güncel Yaklaşımlar-Current Approaches in Psychiatry, 9*(2), 227-249. doi:10.18863/pgy.281802

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education* (8th edition). New York: McGraw-Hill.

Gallo, J. L. (2017). *The effect of an interdisciplinary career exploration course on college students' career decision-making and career decision making self-efficacy* (Unpublished doctoral dissertation). University of Florida Gulf Coast, Fort Myers, Florida.

Ginzberg, E., Ginsberg, S. W., Axelrad, S., & Herma, J. L. (1951). *Occupational choice: An approach to a general theory*. New York, NY: Columbia University Press

Gökdeniz, İ. (2017). Özel sektör ve kamu yönetiminde kariyer planlaması (Career planning in private sector and public administration). *KMÜ Sosyal ve Ekonomik Araştırmalar Dergisi, 19*(32), 123-131.

Gürüz, D., & Yaylacı, Ö. G. (2005). *İletişimci gözüyle insan kaynakları yönetimi (Human resource management from the perspective of communication professional).* İstanbul: MediaCat Yayınları.

Gushue G., V., & Whitson, M. L. (2006) The relationship among support, ethnic identity, career decision self-efficacy, and outcome expectations in African American high school students applying social cognitive career theory. *Journal of Career Development, 33*(2), 112-124.

Karasar, N. (2000). *Bilimsel araştırma yöntemi (Scientific research method)* (10th ed.). Ankara: Nobel Yayıncılık.

Kırdök, O., & Harman, E. (2018). High school students' career decision-making difficulties according to locus of control. *Universal Journal of Educational Research, 6*(2), 242-248. doi: 10.13189/ujer.2018.060205.

Kniveton, B. H. (2004). The influences and motivations on which students base their choice of career. *Journal of Research in Education, 72*, 47–59.

Kracke, B. (2011). Career development. *Encyclopedia of Adolescence, 1,* 97-105, doi:10.1016/B978-0-12-373915-5.00007-3 97

Lee, C. M. (2007). *Career maturity, career decision-making self-efficacy, interdependent self -construal, locus of control and gender role ideology of Chinese adolescents in Hong Kong* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 3460800)

Lent, R. W., & Brown, S. D. (2006). Integrating person and situation perspectives on work satisfaction: A social-cognitive view. *Journal of Vocational Behavior, 69*(2), 236–247. https://doi.org/10.1016/j.jvb.2006.02.006

Lent, R.W., Brown, S.D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45*(1), 79-122.

Lent, R. W., Brown, S. D., & Hackett, G. (2002). *Social cognitive career theory*. In. D. Brown (Ed.). *Career choice and development* (4th ed., pp. 255-311). San Francisco, CA: Jossey-Bass.

Lent, R. W., Hackett, G., & Brown, S. D. (1999). A social cognitive view of school to work transition. *The Career Development Quarterly, 44*, 297-311.

Lo Presiti, A., Pace, F., Mondo, M., Nota, L., Casarubia, P. & Ferrari, L., Betz, N. E. (2012). An examination of the structure of the career decision self-efficacy scale (short form) among Italian high school students. *Journal of Career Assessment, 21*, 337-347. doi:10.1177/1069072712471506

Luzzo, A., D. (1991, April). *Social class and ethnic differences in college students' career maturity: A quantitative and qualitative analysis.* Paper presented at the annual meeting of the American Educational Research Association.

McLennan, B., McIlveen, P., & Perera, H. N. (2017). Pre-service teachers' self-efficacy mediates the relationship between career adaptability and career optimism. *Teaching and Teacher Education, 63*, 176-185.

MEB [MoE (2013)]. *İlköğretim kurumları fen bilimleri dersi 3, 4, 5, 6, 7 ve 8. sınıflar öğretim programı.* Milli Eğitim Bakanlığı Talim ve Terbiye Kurulu Başkanlığı (*Primary education institutions science course 3, 4, 5, 6, 7 and 8th grades curriculum.* Ministry of National Education Board of Education and Discipline), Ankara.

MEB [MoE (2018)]. 2023 Eğitim vizyonu (Educational vision of 2023). Retrieved from: http://2023vizyonu.meb.gov.tr/doc/2023_EGITIM_VIZYONU.pdf

Mickelson, R., & Velasco, A. (1998, April). Mothers and daughters go to work: the relationship of mothers' occupations to daughters' career aspirations. Paper presented at the *Annual Meeting of the American Educational Research Association*, San Diego, CA.

Mutlu, T., Owen K. F., Özdemir, S. & Kılıç, U. Ö. (2019). Öğretmen adaylarının kariyer planları, yaşadıkları kariyer kararsızlıkları ve bununla baş etme stratejileri (Career plans, career indecision and strategies for coping with career indecision among teacher candidates). *Kariyer Psikolojik Danışmanlığı Dergisi, 2*(1), 1-31.

Nasta, K. A. (2007). *Influence of career self-efficacy beliefs on career exploration behaviors* (Unpublished master's thesis). University of New York State, New York, New Paltz.

Niles, S. G., & Bowlsbey, J. H. (2013). *21. yüzyılda kariyer gelişimi müdahaleleri (Career development interventions in the 21st century)*. Ankara: Nobel Akademik Yayıncılık.

Ogutu, J. P., Odera, P., & Maragia, S. N (2017). Self-efficacy as a predictor of career decision making among secondary school students in Busia County Kenya. *Journal of Education and Practice, 8*(11), 20-29.

Otto, L. B. (2000). Youth perspectives on parental career influence. *Journal of Career Development, 27*(2), 111–118.

Özdemir, Y., & Mazgal S. (2012). Bir kariyer tercihi olarak girişimcilikte dışsal faktörlerin etkisi: Sakarya örneği (The impact of external factors in entrepreneurship as a career choice: The case of Sakarya). *Girişimcilik ve Kalkınma Dergisi, 7*(1), 87-102.

Patton, W., & McMahon, M. (2006). *Career development and systems theory: A new relationship* (2nd ed.). Belmont, CA, US: Thomson Brooks/Cole Publishing Co.

Patton. M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Sağdıc, M., & Demirkaya, H. (2009). Üniversite öğrencilerinin kariyer gelişim planlarına ilişkin yaklaşımlar (The approaches of university students about career development stages). *Erciyes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 26*, 233-246.

Salami, S. O. (2006). Influence of culture, family and individual differences on choice of gender-dominated occupations among female students in tertiary institutions. *Gender and Behaviour, 4*(2), 814– 833.

Salomone, P. R. (1996). Tracing Super's theory of vocational development: A 40-year retrospective. *Journal of Career Development, 22*(3), 167-184.

Segal, G. J., Schoenfeld, G. A., & Borgia, D. J. (2002). Social cognitive career theory and self-employment goals. *New England Journal of Entrepreneurship, 5*(2), 47–56.

Super, D. E. (1953). A theory of vocational development. *American Psychologist, 8*, 185-190.

Super, D. E. (1957). *The psychology of careers*. New York: Harper & Bros.

Super, D. E. (1980). A life-span, life-space approach to career development. *Journal of Vocational Behavior*, 16(3), 282-298.

Super, D. E. (1990). *A life-span, life-space approach to career development.* In D. Brown & L. Brooks (Eds.), *Career choice and development: Applying contemporary theories to practice* (2nd ed., pp. 197-261). San Francisco: Jossey-Bass.

Taylor, K. M., & Betz, N. E. (1983). Applications of self-efficacy theory to the understanding and treatment of career indecision. *Journal of Vocational Behavior, 22*(1), 63–81. doi: 10.1016/0001-8791(83)90006-4.

Taylor, K. M., & Popma, J. (1990). An examination of the relationships among career decision making self-efficacy, career salience, locus of control, and vocational indecision. *Journal of Vocational Behavior, 37*, 17-31.

Tekin, H. (1993). *Eğitimde ölçme ve değerlendirme (Assessment and evaluation in education).* Ankara: Yargı Yayınevi.

Tezcan, G., & Genç, S. Z. (2015). İlköğretim öğretmen adaylarının kariyer planları ve öğretmenlik mesleğine yönelik tutumları (Elementary teachers' career plans and attitudes towards teaching profession). *KSBD, Hüseyin Hüsnü Tekışık Özel Sayısı 1*(7), 253-262.

Ulaş, Ö., & Yıldırım, İ. (2016). The development of career decision-making self-efficacy scale. *Turkish Psychological Counseling and Guidance Association, 6*(45), 77-90.

Ulaş, Ö., & Yıldırım, İ. (2019). Influence of locus of control, perceived career barriers, negative affect, and hopelessness on career decision-making self-efficacy among Turkish university students. *International Journal for Educational and Vocational Guidance, 19*, 85–109. doi: 10.1007/s10775-018-9370-9

Wolfe, J. B., & Betz, N. E. (2004). The relationship of attachment variables to career decision making self-efficacy and fear of commitment. *Career Development Quarterly, 52*, 363-369.

Yerin Güneri, O., Owen, D. W., Tanrıkulu, İ., Dolunay Cuğ, F., & Büyükgöze Kavas, A. (2016). Eğitim fakültesi öğrencilerinin kariyer gelişimi ihtiyaçlarının incelenmesi (Examining career development needs of faculty of education students). *Eğitimde Kuram ve Uygulama -Journal of Theory and Practice in Education, 12*(1), 178-193.

Yesilyaprak, B. (2016). *Mesleki rehberlik ve kariyer danışmanlığı: Kuramdan uygulamaya (Vocational guidance and career counseling: From theory to practice)* (6th ed.). Ankara: Pegem Akedemi.

Yıldırım, A., & Şimşek, H. (2008). *Sosyal bilimlerde nitel araştırma yöntemleri (Qualitative research methods in social sciences)* (6th ed.). Ankara: Seçkin Yayıncılık.

Yıldız Akyol, E., & Bacanlı, F. (2019). Building a solution-focused career counselling strategy for career indecision. *Australian Journal of Career Development, 28*(1), 73-79. doi: 10.1177/1038416218779623

Al Khazaleh, S. (2020). A content analysis of the authenticity of the reading texts in the seventh grade EFL book in Jordan. *International Online Journal of Education and Teaching (IOJET), 7*(3). 977-990. https://iojet.org/index.php/IOJET/article/view/872

Received: 20.04.2020
Received in revised form: 24.05.2020
Accepted: 26.05.2020

A CONTENT ANALYSIS OF THE AUTHENTICITY OF THE READING TEXTS IN THE SEVENTH GRADE EFL BOOK IN JORDAN

Research Article

Saqr Al Khazaleh

Yarmouk University

2019230070@ses.yu.edu.jo

Saqr Al Khazaleh is currently PhD student at Yarmouk University/Jordan in Curriculum and instruction/English language major. He is an English language teacher at Ministry of Education. His main interests are teaching English language and decision-making.

A CONTENT ANALYSIS OF THE AUTHENTICITY OF THE READING TEXTS IN THE SEVENTH GRADE EFL BOOK IN JORDAN

Saqr Al Khazaleh

2019230070@ses.yu.edu.jo

Abstract

Based on the specific reading outcomes under the Reading Section in the General Guidelines and General and Specific Outcomes of the English Language Teaching Objectives in Jordan in 2006, the present study aimed at analyzing the reading texts of the student's book in Action Pack Seven to determine to what extent the reading texts were authentic. Non-parametric statistical analyses of frequency and percentage were used to present the results of the study. The findings of the analyses revealed that the reading texts of the student's book in Action Pack 7 had a high degree of authenticity. There was a strong match between reading specific outcomes and the authenticity of the reading texts in Action Pack 7. The findings of the analyses also revealed that the reading texts of Action Pack 7 had a high degree of authenticity, in that, 18 (86%) reading texts out of 21 were found to be authentic.

Keywords: General and specific outcomes, Action Pack, reading texts, authenticity.

1. Introduction

In Jordan, one of the basic as well as compulsory school subjects is the English language curriculum. Education development conferences were held and the consequent recommendations lead to the formation of the Action Pack. This book is still used in the schools of Jordan from grade one to twelve. Guidelines were put forward by the Jordanian Ministry of Education (2006) which stressed upon the importance of foreign language education for the students of Jordan. They believed it developed the student's skills with reference to culture, cognitive, social and psychomotor.

The aspects mentioned below are part of the guideline (2006).

1. Competencies related to knowledge economy were stressed upon – Knowledge economy is that type of economy whereby Students are to be educated in a manner that they become innovative thinkers and are able to analyze as well as communicate information and their work to the others, thus establishing a wholesome knowledge-intensive environment at large.
2. Students develop a new role – Students should be extended opportunities so they may attain their goals through their own path.
3. Teachers develop a new role – through this new role, the teachers engage the students in effective learning and communicating through appropriate consideration towards individual learning requirements.
4. Various instructional strategies – To make sure all students have attained their learning objectives; relevant instructional be strategies are to be selected.
5. The tools and strategies for assessment should be continuously updated (Ministry of Education, 2006)

6. Combining both information and communications technologies: it must be ensured that student learning is enhanced through the employment of proper technology.

There are four organizers created to sort the English language results and these are related to the language skills. They are listening, speaking, reading and writing. The teaching of foreign language is no more restricted to language components, which are vocabulary, pronunciation and grammar and is now focus on the proficiency towards communication and four integrative skills, which are reading, writing, speaking, and listening. Language testing has now altered from discrete point tests to actual performance measurements (Bachman, 2001). In TEFL, reading is considered to be one of the essential skills and to make sure this skill is developed appropriately, it is necessary to have expertise of other language skills, like writing, speaking and listening besides literature appreciation. According to Al Regeb (2009) and Al Khawaldeh (2011), knowledge of the readers, general and specific, is enhanced with reading. Moreover, vocabulary is established and communication with others is possible further enhancing the language skills. For students of EFL, one of the essential skills is reading (Al khrisheh (2008)) since it builds upon knowledge, development and learning. When a student reads, he drifts off into far away lands and gains knowledge regarding the world using websites and electronic journals.

The Jordanian Ministry of Education (2006:53) suggests that reading allows students to assess as well as respond to the English that is written within the context of authentic information and literature. Additionally, the textbook contents which are being read should be associated with subjects that are related to the daily life of the students and must be authentic in reality. This information should also be in accordance with the needs of the knowledge explosion era and communication era. The learning environment must promote authentic texts (Nunan (1991)). Omaggio (2001) suggests that students should be granted opportunities to make use of language in various contexts that the students are likely to face within the target culture. Furthermore, authentic language must be applied during instructions where or when it is possible (p.90).

For the process of teaching and learning in EFL, the text books and general curriculum books need to be analyzed. The supervisor is able to assess the strengths and weaknesses present within the textbook and to determine its appropriateness for the course at large. This analysis allows making optimum use of the strengths and replacing or modifying the weak points through the use of other books (Cunningsworth, 1995). In Jordan, the English language educators are careful regarding the texts that are read by the students. They usually engage those texts which are related to their current life and environment. It is necessary to promote the cultural aspects through various methods so that students are able to survive in accordance with the target-language community. Hence, in the current research, analysis is carried out upon the authentic foreign language texts and materials which should be included within the eleventh grade Action Pack content. This implies that the English textbooks content analysis is essential since the authenticity needs to be confirmed. The researcher as the sample for Jordanian public schools English textbooks has selected the Seventh-grade Action Pack.

1.1. Purpose and Question of Study

The objective of the current research was to assess the authenticity aspect of the reading texts in the course book Action Pack 7 Student's Book, which is used in the EFL classes in Jordan. Therefore, the research question of the study was "Are the Action Pack Seven reading texts authentic?"

1.2. Background of Study

1.2.1. English language curricula in Jordan

According to the General Guidelines and General Specific Outcomes, the Action Pack is used in Jordan as an English course material for the students of basic and secondary level. It states that teaching of the English language should be interactive in nature and assessment should be done using the communicative language teaching basic principles (Ministry of Education 2006, p.9). The Jordanian Ministry of Education presented English Curricula Outcomes where the Action Pack materials integrated activities and tasks which would help develop skills for students and teachers. Hence, for every module, the outcomes are based on the teacher and learner interaction along with skill integrity.

In Jordan, the students are required to complete a twelve-level course as part of the Action Pack series. It allows students to learn language through a course that guides them from the elementary level to secondary level. Developed and modern language teaching procedures are used. The functional language practice and topic-based approach are integrated and special focus is maintained upon the overall skills, vocabulary and grammar.

The learners can now learn grammar through a systematic procedure and practice. If specific focus is maintained upon reading, writing and critical thinking skill development, it is possible to achieve effective integrated skills. The contents of the Action Pack include various international subjects that cover the educational updated requirements of the Jordanian students.

There are six modules within the student books. Each of the modules is focused upon a specific theme that develops gradually. There is a two-page beginner for each module which offers insight into the subject matter of the module by showing some images from within the module. The beginner also states the potential outcomes, which are expected from the students after studying that particular module. For the students, having knowledge beforehand regarding what is to be learnt in the particular module helps them prepare for the detailed learning process.

There are three modules, which come after the revision modules. Six headings including grammar, vocabulary, listening, reading, writing and speaking are also present. Various exercises are present under each of these six headings. For each module, there are one or two boxes of ‘Four Language Skills Strategies’. It helps students prepare themselves for writing, listening, speaking and reading tasks. There is a yellow task box which emerges above each writing exercise that asks student what they would do next. The students are given the chance to involve in a project to apply their learnt skills.

A ‘Skills focus’ is present in some modules. The four skills -reading, listening, speaking and writing- are the centre of this section, emphasizing practice and production of language. This section provides plenty of opportunities for students to develop critical-thinking skills and express their opinions.

A blue 'Quote' box is present in majority of the modules. The quote box includes a short quotation from a subject expert or notorious writer. A stimulating idea, stated in a few words, is present within the quote. It is like a comment upon the subject. A project is present at the end of each module. Through this project, the students are able practice the English language within a slightly in-formal context and establish cooperation and association amongst themselves. Some groundwork such as Research or preparation may be required in this context.

Hence, for the curriculum, a textbook is quite essential. It is used as a resource by students and teachers in most of the schools since it allows them to extract knowledge, information,

guidance and structure regarding the topic. Textbooks offer cultural strategies, listening comprehensions, speaking, writing, reading, vocabulary and other communicative activities which help the teachers and learners.

Textbooks are viewed as resource books by Allwright (1990) since they contain activities and ideas. They are not considered to be instructional materials specifically. The course books usually meet student requirements; however, they are not created to only cater to the students or a specific group. The teachers can also benefit from these (O'Neill, 1990). English Textbooks must contain the following qualities to be regarded as effective (Romero, 1975).

1. A series of courses for language learning must be issued as it ensures lower cost per unit for students and when they progress from one unit to another, they feel a sense of achievement.
2. The look of the textbooks must be appealing. It is important to keep the size of the fonts small and each page must hold limited amount of content. Each lesson must be of precise size to prevent confusion and boredom. Moreover, it must be well-organized.
3. Students who use the books should find the contents interesting to read.
4. The exercise included must be concise and short.
5. The dialogues should remain short and to the point.
6. The objectives of the textbook should be practicable (p.63).

1.2.2. Content analysis

Substance investigation is the strategy that falls in the boundaries of social sciences, which explores the ‘content’ of communication. The sources, authenticity, or definition are closely investigated in this smart technique. The main questions of substance investigation suggested by Lasswell (cited in Krippendorff, 1980) involve study of reference to context determining "Who says what, to whom, why, to what degree and with what effect?"

The substance investigation can be a clear, concise method used for summarizing the content into substance groups that are based on unbiased coding rules as suggested by Berelson (1952). It allows making few deductions in order to use other techniques of data transmission correctly.

Palmquist (1990) laid emphasis on the fact that content analysis is a technique that allows concentrating on the internal features of media and on the original content. This tool is used to identify the existence of particular words, ideas, themes, statements, characters, sentences within preset texts or groups of texts and then it measures this presence accurately. Texts are widely explained as being something that communicates with the other person like: books, book topics, essays, discussions, newspaper headlines and articles, historical documents, speeches, dialogues, advertising, plays, casual chats. In order to analyze the content of texts the text is divided into subgroups which can be on various basis like: word, expression, verdict or topic followed by the analysis using any of the methods of content analysis, which are conceptual or relational analysis. Then, the outcomes are used to interpret messages in the texts, to interpret info about authors, audience and also, about the traditions and time at which these took place. Content Analysis has many benefits that are suggested by Palmquist (1990) as mentioned below:

- It is able to understand the main aspect of social contact as it directly focuses on the communication through theories and books.
- Allows both objective and subjective actions.

- It can help to gain historical/cultural experience through the exploration of the transcripts.
- It can be used to decode the writings for the reasons like advancement of major mindsets (as the statements and verdicts can be coded in terms of clear explanation of concepts).
- It is a smart means of intelligence analysis.
- It explains complicated models of human psychology and language clearly.
- It is considered as the right strategy for investigation if it is executed accurately [Contrary to Discourse Analysis (p: 3), this strategy is dependent upon facts].

For the use of content analysis, three kinds of deductions have to be made. Firstly, it must be considered that who is investigated for the deductions in the previous messages and the reason of these deductions. Secondly, it must be considered that what is the message, what the mode of communication is and who the receiver to understand the features of conversation is. Lastly, a conclusion is derived through the use of communication results considering the influence of communication as presented by Hostli (1969).

As per Krippendorff (1980, p.51), content analysis involves the use of methods that are stimulated from symbolic information and that are cost-effective , convenient and more outstanding as compared to other techniques. This procedure can be precious as it allows finding out the main individual, firm or society (Weber, 1990). The content investigation will not only be limited to content's capacity and permit for copy but the technique is also connected with valuable information.

Following six questions must be answered in each content analysis as pointed out by Krippendorff (1980):

1. Which data is going to be examined?
2. How will they be identified?
3. What population is the sample taken from?
4. What is the perspective of data under analysis?
5. What are the limitations of the analysis?
6. What is the main aim of interpretations?

2. Literature Review

Some examples of theories regarding content analysis are used as research tools in literature review.

Modern Living English for Jordan is analyzed on the basis of needs, repetition, availability, potential and operations of students by Said (1985). He realized that the elementary books of these theories only deal with a few identifiable point zones where students can make use of English language. This majorly focuses on structure rather than vocabulary.

2216 children's books were chosen by Grauerholz and Pescosolido (1989) from kids' catalogue that had a wide range of topics and it used to aid librarians gathering a collection books. The analysts thought to categorize collection on the basis of gender or age of main character (for example adult, child, and creature), gender of the author. Followed by this they calculated ratio (male is to female) that helped to know the number of books having particular

gender as main or secondary character. It was concluded that there was unequal representation of both genders.

English lexicon of reading is explored by Ljung (1989), it is the evidence gathered in Swedish upper supplementary schools to determine the relationship between the lexicon of the reading data and cutting edge in routine English. Ljung examined 56 books to know the difficulty level in lexicon between grades focusing on the conveyance of lexicon in reading data. The process starts from choosing writings from two Exercise center corpuses and then these are compared to the COBUILD corpus which offers largest mechanized English content. The outcome showed a different lexicon profile in Exercise center writings from those usually found in English content, as given by COBUILD theories.

To know whether the vocabulary items concur with the vocabulary criterion suggested by Celce-Murcia (1991) an investigation was carried out by Manasrah, Al-Sobh and AL-Jabali (2013). This research helped to find out the extent to which vocabulary items concur with the suggested vocabulary analysis criteria by Celce-Murcia and the most and least convenient benchmark given in all text books' courses. It was inferred by the outcomes of this study that vocabulary items were used in suitable framework. Moreover, these were added to each syllabus. Thirdly, these were available easily and are in appropriate numbers that can be easily understood at students' level.

The two Iranian English readings that were used for the eighth and ninth review in the open and private schools of Iran were analyzed by Majdzadeh (2000) who examined 21 lessons from the eighth and ninth review open school reading data and 24 lessons from the similar level course readings in a private school to determine the extent to which English dialect and culture differ from Iranian English course readings. The English reading material used in Iran are well disciplined for learning the structure of English dialect without the need of different communication exercises.

The constructive English dialect of the first commercial secondary grade was assessed by Magableh (2000). These studies unveiled the need of language, theater, accent, spellings, and phonic translation of lexicon, tests, image facilities and conversation. The studies show that data was sequenced properly. This affected the students' level and their concentration.

To discover gender representations in topics, protagonists, and outlines from 1995-1999 from books of American Library Association eighty-three books were analyzed by Gooden and Gooden (2001). The results showed that more females played central role in the literature of that specified period. Secondly, there was slight reduction in gender generalizations. The stereotypes were evident within the outlines with gender discrimination as males were portrayed alone more often than females.

Shatnawi (2005) researched culture in foreign language textbooks by performing content analysis on material and to examine the degree of its representation in the "cutting edge" series. To figure out the cultural elements of these textbooks, the researcher studied the contents of the Cutting Edge collection. The analysis showed that cultural dimensions including historical, physical, spatial, literary, political, religious, social, man-female, habitual, customary and conventional dimensions are part of the textbooks.

Ababneh (2007) published a report evaluating the scope and experiences of teachers and managers on the aspects of Jordan Opportunities to grade 10 students. His research findings revealed that the details and terminology of his modules had not been evenly spread across modules. Most of this content included spelling and comprehension functions. The book of the instructor was a major support for the students. The study participants suggested the Jordan Opportunities ' suitability and recommended the omission of grammar exercise and provision

of word list with a phonetic transcript and also recommended that the Jordan Opportunities modules be allocated equally. A consensus on the adequacy of the Jordan Opportunities modules for the Jordanian students' 10th grade has usually been achieved.

In the third year of students of electronics engineering in Telecommunications, Zaragoza University, Spain, Perez-Liantada (2009) has studied a corpus-based system to study and teach spoken English for academic intent. He reviewed the Multi-Viewpoint Decision Analysis paradigm of Bhatia in 2002 including the societal viewpoint, the genre view and a literary perspective. The results from the assessment phase and student output suggest that a pedagogic method is reflected from the corpus in the guidelines explained by Bhatia's model. This approach is helpful in two ways. It enables students to recognize and appreciate the literary, genre and social characteristics of grammar in actual contexts. Secondly, it helps in achieving constructive student reaction in response to inputs and real grammatical use.

Lee and Collins (2008) explored how recent enhancements in women's status affected their representation in secondary English textbooks in Hong Kong. They contrasted 10 recently published books being read currently with 10 of the books written at the end of the 1980s and not being read currently. The results showed women had greater representation in recent textbooks. For recent publications, it was reported that the representation of women in contrast to men is greater and there has been increased usage of Gender-inclusive pronouns and the respectful address title of Ms.

Lee (2009) has studied 11 EFL secondary school teaching manuals used in Korea to know about the role of textbooks in teaching of culture. The main reason behind considering the contents of conversation is that the socio-cultural principles and ideals are usually seen during conversations. The study showed that the lessons of culture (including the general dimension of cultural learning and the tiny "c" goal of culture learning) were overlooked in all the considered textbooks. There has always been somewhat minimal usage of genuine content and digital technology in cultural learning. Coloring books published for children were studied as cultural artifacts by Fitzpatrick and McPherson (2010) wherein masculine protagonists are more prominent than feminine. Furthermore, 44% of males and 58% of female figures depicted traditional gender comportment. Eventually, 53% of men's characters were sexually egalitarian, contrasted with 36% of women's characters.

The use of authentic content in English syllabus Action Pack Twelve was studied by Islami (2019). The content was being used in Jordanian schools at that time. The study depicted that the content of Action Pack Twelve was highly authentic having a reliability of 79.50%. In other words, 31 out of 39 content units were found to be authentic.

The six modules of the Action Pack Seven (2012) were studied by Zawahreh in terms of the grammar work that was used in this student book for teaching English in Jordan as a foreign language and to assess how well the criteria proposed by it as well as that proposed by Celce-Murcia(1991) is fulfilled by such grammatical works. The findings indicate that, firstly, the amount and distribution of grammar tasks within the six modules of the textbook are sufficient and well structured. Secondly, the second criterion is fulfilled by all grammar operations, since the linguistic data is correct and comprehensive. Thirdly, 55 grammatical works out of the total of 60 were found to fulfill the consistency and completeness requirements. Lastly, the fourth criterion regarding the meaningful context was fulfilled by 56 out of 60 grammatical works.

The six modules of the Action Pack Seven (2012) were studied by Zawahreh (2012) in terms of the vocabulary items that were used in this student book for teaching English in Jordan as a foreign language and to assess how well the criteria proposed by it as well as the ten-item criteria proposed by Al-Momani (1998) are fulfilled by these vocabulary items. The test results

show: First, most of the latest vocabulary products in the six Action Pack 7 modules fulfilled 100% and 82% of the two criteria. Furthermore, there is no equilibrium in (a) distribution of vocabulary items among the six modules; (b) distribution of parts of speech inside each module.

3. Methodology

The study was based on mixed methods with qualitative and quantitative data. For the quantitative purposes, non-parametric statistical tests of frequency and percentage were used. In the quantitative dimension, the texts were analyzed one by one using the content analysis criteria of Krippendorff (1980).

3.1. Categories of Analysis

Articles, conversation, (short) story, paragraph, text, dialogue and others in the studied textbook are the areas of study.

3.2. Reliability and Validity of Instrument

To find the inter-rater reliability, two raters each analyzed the text by himself /herself analyzed the textbook. Then, the inter-rater reliability between them was calculated. It was found to be 0.85, which is statistically acceptable for this study. To check the instrument validity, it was given to a team of jury of judges. The team consisted to professors of English language teaching and English language teachers. They checked the instrument with regard to the text type. Their suggestions and recommendations were considered. They suggested adding some text types and analyzing frequencies in percentages.

4. Findings and Discussion

Table 1 presents the frequencies and percentages of the reading texts in the Student's Book of Action Pack Eleven and their authenticity.

Table 1. *Frequencies and percentages of the reading texts in the student's book of Action Pack Seven*

Type of text	Frequencies of Text	Percentages	Authentic Text	Non Authentic text	Percentages of the authentic Texts	Percentages of the None Authentic Texts
Article	4	19.0	4	0	22.2	0.0
Conversation	3	14.3	2	1	11.1	4.7
(Short) Story	3	14.3	3	0	16.7	0.0
Paragraph	2	9.5	2	0	11.1	0.0
Text	2	9.5	1	1	5.6	4.7
Dialogue	2	9.5	2	0	11.1	0.0
Other (Brochure, report, leaflet, interview and radio documentary	5	23.8	4	1	22.2	4.7
Total	21	100	18	3	86.0	14.0

Table1 shows that 18 texts out of 21 in the Student's Book represent authentic reading texts with a percentage of 86. Such focus on authentic reading texts highlights the significance of the reading skill in building the communicative competence of the students at the essential stage. Having a detailed look into the table, we can notice that in the first category, **the articles**, there are four articles out of 21 reading texts in Action Pack Eleven. The authentic articles are four. According to General Guidelines for the English Language (2006), it is expected that the students will read and understand authentic written English texts on topics of specific or general interest. One of the main reasons for using authentic materials in the classroom is once outside the "safe", controlled language learning environment, the learner will not encounter the artificial language of the school but the real-world language and how it is used. The role of the teacher is not to delude the language learners but to prepare them and to teach them the necessary skills to understand how the language is used.

Omaggio (2001, p. 90-91) in her fifth hypothesis stated "Cultural understanding must be promoted in various ways so that students are prepared to live more harmoniously in the target-language community. This is one of the main calls by the communicative approach and the ACTFL guidelines the 1980s, and the Standards for Foreign Language Learning the 1990s. They believe that languages cannot be taught in isolation of their culture. However, the question to be tackled is: which culture should we teach in the foreign language? Is it the target culture? I.e. the culture of the foreign language being learnt? Or the learner's own culture?" For Jordanian students, the EFL curriculum should help the learners to internalize the Islamic and Arabic culture which should be used as a springboard to understand, appreciate and interact with people of different countries as well as Jordanian identity" (General Guidelines and General and Specific Outcomes for the English Language Curriculum, 2006 P.9).

Though the General Guidelines tend to focus on Islamic and Arabic culture, for example, there are two articles on page 34; the first one is about Visit the British Museum. The primary function of this article is to read about the objects found in the galleries of the museum. When they are ready, invite students from each group to share their ideas with the class, and encourage comments and further discussion. This article is related to Islamic and Arabic culture. Such texts motivate the students to practice the language and to communicate with their teacher and\or with their classmates.

The second article is called "Petra comes back to life". This article is considered an authentic one; it includes information about Petra, which is one of the new seven wonders. The students have enough information about Petra so they can discuss or interact effectively in the classroom. However, this kind of article has a beneficial effect that enables students to gain knowledge and understanding of their culture.

There is also an article on page 48; its title is "The wonders of the ancient world". The students are familiar with its importance in Jordan, so this article is an authentic one and is related directly to the historical locations in Jordan. It encourages them to discuss, interact and adequately practice the language using their personal information about beautiful sites in Jordan. The article on page 18 is about global warming. This article is also an authentic one. It is related to the environment of the students and how to deal with it. According to the percentages of the authoritative articles, it is clear that most of the articles in Action Pack 7 relate to the students' environment and their real world. These kinds of items encourage students to communicate in the English language, not only inside the classroom but also outside the atmosphere.

As for the **short stories**, it is also given considerable space in the textbook. As seen in Table1, there are three stories out of 21 reading texts. The authentic stories are three with a percentage of 16.7, while the non-authentic stories are zero. Such focus on authentic stories highlights the significance of the authentic contexts in communication. The Standards for Foreign Language Learning describe the "what" (content) of world languages learning and form the core of standards-based instruction in the world languages classroom. One of the primary goals is “Communication stresses the use of language for communication in real-life situations"(Ommagio, 2001). These standards illustrate how the teaching of culture can be achieved while students engage in communicative tasks.

The story on page 81 is authentic. It talks about a man called Ali Cogia lived in Baghdad in the time of Calipha Haroun, it improves students’ critical thinking and creativity. There is another story on page 60 which is considered authentic. It talks about a rich man who loses his bag, which has money when he was on his way back home. The idea is how Shiekh returned his lost bag. It is an exciting topic for many students to be discussed in the classroom and to have a lesson about how Shiekh is an honest and reliable man. They can also write about different issues that reflect their Islamic values. This will create an authentic environment that encourages students to practice the language effectively. We should keep in mind that students usually are attracted more to subjects that are interesting to them and not strange to their cultural background. Tomlinson (1998, p.8) says, “most learners are more at ease with text and illustrations that they can relate to their own culture than they are with those who are culturally exotic".

Another example is on page 74. This short story is authentic. It talks about an intelligent sailor Ahmed Bin Majid. He was a knowledgeable traveler. This issue is significant in the students' life because it encourages them to be cleverness and ambition. In general, there is a reasonable degree of authenticity regarding this category. Bryan (2005) asserts that providing

students with activities from their real-life situations is part of a culture, which is also part of communication.

Furthermore, the more one is exposed to the culture, the easier it is to learn the English language. He also stresses that a textbook should provide and deal with subjects that are relevant to the students' daily life and real context. Being presented richly, this category is characterized by utility and authenticity.

The third category, **Conversations**, is also presented well in the textbook. As seen in Table 1, there are three, which mean that 14.3 of the reading texts are conversations. The authentic ones are two, with a percentage of 11.1, which seems reasonable.

For instance, there is a conversation between Nawal and Hisham on page 24; it is about global warming. The global warming happens when the Earth's climate goes up every year. It is a global problem, so this reading text is considered authentic. Another example is on page 37. It talks about a trader called Abbas. This kind of writing encourages the students to learn how to buy things from the sellers and to communicate with them. Ketch (2005) asserted, "Conversation provides opportunities for students to practice and use cognitive strategies and is critical for developing comprehension. The Conversation is authentic and becomes evidence for teachers to determine strategies used and internalized". There is a conversation which is non-authentic. It talks about the most famous detectives, especially Sherlock Holmes and Dr Watson. They are talking about who the owner of the stick was.

As for the **paragraphs**, it is also given considerable space in the textbook. As seen in Table1, there are two paragraphs out of 21 reading texts. The authentic stories are two with a percentage of 11.1. The first one talks about a day in the life of a pilot Kareem Mahmoud. He is a Jordanian pilot. The paragraph is talking about his daily routine. The second one is on page 49. It talks about ancient locations in the Middle East, especially historical locations in Jordan. It gives a chance for the students to know more about historical sites in their country.

As for the **texts**, it is given considerable space in the textbook, too. As seen in Table1, there are two texts out of 21 reading texts. The authentic documents are one with a percentage of 5.6, while the non-authentic texts are one with a percentage of 4.7. The first one talks Ibn Battuta, who is A Moroccan scholar and traveller. He visited different countries such as the Middle East, Turkey, North, East and West Africa. The second is on page 56. It talks about the best detective of all time. They are Sherlock Holmes, Hercule Poirot and Miss Jane Marble.

As for the **dialogues,** it is also given considerable space in the textbook. As seen in Table1, there are two dialogues out of 21 reading texts. The authentic stories are two with a percentage of 11.1. The first one talks about the dialogue between Ibrahim and Noura in the British Museum in London. It has objects from all the countries such as Egyptian mummies, the Sutton Hoo treasure and the turquoise serpent. The second one talks about the dialogue between Hassan and Omar. Hassan has a beautiful adventure holiday in New Zealand.

The last category, which is **Others** (Brochure, interview, leaflets, radio commentary and report), is given much space in the textbook. Table 1 shows that there are four reading texts out of 21 reading texts in Action Pack 7, with a percentage of 22.2, whereas there is one reading text non-authentic with a percentage of 4.7. The authentic ones (Brochures, leaflets, radio documentaries and reports) are in the following pages 36, 30, 31 and 50. They talk about the Roman theatre in Amman, Welcome to Souk Jara!, the important areas in Souk Jara, the Great Pyramid of Giza in Egypt. The students are interested in these topics. The students like to talk about important sites in Arab and Jordanian countries which refer to their culture.

Moreover, the students find that these texts are interesting and provide them with an excellent chance to talk about their cultures. This kind of reading text requires both reading

and speaking skill. The teacher asks his students to read the document carefully; then, he will ask every student to talk about what they like to know more about these places. Moreover, this kind of document encourages the students to talk about what they want to know more and develop their ability in expressing their opinions. It also promotes a friendly classroom atmosphere, which helps students, especially shy ones, to communicate using the English language since they are talking to a friend or a classmate, so embarrassment is reduced. Students become highly motivated to speak and listen using English (Ommagio, 2001).

The non-authentic one is an interview on page 10 is about dangerous activities. The interview is between a journalist and Dr Fred. They are talking about there are two elements in danger: one is fear; the other is the need to defeat the fear

5. Conclusion

The findings of the analyses revealed that the reading texts of the student's book in Action Pack 7 had a high degree of authenticity and there was a strong match between the reading specific outcomes and the reading text's authenticity in the textbook.

Students will not learn effectively without relating what they have learned to their real environment. They are attracted more to subjects that are interesting to them and not strange to their cultural background. It is efficient and valuable to use authentic materials as Bryan (2005.p17) put it concisely "Real-world use is the eventual goal of any language program and authentic texts offer the first baby steps for the students along this journey.

6. Conflict of Interest

The author declares that there is no conflict of interest.

7. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Al-Kawaldeh, A. (2011). EFL reading comprehension interest among Jordanian high school students and their relationship with gender, achievement level and academic stream. *European Journal of Social Sciences*, *23*(3), 454-465.

Al khrisheh, T. (2008). *The effect of instructional strategy and cognitive learning style on Jordanian EFL University students' reading achievement and motivation for reading*. Unpublished PhD Dissertation. Amman Arab University. Amman. Jordan.

Al Regeb, K. (2009). *The effect of semantic mapping and group discussion on Jordanian secondary stage students' reading comprehension and verbal communication in English*. Unpublished PhD Dissertation. Amman Arab University. Amman. Jordan.

Ababneh, J. (2007). *Analyzing the content of Jordan opportunities series for basic stage Jordanian students and investigating teachers' and supervisors' opinion*. Unpublished Ph.D Dissertation. Amman Arab University, Amman, Jordan.

Allwright, R. L. (1990). *What do we want teaching materials for*? In R. Rossner and R. Bolitho, (Eds.), Currents in language teaching. Oxford University Press.

Bachman, L. F (2001). *Foreign language assessment: 30 Years of evolution and change*. Retrieved 11/10/2010. http://www.caLors/resources/archive /news/200012/assessment. htm Berelson, B. (1952). Content analysis in communication research. Glencoe, IL: Free Press.

Cunningsworth, A. (1995). *Choosing your course book*. Oxford: Heinemann.

Fitzpatrick, M., & McPherson, B. J. (2010). Coloring within the lines: gender stereotypes in contemporary coloring books. sex roles 62:127-137. http://dx.doi.org/10.1007/s11199-009-9703-8

Gooden, A. M., & Gooden, M. A. (2001). Gender representation in notable children's Picture Books: 1995-1999. *Sex Roles*, 45(1/2), 89-101. http://dx.doi.org/10.1023/A:1013064418674

Grauerholz, E., & Pescosolido, A. (1989). Gender Representation in Children's Literature. *Gender and Society*, 3(1), 113-125. http://dx.doi.org/10.1177/089124389003001008

Holsti, O. K. (1969). *Content analysis of the social sciences and humanities, reading, massachusetts*: Addison Wisely Publishing Company.

Islim, S. A. (2019). A Content Analysis of Authentic Reading Activities in the Jordanian English Textbook Action Pack Twelve Matching the General Guidelines and General and Specific Outcomes. *مجلة العلوم التربوية والنفسية*, *3*(31).

Lee, J. F., & Collins, P. (2008). Gender voices in Hong Kong English textbooks—Some past and current practices. *Sex Roles*, *59*(1-2), 127-137.

Ljung, M. (1989). *Swedish Upper Secondary School English. Retrieved on June*, 2012 from http://eric.gov/ERICwebportal/Custom/portlest/ recordDetails/detailmimi.jsp

Magableh, W. (2000). *An evaluation of the functional English language textbook for the commercial first secondary class in Jordan*. Unpublished Master Thesis. Yarmouk University, Irbid, Jordan.

Majdzadeh, M. (2002). *Disconnection between language and culture: A case study of Iranian English textbooks*. Available at http://eric.ed. gov/ERIC webportal/Custom/ portelest/.

Manasrah, M. A., Al-Sobh, M. A., & AL-Jabali, M. A. (2013). A Content analysis of the vocabulary items in" Action Pack 12" for twelfth grade in Jordanian schools. *International Journal of Humanities and Social Science*, *3*(15), 129-136.

Nunan, D. (1991) Language teaching methodology. Hemel Hempstead: Prentice Hall.

Omaggio, A. (2001). *Teaching language in context*. NewYork: Heinle&Heinle.

O'Neill, R. (1990). *Why use textbooks*?. Oxford University Press.

Palmquist, M. (1990). *Content Analysis*. Retrieved on April 30, 2013 available at http://www.colostate.edu/Depts/writingCenter/references/search/content/ page2.htm

Perez- L. (2009). Textual, genre and social feature of spoken grammar: *A Corpus- Based Approach. Language and Learning Technology*. 13(1),40-50. Retrieved on June 10, 2013 from www.iit.msu.edu/vol13num1/perezllantada. pdf

Said, K. S. (1985). Vocabulary selection and presentation in the English course books of the elementary stage in Jordan. Unpublished Master Thesis, University of Wales. Bangor.

Virgina, Paris. (2009). *Action Pack 7, Student's Book.* London: York press.

Virgina, Paris. (2009). *Action Pack 7, Teacher's Book*. London: York Press.

Zawahreh, F. (2012). A content analysis of grammar activities in student's book of Action Pack Seven as a textbook for teaching English as a foreign language in Jordan. Language in India 12:160-178

Zawahreh, F. (2012). A content analysis of the vocabulary items in students' books of Action Pack Seven as a textbook for teaching English as a foreign language in Jordan. Continental J. of Education Research, *5*(1), 34-45.

Egüz, Ş. (2020). The meaning of war and peace for the migrant Syrian students at tertiary level in Turkey: An art-based study. *International Online Journal of Education and Teaching (IOJET), 7*(3). 992-1008. https://iojet.org/index.php/IOJET/article/view/937

Received: 01.05.2020
Received in revised form: 01.06.2020
Accepted: 04.06.2020

THE MEANING OF WAR AND PEACE FOR THE MIGRANT SYRIAN STUDENTS AT TERTIARY LEVEL IN TURKEY: AN ART-BASED STUDY

Research Article

Şule Egüz

Inonu University

suleeguz@gmail.com

Dr. Egüz completed her doctorate in social studies education at Marmara University in 2017. In 2018, she was appointed as an assistant professor in Inonu University, Faculty of Education, Department of Social Studies Instruction. The author still works at the same university on teacher education, museum education, art-based studies, media literacy and global education.

THE MEANING OF WAR AND PEACE FOR THE MIGRANT SYRIAN STUDENTS AT TERTIARY LEVEL IN TURKEY: AN ART-BASED STUDY

Şule Egüz

suleeguz@gmail.com

Abstract

The present study aimed to determine the definition of war and peace by the migrant Syrian students at tertiary level; their image of war via their artistic drawings, as well as to reveal their expectations from peace. For this purpose, the study was conducted in the 2018-2019 academic year with an art-based research approach, employing art as a method, a form of analysis and as an object. The participants comprised 25 Syrian students between the age range of 17-20 years old who emigrated from Syrian war zones to Turkey. The analysis of the data focused on the definitions of war and peace, Syrian students' drawings, and their verbal expressions about the drawings that help develop an analytical framework. The findings of the study demonstrated that most of the drawings reflected real images of war and peace; the participants rendered both visual and verbal symbolizations as the main expression of their suffering during the war and longing for peace. The drawings provided clues that could help them cope with the possible traumatic incidents they could experience at the present or in the future, and preserve their identity destructed by factors out of their control.

Keywords: Syria, war, peace, art, Syrian students, tertiary level, immigrants

1. Introduction

The war and peace have been an integral part of the humanity since the beginning of the human history. Humankind has achieved great success in controlling the nature and has overcome several fatal diseases but could not find a solution to murder. For this reason, the major enemy of humankind is humankind according to certain psychologists. Bloch reported in the article titled "The Future of War" that there were 3130 years of war and 227 years of peace between 1496 BC and 1861 BC. In the one hundred and forty years long history of the United States, there was a hundred and twenty-three years of peace and seventeen years of war (Eckhardt, 1917). It was believed that the concept of war was the first to be understood in history. Even the youngest children perceive war in concrete terms such as combat, weapons and soldiers, and all children have a definition of war, but they cannot fully express what peace means (McLernon & Cairns, 2001). War is an act where force is employed, and there is no limit to the use of force in war (Clausewitz, 2017). According to Cicero, war is a means to resolve conflicts with coercion (Grotius, 2001). Tolstoy (2007) argued that the war is induced by the buildup of several factors rather than the will of an individual. On the other hand, Shakespeare described wars and conflicts as a game where the good fight against the evil (Page, 2000). Sometimes the word war could refer to different concepts in different ideologies. For realist or liberal philosophers who approach the events from a distinct perspective, war may not mean the same thing. Certain liberal philosophers argued that the war takes place for reasons such as lack of interaction and communication or misunderstanding between the actors, while realists claimed that the system fuels the conflicts based on the thesis of the unavoidability of war. As is known, although Kant

described war as an abnormality, Hegel considered war legitimate and functional (Dağı, 2004). According to Hobbes, if there is a desire to possess the same thing among people, people become enemies. They try to destroy each other or dominate them. Hobbes argued that there were three main reasons for conflict in human nature: competition, distrust, and glory (Hobbes, 1985). The issue of how war leads to peace created an important and problematic anxiety in all approaches (Carr & Porfilio, 2012). War is in fact a consequence of our intention to eliminate conflicts and differences when we lose hope with the peace process (Schrumpf, Crawford & Bodine, 2007). Unlike war, when we consider the concept of peace from a narrower and more traditional perspective, the concept seems complex practically; however, it is conceptually quite simple (Smith, 1993). Peace is the process of reacting to conflict and differences with tolerance, imagination, and flexibility. In other words, peace is consensus, harmony and mutual understanding (Hakvoort, 2010). Harris and Morrisson (2003) described peace as a positive force that aims to forgive and respect others, to cooperate with them, and to avoid all forms of violence. In short, peace tends to resolve conflicts without war or psychological force. Perkins (2002) analyzed the concept of peace with five models. These five models include friendly peace, ethical peace, interdependence peace, legal peace, and retaliation peace dimensions. The friendly peace model is based on harmony and trust between the parties. The ethical peace model reflects the case when the parties act in an ethical, just and rightful manner in their mutual relations. The interdependence peace model means that the parties interact with their common interests in mind. The legal peace model refers to the peace based on legal mechanisms such as law, justice, and courts. Finally, the retaliation peace model reflects the cases where peace is maintained with preventive attacks when war is inevitable.

Some studies have based the conceptual development of war and peace on a cognitive development context. Thus, it was argued that the understanding of war develops before the understanding of peace and young children focus on the concrete aspects of war, while older children could also understand the abstract aspects of war (Cooper, 1965; Hall, 1993). These developmental differences were associated with cognitive developments in children's ideation as defined by Piaget (1952). Students first learn the concept of war and peace based on their relationships. Competition, collaboration, and individual experiences play a key role in children's perceptions about these concepts. In fact, the recognition of the children's conception about war is the first step in helping them to cope with their emotions about war. Especially in education, awareness of the students on the conceptual dimension of peace could help professionals find ways to help them to identify positive, non-violent acts against war (Walker, Myers-Bowman & Myers-Walls, 2003). In reality, we all have abstract concepts about war and peace in our minds; however, the conceptualization might differ significantly in the mind of an individual who experienced the actual trauma of war (Özer et al., 2018).

Art functions as a source of spirituality that provides aesthetic pleasure; it is considered a silent form, since it provides individuals, who could not talk about events or decide whether these events were positive or negative, the opportunity to do all these via impressive drawings (Kollontai, 2010). Hsieh and Tsai (2016) concluded that drawings could be an alternative approach to determine the emotional problems of students. Indeed, the consequences of wars affect large masses and future generations. Wars could lead to irreversible constructive and destructive consequences. Thus, it is necessary to understand and analyze wars and steps towards peace. Art is one of the most effective methods that serve this goal. Literature review revealed that art-based studies on war and peace were mostly coducted with younger children in the literature (Âlvik, 1968; Barton & McCully, 2005; Brunick, 1999; Buldu, 2009; Çengelci-Köse & Gürdoğan-Bayır, 2016; Gardner, 1980;

Grauer, 1994; Jabbar & Betawi, 2019; Lambert, 1994; Özer et. al, 2018; Stiles, Gibbons & De Silva, 1996; Sundström, 1981; Walker, Myers-Bowman & Myers-Walls, 2003; Tanay, 1994; Tuneu et. al, 2015; Yedidia, T. & Lipschitz-Elchawi, 2012). The number of studies conducted with higher education students are quite limited (Aktaş, 2015; Droba, 1931; Madzarac et. al, 2003; Shehi, Ozcan & Hagen, 2018). The attitudes of the Syrian individuals who attend the higher education system in Turkey towards war and peace is important since they could utilize the education they received in the host country for the benefit of their motherland and would be ready to work towards the development and progress in their country as qualified individuals.

The migration from Syria to Turkey started on April 29, 2011 250-300 people fleeing from the clashes that started in March 2011 and when these individuals requested asylum (Ihlamur-Öner, 2015). The open-door policy adopted by Turkey led to the migration of over 3.5 million Syrians to Turkey and the country became the host nation for the highest number of refugees in the world. As is known, migration means a profound transformation in life for many immigrants (Kırılmaz & Öntaş, 2020). The resettlement process is described as a 'secondary trauma' for migrant children and their families due to various difficulties such as a new school system, job market, accommodations, and the requirement to learn a new language (McArdle & Spina, 2007). Bearing the heavy burden of war and migration alone leads to challenging life experiences (education system, language, etc.), especially for students. It is clear that such a large number of people, who try to start a new life after escaping from the war, are in a disadvantaged and fragile position due to the difficulties inherent in the war and the migration process. Emotional difficulties and responsibilities experienced by the adults and children with war trauma, who lost their family and relatives, could be severe. Separation from the home environment, loneliness, alienation, lack of self-worth, absence of relatives and the regret due to leaving them behind could affect students' perceptions about war and. Syrian students' drawings about war and peace based on their own experiences could provide clues and critical information about their mood. Brunick (1999) emphasized that the power of creating art and especially the artistic images are important in the demonstration of the past traumatic experiences of refugee students, and we could find the signals that these milestones could have extensive effects on their present and future relations. The present study aimed to determine how the effects of war reflected by tertiary level migrant Syrian students in their artistic drawings of war and peace and to reveal their expectations about peace. Therefore, research questions of the study can be formulated as follows:

1. How do tertiary level migrant Syrian students in Turkey reflect their hopes about the future, and their country's peaceful approach upon their drawings of' peace'?

2. How do tertiary level migrant Syrian students in Turkey reflect their country's violent past and conflicts upon their drawings of 'war'?

2. Method

2.1. Research Design

The number of art-based researches have noticeably increased in the last two decades (Finley, 2011). Art-based researches could be defined as the systematic use of the artistic process, the actual creation of artistic expressions in all art forms as a primary method of understanding and investigating experiences by both researchers and their subjects (McNiff, 2008). The present study was conducted with an art-based research approach, which employed art as a method, a form of analysis and as an object. The research design was selected based on the research questions to reveal students' viewpoints about war and peace.

The adopted model is a qualitative research method and emphasizes the social perspective that expands from personal to universal, contains novel ideas and participatory and active inquiry approaches (Barone & Eisner, 2012; Paul, 2005). In fact, most art-based research theorists suggested that art practice deepens researches (Cole & Knowles, 2008; Gray & Malins, 2004; Leavy, 2009; McNiff, 2008).

2.2. Participants

In qualitative research, sample assignment is generally conducted with purposive sampling. Although there are several strategies that could be employed in this technique, the common goal is to assign the most adequate individuals or manuscripts to solve the research problem (Miles, Huberman & Saldana, 2014). In the present study, density sampling, a purposive sampling technique, was used to determine the views of Syrian students on the concepts of war and peace. Density sampling includes information-laden cases that describe the investigated events and phenomena strongly, but without going to extremes (Silverman, 2013). The density sampling employed in a qualitative research should include examples of the best or richest information on the case of research rather than extreme cases or outliers (Morgan & Morgan, 2008). Thus, the study sample included 25 17-20 years old Syrian students who immigrated to Malatya province in Turkey from the war zone and attending Inonu University. The sample size was determined based on the study aim and research questions, and volunteering students who could master the concepts of war and peace, draw associated drawings, and accepted to participate in 6 hours of training in the study. Two of the participant students were from the School of Medicine, 2 were from the Faculty of Dentistry, 3 were from the Faculty of Law, 7 were from the Faculty of Science and Letters, and 11 were from the Faculty of Education. For ethical purposes, the names of the students were not used, and they were named using codes, such as M1, M2, ... M25.

2.3. Procedure

For the study, in the Spring Semester of 2018-2019 academic year, examples of peace in idealism tradition, peace in liberalism and neoliberalism, democratic peace theory, realist peace, peace approach of critical theory, social justice, capitalism, racism and war concepts in different ideologies, past examples of war, changes in the social structure after peace treaties were presented to facilitate the historical comparisons of the students to allow them to master the concepts of war and peace. This training was planned for 6 hours and at the end of each training hour, a discussion session was conducted on the information learned in the previous hour and the students were allowed to make individual analyses. Thus, an attempt was made to allow the students to think about the concepts in detail. Because if the aim is to teach students the concepts of war and peace, these concepts should be instructed pedagogically and discussed rational in the classroom setting (Oppenheimer, 2010).

In the research, the data were collected via students' artistic drawings which were considered the first step to challenge the limiting factors in their country. Thus, the participant students were asked to draw to demonstrate their approach to war and peace. Each participant was given an A4 size paper sheet that contained two prompts (war and peace): "What does war mean to you? Draw the first image that comes to your mind," and "What does peace mean to you? Draw the first image that comes to your mind," and the participants were given 60 minutes to complete their drawings. Also, they were allowed to use the provided crayons. Furthermore, each student who finished drawing was asked to "explain the picture he drew" in writing on the back of the drawing paper. However, certain students preferred not to comment on their drawings. About 5% of the drawings were analyzed without a verbal explanation. It is important for students to state verbal explanations about their drawings to understand what they mean and how (Richardson, 1982). Thus, the aim of

the study was to determine the perspectives of students on various concepts, events or situations using their explanations on their artistic drawings (Denzin & Lincoln, 2005). Hervey (2004) argued that artistic inquiries were necessary for small-scale art-based research to contribute to literature for data collection, data analysis and presentation of findings.

2.4. Data Coding and Analysis

The analysis focused on the definitions of the concepts of war and peace, drawings of the migrant Syrian students in a state university in Turkey, and their verbal statements on the drawings that helped the researcher develop an analytical framework. The drawings were coded based on the war and peace categories developed by McLernon and Cairns (2001) and adapted from Hakvoort and Oppenheimer (1993). Certain categories were not included in the coding since they were not included in the drawings.

Five categories employed in war drawings:

Category 1: Weaponry or soldier drawings, tanks, bombs, rifles.
Category 2: Symbols such as flags.
Category 3: War activities (firing, stabbing, etc.).
Category 4: Negative consequences of war such as death, injury and migration.
Category 5: Negative emotions such as crying individuals.

Three categories employed in peace drawings:

Category 1: Natural landscapes (trees, flowers, rivers, etc.).
Category 2: Positive images (shaking hands, hugging, smiling to one another, collaboration, etc.).
Category 3: Images that negate war; sitting people (on a bed or divan), views of tranquility or silence, views of children at home or school.

All drawings were coded and compared separately by a field expert and the author based on the above-mentioned categories before the analysis. Miles and Huberman (1994) formula (Reliability = Agreement / Agreement + Disagreement x 100) was employed to determine the coding reliability. Thus, the reliability of the study was calculated as 90%. Miles and Huberman (1994) argued that the reliability should be over 70% to consider a research reliable. Qualitative data analyses were conducted based on the guidelines proposed by Patton (1990). Thus, the drawings were initially reviewed and the verbal statements that accompanied the drawings were read and the drawings were assigned to the relevant categories. During the qualitative analysis, specific drawing characteristics were also defined (design elements: color, space, contrast; design principles: motion, harmony, emphasis; recognizable content: objects, figures, etc.). During coding, a guide that included the number of shapes and objects and color assignments employed by each student in the war and peace drawings was developed. Based on our first observations during the analysis, a hypothesis was determined that war figures included a higher number of figures and details. Furthermore, it was expected that more colors would be used in peace drawings.

3. Findings

3.1. The Meaning of ‘Peace’ and Peace Drawings

Syrian students stated their definition for the concept of peace before starting the "peace-themed" drawings. These definitions are presented in Table 1.

Table 1. *The meaning of peace according to Syrian students*

Theme	Participants	Frequency (f)
Tranquility	M1, M2, M5, M7, M8, M9, M10, M11, M12, M13, M14, M15, M16, M17, M18, M20, M24	17
Freedom	M1, M3, M4, M5, M6, M7, M9, M11, M12, M14, M16, M17	12
Trust	M2, M9, M10, M11, M13, M15, M16, M24	8
Love	M7, M8, M9, M17, M18, M20	6
Happiness	M10, M11, M12, M24, M25	5
Hope	M5, M6, M16, M23	4
Respect	M7, M9, M18, M19	4
Solidarity	M1, M2, M5, M17	3
Dream	M21, M22, M23	3
Health	M9, M14	2

The review of Table 1 demonstrated that "peace" meant “tranquility” and "freedom" for most students and it meant "solidarity", "dream" and "health" the least. Furthermore, based on the student definitions, peace also meant trust, love, happiness, hope and respect. Students reflected these expressions on 'peace' drawings as well. The themes described in the students' peace drawings included freedom, tranquility, unity, love, happiness, hope and solidarity. When reflecting these themes, birds, olive branches and the world were employed the most. Furthermore, students employed wings, sky, ocean, clouds, rainbow, stars, humans, hearts, hands, houses, flowers and trees. They frequently selected nature as a space and generally nature images were presented with a positive act such as shaking hands. It was observed that only the student M16 coded included a negative element (weapon) in a peace drawing. However, the element that implies the negation of the war in this drawing was the flowers in the fired gun (Drawing 5). It was determined that the figures in the students’ peace drawings were mostly passive (inert). Green, blue, and white colors were generally preferred in the drawings. Furthermore, female students emphasized their emotions more in their peace drawings and verbal expressions. Examples of students' peace drawings are presented below:

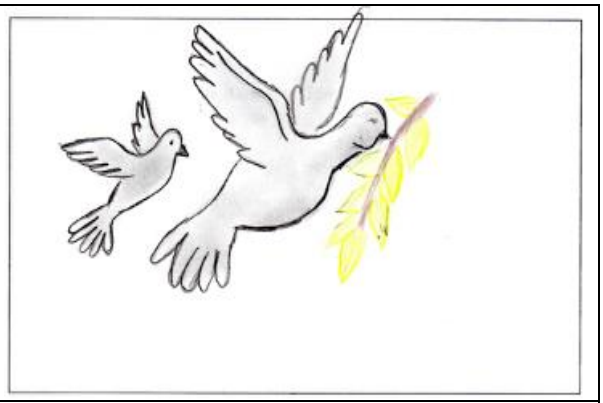
Drawing 1. Peace in the drawing of female student M17: World, bird, olive branch, hands and heart.

Drawing 2. Peace in the drawing of male student M3: World, wings.

Student M17 who emphasized universal peace in Drawing 1, stated the following on her drawing: “*I actually drew this because I wanted all countries in the world to be in peace, not only my country. If all people were full of love and live peacefully, these would not have happened to us. If we all embrace the world with love, peace will be permanent*.” On the other hand, M3, who emphasized freedom in his drawing stated that "*for me, peace is*

freedom. When we live in peace, we can act freely. I drew wings because when peace is achieved, I would like to fly like a bird and go where I want."

Drawing 3. Peace in the drawing of female student M2: Mother, child, stars



Drawing 4. Peace in the drawing of male student M6: Bird, olive branch

When explaining the drawing that emphasized the provision of a permanent peace in Drawing 3, M2 stated the following: "*When I hear peace, I immediately look at the sky. The sky and my mother's love are infinite for me. I drew both the sky and my mom because I wanted peace to last forever.*" Including only two of the universal symbols of peace in his painting (bird and olive branch), M6 reflected on peace as follows: "*The olive branch symbolizes both peace and victory. I dreamed that drawing an olive branch in the bird's mouth would bring peace to all nations*" (Drawing 4).

Drawing 5. Peace in the drawing of female student M16: Bird, olive branch, weapon, flowers

Drawing 6. Peace in the drawing of female student M1: Earth, bird, olive branch, hands

In Drawing 5 by student M16, unlike other drawings, a negative element, namely "a weapon" was included: "*I imagined that the gun shot flowers instead of bullets when I heard this sound in peace instead of fearful days where we had to wake up with gunshots, and this would make everywhere beautiful. Of course, this beauty could only spread to the world on the wings of a bird. That is why I added a bird*." M1, the illustrator of the Drawing 6 that depicted hands with a flying bird carrying an olive branch in its mouth on the world, stated the following: "*If the feeling of solidarity and unity is adopted by all people in the world, then peace would be permanent. For this reason, I drew the hands. Bird means freedom to me. We are not free if we cannot do what we want. If you live in peace, there is freedom.*"

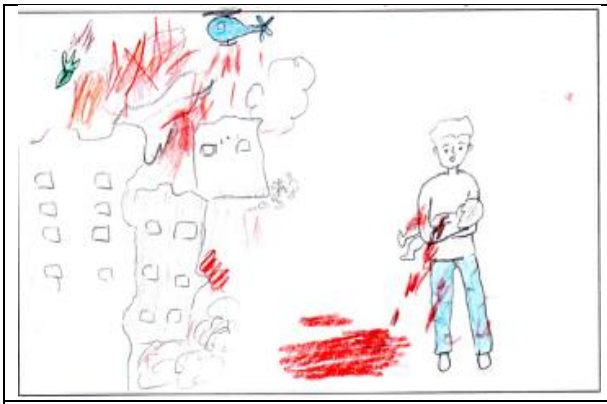
3.2. The Meaning of 'War' and War Drawings

The student views on the meaning of the concept of "war" were determined via the interviews and presented in Table 2.

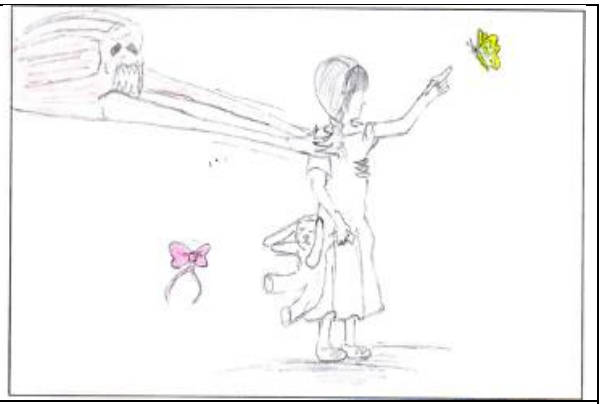
Table 2. *The meaning of war according to Syrian students*

Theme	Participants	Frequency (f)
Death	M1, M2, M3, M4, M5, M6, M8, M11, M15, M16, M17, M20 M21, M23, M25	15
Conflict	M1, M3, M4, M6, M8, M10, M11, M12, M13, M17, M24	11
Migration	M7, M9, M10, M11, M15, M16, M18, M20, M23, M25	10
Unrest	M9, M13, M14, M24	4
Fear	M5, M13, M25	3
Sorrow	M2, M8, M10	3
Hunger	M9, M14, M,20, M22	3
Despair	M5, M13	2
Hate	M20, M23	2
Unhappiness	M10, M11	2
Oppression	M15	1
Hopelessness	M16	1

Based on the data presented in Table 2, war meant 'death', 'conflict' and 'migration' for the students the most and it meant ‘oppression’ and ‘hopelessness’ the least. It was stated by the students that it also meant unrest, fear, sorrow, hunger, helplessness, hate and unhappiness. In the war drawings of the students, death, migration, fear, despair and unhappiness were the common themes associated with the consequences of the war. The students who reflected the consequences of war intensively were 90%. Destroyed homes, injured people, blood, cemetery, weapons, fire, bombs, children, tanks, helicopters and Syrian map were used to reflect these themes. The positive elements included in war drawings were the sky, mountain, sea, butterfly, flag and toy. It was determined that the figures in the war drawings of the students were reflected with events (shooting, injury, migration, etc.). The number of colors used in war drawings was limited. In drawings where colors were uses, it was observed that black was the most preferred color and red was used to emphasize blood and fire. Similar to the peace drawings, female students emphasized their emotions better in war pictures. Examples of students' war drawings are presented below:



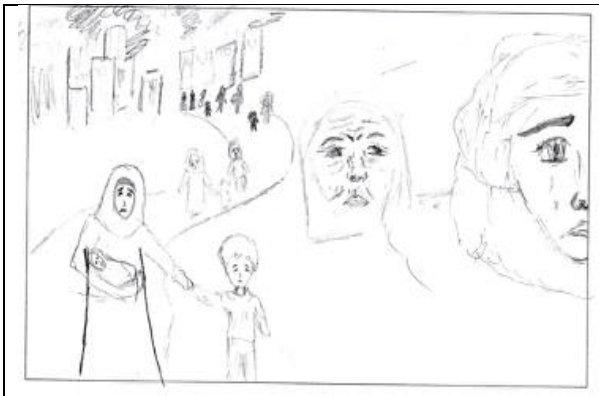
Drawing 7. War in the drawing of male student M8: Destroyed buildings, father, child, blood, helicopter, bomb, fire



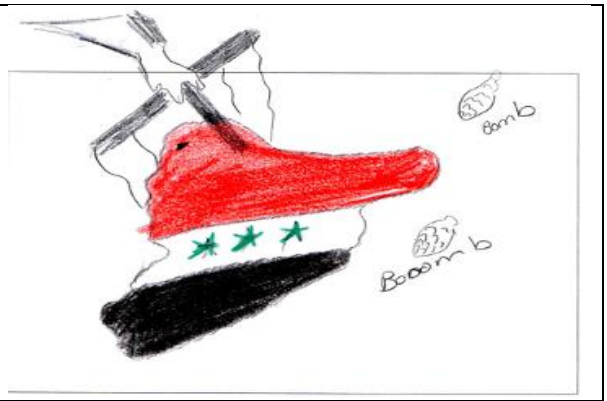
Drawing 8. War in the drawing of female student M5: Girl, butterfly, toy rabbit, monster

On his drawing, M8 stated the following: "*I actually wanted to show a father's desperation to save his injured child and the bombing of our houses by armored vehicles although we did nothing wrong*" (Drawing 7). In this drawing, especially the depiction of blood and fire were significant. Student M5 said the following: "*I imagined the war as a*

monster because war is so bad that it could prevent a child to reach her or his dreams and destroy her or his right to live" (Drawing 8). The dominant element in this drawing was the identification of war as a monster.

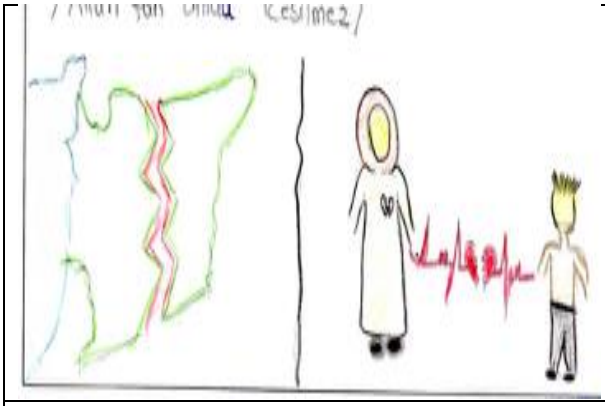


Drawing 9. War in the drawing of female student M10: Destroyed buildings, people, unhappiness, tears, the migration road

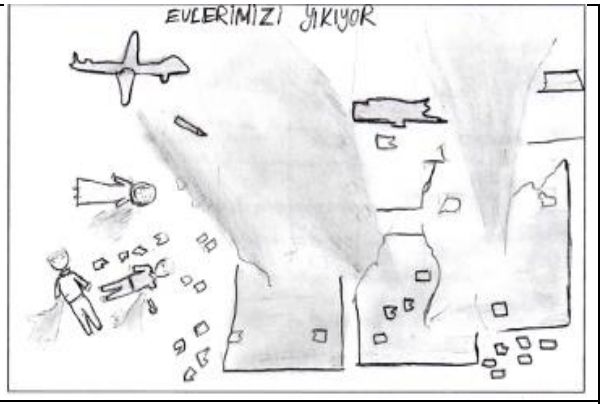


Drawing 10. War in the drawing of male student M20: Syrian land, flag, puppet sticks, hand, bomb

In Drawing 9 on immigration, a procession of people that arrive from the collapsed buildings could be observed. M10 stated the following about her drawing: "*We left our home like this. War means separation from home, unhappy mothers, unhappy people for me*." Associating the war in Syria to with foreign powers, student M20 stated the following: "*If no other nations were involved in the internal affairs in Syria, there would be no war. Other countries play with our land like a puppet. But the land belongs to us. Other countries led to the war, not Syrians. I drew this because it's their war*."



Drawing 11. War in the drawing of female student M13: Divided Syria map, mother, child, destroyed heart



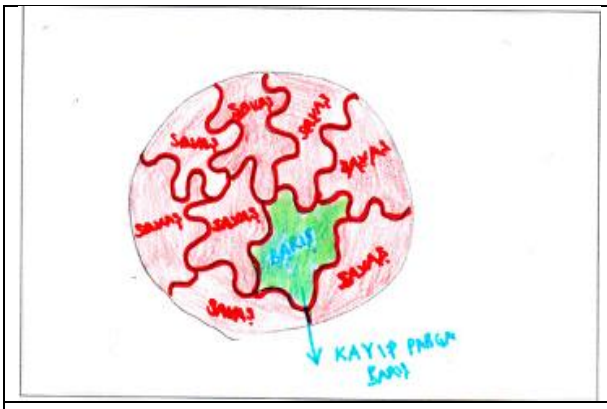
Drawing 12. War in the drawing of male student M11: Dying people, clashes, destroyed buildings

Student M13, who associated division of Syrian lands with the separation of the mother and child in Drawing 11, stated the following: "*In fact, the war not only divides the land, but also the bond of love between a mother and her child. It tears the families apart*," stressing that war leads to emotional destruction. On the other hand, the M11 stated the following on war: "*While I was dreaming that I would leave my family for school, death separated me from my father. War means death for me.*"

3.3. Drawings that Emphasized the Contrast Between Peace and War

In the study, although drawing material that students could use to draw different drawings for war and peace, 2 students depicted war and peace in a single drawing, and 2 other students compared the lands without war and Syria, reflecting the contrast between war and

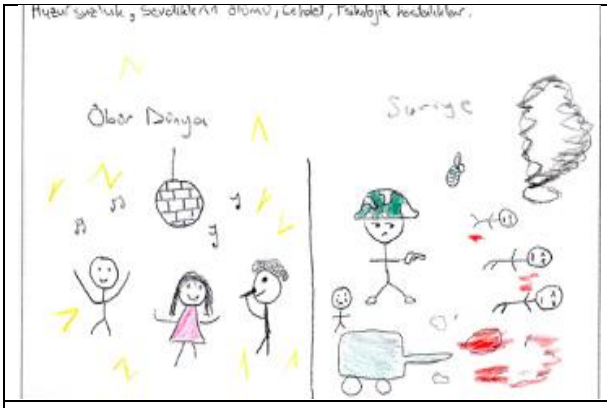
peace in their paintings. War and peace were depicted as the world, a puzzle, sky, bird, earth, and fire. War was presented in red, and peace in blue and green (Drawings 13 and 14). In Drawings 15 and 16, which tried to reflect this contrast in two side-by-side drawings, war and peace were represented with dancing people, conflict, dying people, blood, bombs, soldiers, armored vehicles, cemetery, forest, human, sky, rainbow, butterfly, birds and trees. Furthermore, it was determined that peace was more colorful in these drawings.



Drawing 13. War and peace in the drawing of female student M14: World, puzzle

Drawing 14. War and peace in the drawing of male student M25: Sky, birds, earth, fire

M14, who visualized the world as a puzzle, stated the following: "I wrote war on all the puzzle pieces in my drawing, except for a single part of the world, because the number of people that think about war is very high in the world. I thought of this single piece as peace. Unfortunately, that piece of the puzzle is missing." She reflected her critical view on people who defend the war and are somewhat insensitive to war in her drawing (Drawing 13). In Drawing 14, the student M25 separated the sky and the earth using colors and stated the following: "*For me, the sky is a space of freedom, but the earth is a piece of fire. Peace is in the infinite sky, the war is in the piece of fire on earth unfortunately.*" He accepted the harmony of the earth and sky, which are so close to each other, while reflecting the two cases (war and peace) that are far apart from each other from a different perspective.



Drawing 15. War and peace in the drawing of female student M4: Dancing people, clashes, dying people, blood, bomb, soldier, war vehicle

Drawing 16. War and peace in the drawing of male student M23: Cemetery, forest, human, sky, rainbow, butterfly, birds, trees

M4 reflected two different frames of the world to her painting: "*As Syrian people die due to war, they are forced to leave their loved ones and live unhappy lives in other countries, while other countries continue their fun in peace*," expressing her discomfort with insensitive people (Drawing 15). M23 stated the following: "*Syrian people lie in graves due to the war.*

But other countries live peacefully in their gardens and watch the sky. I drew this drawing because their eyes are closed to our experiences."

3. Discussion and Conclusion

Peace is an international movement that includes positive ideals adopted by humanity. Hakvoort and Hagglund (2001) argue that children understand peace at an early age, and it develops with the addition of more abstract elements as they get older. In the study, it was determined that peace meant "tranquility" and "freedom" the most for the students and it meant "solidarity", "dream" and "health" the least. Furthermore, peace also meant trust, love, happiness, hope and respect for the students. Similar emotions were reported by the participants of the study conducted by Çengelci-Köse and Gürdoğan-Bayır (2016), who worked with the younger students. The themes identified in students' drawings of peace included freedom, peace, unity, love, happiness, hope and solidarity. When reflecting these themes, students employed the bird, olive branch and world figures the most. Birds, especially pigeons, represent peace. Olive branch is also among the significant universal symbols of peace (Aktaş, 2015). A need for universal peace is a consensus among all humanity. The inclusion of 'the world' in student drawings was due to a longing for universal peace. Nature was frequently included in the drawings; generally, the images of nature were associated with a positive act such as shaking hands. It was observed that only the student M16 included a negative element (weapon) in a peace drawing. However, in the drawing, the element that implied the negative face of the war was a gun shooting flowers. It was determined that the figures in the peace drawings were mostly passive (inert). Similar to this finding, Âlvik (1968) reported that peace was perceived not as an active but as a passive process by individuals. Emphasis on the concept of peace in the study was expressed more frequently by female students. Similarly, Madzarac et al. (2003), who studied on war and peace with college students during the civil war in Bosnia and Herzegovina and Zagreb, also reported that female students placed more emphasis on peace when compared to male students. The colors used in peace drawings were mostly green, blue and white in addition to other colors. The blue and green reflect calmness in a drawing, yellow reflects joy, and light and pale colors indicate that the child is trying to hide real experiences and emotions (Chermet-Carroy, 2008). In the peace drawings, birds were predominantly depicted in white, olive branches were drawn in green, sky and the sea were painted in blue. While this demonstrated that peace was associated with tranquility by the students, it also suggested that students try to hide their emotions. In support of this finding, in a study conducted with college students, Aktaş (2015) revealed that green and blue were used predominantly in the peace drawings by the students.

It was also discovered that the concept of war meant "death", "conflict" and "migration" the most and 'oppression' and 'hopelessness' the least for the students in the study. War also meant unrest, fear, sadness, hunger, helplessness, hate, and unhappiness for the students. When expressing these meanings, students mostly focused on abstract emotions. In war drawings, clashes in war and consequences of war such as death, migration, fear, despair and unhappiness were the common themes. 90% of the students reflected the consequences of war in their drawings. Similarly, Jabbar and Betawi (2019) emphasized that older individuals focus on the results of the war, the reasons of people to start a war, and explaining their negative emotions about the war using abstract ideas. This finding did not differ based on gender. Contrary to this finding, Hakvoort and Oppenheimer (1998) reported differences based on gender. Accordingly, males were more focused on the concrete aspects of war, while the females were more focused on the negative consequences.

Humankind assigned a symbolic form and meaning to everything that existed in history. In the study, destroyed homes, injured and dead, blood, cemetery, weapons, fires, bombs, children, tanks, helicopters and Syrian map were used to reflect the war theme in drawings. Despite developmental differences, these elements were also reflected in the drawings of young children in certain studies (Hakvoort & Hagglund, 2001; McLernon & Cairns, 2001; Walker, Myers-Bowman & Myers-Walls, 2003). In the present study, it was determined that both female and male students had knowledge about combat vehicles. Contrary to this finding, Tolley (1973), Hall (1993) and McLernon & Cairns (2001) reported that males had more knowledge about war, weaponry and war activities when compared to females, which was clearly observed in descriptions of war. However, certain other studies reported insignificant differences between the knowledge on war based on gender (McLernon, Ferguson & Cairns, 1997; McLernon, 1998). In the present study, the lack of difference in knowledge based on gender could be attributed to the participants' age group and the actual war experiences of the participants.

The positive elements included in war drawings in the study were the sky, mountain, sea, butterfly, flag, and toys. By associating these elements with the theme of war, students transformed them into visual symbols as a coping mechanism with trauma. Tanay (1994) reported that children who could not cope with the war trauma could not achieve perceptual integrity and used unassociated objects in their drawings. Tanay (1994) conducted a study with 4-7- and 7-11-years old children. It could be more difficult for children to cope with a significant trauma such as the war when compared to adults. As is known, perception integrity is one of the motor processes such as breathing (Arnwine & McCoy, 2006). In this process, the brain turns the parts into a whole, combining several sensory information that originate from the environment, leading to an integral perception (Ayres & Robin, 2005). In the present study, unassociated objects were not used, and the students stated the associations between the elements when they explained their drawings in detail. It was determined that the figures in war drawings mostly reflected was with an action (shooting, injury, migrating people, etc.). It was significant that all drawings were in detail. According to Lambert (1994), the more detailed the drawings, the greater the student's sensitivity. Thus, it could be suggested that the participating students were more sensitive to war. In their verbal expressions, the students who drew detailed drawings, expressed their negative emotions more frequently. Similarly, Cooper (1964) suggested that as the emphasis on the consequences and activities of the war increases, negative emotional reactions may increase as well.

Colors always played a significant role in influencing individuals' mood, emotions, feelings and perceptions (Singh & Srivastava, 2011). Not many colors were not used in war drawings in the present study. In drawings that included colors, black was the most dominant color, while red was often used to emphasize fire and blood. Black and red are an indication of depression or feeling hopeless or restricted in a drawing, while red reflects anger (Laguna & Lachowska, 2003). The students also developed a secret language in reflecting their moods, emotional anxiety and anger by using these colors in their drawing about war. Also, female students emphasized their emotions more than male students in war and peace drawings and verbal statements in the study. The fact that female students emphasized their emotions in peace and war drawings could be due to gender differences and culturally attributed gender roles.

In the study, it was observed that the experiences of Syrian students were effective on their definitions of the concepts of war and peace, especially when commenting on war. Thus, the general findings of the study demonstrated that most student drawings included real images of war and peace; Syrian students utilized both visual and verbal symbolizations as the main

expression of their suffering during the war and their longing for peace. The drawings provided clues that could help them cope with the past and future traumatic events and protect their identity deconstructed beyond their control. Obviously, students deeply felt the devastating effects of war, even if they were not involved in a direct conflict. As the findings demonstrated, exposure to war and longing for peace affect students' perspectives on the concepts of war and peace. Conflicts and casualties in the war deeply shook certain students, while others were deeply affected by the sense of obscurity during and after migration. The most important reason underlying the desire for peace was the desire to go back to their country. To realize the complexity and multidimensionality of the concepts of peace and war, comparisons should be made in further studies on adolescents and adults, and a living space should be built for these aspirations, especially during the times of peace. Adoption of a contextual approach in future studies would further improve our insight. Also, artistic studies on similar subjects would improve communication, problem solving, creative thinking, cultural understanding and decision making. Thus, it was considered that the present study benefited the students.

4. Conflict of Interest

The author declares that there is no conflict of interest.

5. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Aktaş, Ö. (2015). War and peace in student drawings. *Turkish Studies, 10*(7), 97-110.

Âlvik, T. (1968). The development of views on conflict, war, and peace among school children. *Journal of Peace Research, 5*(2), 171-195.

Arnwine, B. & McCoy, O. (2006). *Starting sensory integration therapy: Fun activities that won't destroy your home or classroom!*. Arlington, CA: Future Horizons.

Ayres, A. J. & Robbins, J. (2005). *Sensory integration and the child: Understanding hidden sensory challenges.* Torrance, CA: Western Psychological Services.

Barone, T. & Eisner, E. W. (2012). *Arts based research.* Los Angeles, CA: Sage Publication.

Barton, K. C. & McCuly A.W. (2005). History, identity, and the school curriculum in *Northern Ireland: An empirical study of secondary student's ideas and perspective. Journal of Curriculum Studies, 37*(1), 85-116.

Brunick, L. L. (1999). Listen to my picture: Art as a survival tool for immigrant and refugee students. *Art Education, 52*(4),12-17.

Buldu, M. (2009) Five to 8-year-old Emirati children's and their teachers' perceptions of war. *Journal of Research in Childhood Education, 23*(4), 461-474. DOI: 10.1080/02568540909594674

Carr, P. R. & Porfilio, B. J. (2012). Framing peace and war within the educational Project-willful (dis)engagement and the meaning (and cost) of conflict. In P. R. Carr & B. J. Porfilio (Eds.), *Educating for Peace in a Time of "Permanent War"* (pp.1-41). New York: Routledge.

Çengelci-Köse, T. & Gürdoğan-Bayır, O. (2016). Perception of peace in students' drawings. *Eurasian Journal of Educational Research, 65,* 181-198. DOI: 10.14689/ejer.2016.65.11

Chermet-Carroy, S. (2008). *Understanding the drawings of a child, or how to interpret the drawings of young children.* Lodz: Wydawnictwo Ravi.

Clausewitz, C. V. (2017). *On war.* Ankara: Doruk Publication.

Cole, A. & Knowles, J. G. (2008). Arts informed research. In J.G. Knowles & A. Cole (Eds.), *Handbook of the arts in qualitative research* (pp. 55-70). Los Angeles, CA: Sage Publication.

Cooper, P. (1965). The development of the concept of war. *Journal of Peace Research, 2*(1), 1–16. DOI: 10.1177/002234336500200101

Dağı, I. D. (2004). Normative approaches: Justice, equality and human rights. In A. Eralp (Ed.), *State, System and Identity.* İstanbul: İletişim Publication.

Denzin, N. K. & Lincoln, Y. S. (2005). *The sage handbook of qualitative research.* New York, US: Sage Publication.

Droba, D. D. (1931). Effect of order of presentation on the recall of pictures. *Journal of Educational Psychology, 22*(9), 677-682.

Eckhardt, C. C. (1917). War and peace in the light of history. *History Teacher's Magazine, 8*(2), 43-46.

Finley, S. (2011). Critical arts-based inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *The sage handbook of qualitative research* (pp. 435–450). Los Angeles, CA: Sage Publication.

Gardner, H. (1980). *Artful scribbles: The significance of children's drawings.* New York, NY: Basic Books.

Grauer, K. (1994). *Art education for children in crisis.* Çevrim-içi: [https://files.eric.ed.gov/fulltext/ED385476.pdf]. Erişim tarihi: 01.02.2020.

Gray, C. & Malins, J. (2004). *Visualizing research: A guide to the research process in art and design.* Burlington, VT: Ashgate.

Grotius, H. (2001). *On the law of war and peace.* Çevrim-içi: [https://socialsciences.mcmaster.ca/econ/ugcm/3ll3/grotius/Law2.pdf]. Erişim tarihi: 10.02.2020.

Hakvoort, I. (2010). The conflict pyramid: A holistic approach to structuring conflict resolution in schools. *Journal of Peace Education, 7*(2), 157-169. DOI: 10.1080/17400201.2010.498997

Hakvoort, I. & Hagglund, S. (2001). Concepts of peace and war as described by Dutch and Swedish girls and boys. *Peace and Conflict: Journal of Peace Psychology, 7*(1), 29-44.

Hakvoort, I. & Oppenheimer, L. (1993). Children and adolescents' conceptions of peace, war and strategies to attain peace: A Dutch case study. *Journal of Peace Research, 30,* 65-77.

Hakvoort, I., & Oppenheimer, L. (1998). Understanding peace and war: A review of developmental psychology research. *Developmental Review, 18*(3), 353-389. DOI:10.1006/drev.1998.0471

Hall, R. (1993). How children think and feel about war and peace: An Australian study. *Journal of Peace Research, 30*(2), 181-196. DOI: 10.1177/0022343393030002005

Harris, I. M. & Morrison, M. L. (2003). *Peace education.* Jefferson, NC: McFarland.

Hervey, L. W. (2004). Artistic inquiry in dance/movement therapy. In R. F. Cruz & C. F. Berrol (Eds.), *Dance/Movement Therapists in Action: A Working Guide to Research Options* (pp. 181-205). Springfield, IL: Charles C Thomas.

Hobbes, T. (1985). *Leviathan.* USA: Penguin Books.

Hsieh. W. M. & Tsaii, C. C. (2016). Learning illustrated: An exploratory cross-sectional drawing analysis of students' conceptions of learning. *The Journal of Educational Research, 111,* 1-12. DOI: 10.1080/00220671.2016.1220357

Ihlamur-Öner, S. F. (2015). Türkiye'nin Suriyeli mültecilere yönelik politikası. *ORSAM, 6*(61), 42-45.

Jabbar, S. & Betawi, A. (2019). Children express: War and peace themes in the drawings of Iraqi refugee children in Jordan. *International Journal of Adolescence and Youth, 24*(1), 1-18. DOI: 10.1080/02673843.2018.1455058

Kırılmaz, M. C. & Öntaş, T. (2020). Examination of implementing inclusive education towards refugees by elementary school teachers. *HAYEF: Journal of Education, 17*(1), 51-82.

Kollontai, P. (2010). Healing the heart in Bosnia-Herzegovina: Art, children and peacemaking. International Journal of Children's Spirituality, 15(3), 261–271.

Laguna, M. & Lachowska, B. (2003). *Projection drawing as a method of psychological research.* Lublin: Towarzystwo Naukowe.

Lambert, N. (1994). Art education for children in crisis: Drawings of war and peace. *International Society for Education through Art, 1*(2),12-16.

Leavy, P. (2009). *Method meets art: Social research and the creative arts.* London, UK: Guildford.

Madzarac, Z. B., Barić, A., Abdović, S. & Marić, Z. (2003). Peace test: Is war sometimes a better solution? Survey of students of Zagreb and Mostar Schools of Medicine. *Croatian Medical Journal, 44*(1):36-40. Çevrim-içi: [http://neuron.mefst.hr/docs/CMJ/issues/2003/44/1/12590427.pdf]. Erişim tarihi: 10.02.2020.

McArdle, F. A. & Spina, N. J. (2007). Children of refugee families as artists: Bridging the past, present and future. *Australian Journal of Early Childhood, 32*(4), 50-53.

McLernon, F. (1998). *Northern Irish children's understanding of peace, war and strategies to attain peace.* Unpublished doctoral thesis, University of Ulster, Coleraine, Northern Ireland.

McLernon, F. & Cairns, E. (2001). Impact of political violence on images of war and peace in the drawings of primary school children. *Peace and Conflict: Journal of Peace Psychology, 7*(1), 45. DOI: 10.1207/S15327949PAC0701_04

McLernon, F., Ferguson, N. & Cairns, E. (1997). Comparison of Northern Irish children's attitudes toward and peace before and after the paramilitary ceasefires. *International Journal of Behavioral Development, 20,* 715-730.

McNiff, S. (2008). Art-based research. In J. G. Knowles & A. L. Cole (Eds.), *Handbook of the arts in qualitative research* (pp. 29-41). Los Angeles, CA: Sage Publication.

Miles, M. B. & Huberman, A. M. (1994). *Qualitative data analysis.* Los Angeles, CA: Sage Publication.

Miles, M., Huberman, M. & Saldana, J. (2014). *Qualitative data analysis.* Los Angeles, CA: Sage Publication.

Morgan, D. L. & Morgan, R. K. (2008). *Single-case research methods for the behavioral and health sciences*. Los Angeles, CA: Sage Publication.

Oppenheimer, L. (2010). Contributions of development psychology to peace education. In G. Salamon & E. Cairns (Eds), *Handbook on Peace Education* (pp. 103-119). UK: Psychology Press.

Özer, S., Oppeal, B., Şirin, S. & Ergün, G. (2018). Children facing war: Their understandings of war and peace. *Vulnerable Children and Youth Studies, 13*(1), 60-71. DOI: 10.1080/17450128.2017.1372652

Page, J. S. (2000). Can history teach us. *Peace Review, 12*(3), 441-448.

Patton, M. Q. (1990). *Qualitative evaluation and research methods.* Newbury Park, CA: Sage Publication.

Paul, J. (2005). *Introduction to the philosophies of research and criticism in education and the social sciences.* Upper Saddle River, NJ: Pearson.

Perkins, D. (2002). Paradoxes of peace and the prospects of peace education. In G. Salomon & B. Nevo (Eds.), *Peace Education: The Concept, Principles, and Practices Around the World* (pp. 37-53). Mahwah, NJ: Lawrence Erlbaum Associates.

Piaget, J. (1952). *The origins of intelligence in children.* Madison, CT: International Universities Press.

Richardson, A. S. (1982). Arts means language. *Art Education, 35*(5), 10-15.

Schrumpf, F., Crawford, K. D. & Bodine, J. R. (2007). *Okulda çatışma çözme ve akran arabuluculuk program rehberi.* Ankara: İmge Kitapevi.

Shehi, R. Z., Özcan, S. & Hagen, T. (2018). The role of higher education institutions in building a culture of peace: An Albanian case. *Journal of Peacebuilding & Development, 13*(1), 46-61.

Silverman, D. (2013). *Doing qualitative research: A practical handbook.* New York, US: Sage Publication.

Singh, N. & Srivastava, S. K. (2011). Impact of Colors on the Psychology of Marketing - A Comprehensive overview. *Management and Labor Studies, 36*(2), 199-209.

Smith, R. C. (1993). Concepts of peace. *Political Science, 45*(2), 198-208. DOI: 10.1177/003231879304500204

Stiles, D. A., Gibbons, J. L. & De Silva, S. S. (1996). Girls' relational self in Sri Lanka and the United States. *The Journal of Genetic Psychology, 157*(2), 191-203.

Sunström, M. (1981). Pictures of war and peace by the Finnish and Icelandic youth, *AGORA*, 177-187.

Tanay, E. R. (1994). Croatian and Bosnian children's art in times of war. *Journal of Art & Design Education, 13*(3), 235-240. DOI:10.1111/j.1476-8070.1994.tb00718.x

Tolley, H. (1973). *Children and war: Political socialisation to international conflict.* New York: Teacher's College Press.

Tolstoy, L. (2007). *War and peace.* New York: Knoph.

Tuneu, N. P., Flores, I. C., Prat, J. C., Prat-Viñolas, P., Bardolet, A. T. & Mundó, A. G. (2015). The Spanish Civil War as seen through children's drawings of the time. *Paedagogical Historica, 51*(4), 478-495.

Walker, K., Myers-Bowman, K. S. & Myers-Walls, J. A. (2003). Understanding war, visualizing peace: Children draw what they know. *Art Therapy: Journal of the American Art Therapy Association, 20*(4), 191-200.

Yedidia, T. & Lipschitz-Elchawi, R. (2012). Examining social perceptions between Arab and Jewish children through human figure drawings. *Art Therapy: Journal of the American Art Therapy Association, 29*(3), 104-112. DOI: 10.1080/07421656.2012.703052.

İbili, E. (2020). Examination of Health Science University students' level of readiness for e-learning. *International Online Journal of Education and Teaching (IOJET), 7*(3). 1010-1030. https://iojet.org/index.php/IOJET/article/view/868

Received: 16.04.2020
Received in revised form: 16.05.2020
Accepted: 18.05.2020

EXAMINATION OF HEALTH SCIENCE UNIVERSITY STUDENTS' LEVEL OF READINESS FOR E-LEARNING

Research Article

Emin İbili

Afyonkarahisar Health Sciences University

eminibili@gmail.com

Emin İBİLİ is a faculty member at Afyonkarahisar Health Sciences University. He is the director of the Distance Education Research Center. He received his Ph.D. in Computer Education and Instructional Technology from Gazi University. His research interests are computer-assisted learning tools, in particular educational augmented reality tools for medical education, and geometry education. Also his research interests are include distance education and Internet addiction effects in terms of academic performance and behavior.

EXAMINATION OF HEALTH SCIENCE UNIVERSITY STUDENTS' LEVEL OF READINESS FOR E-LEARNING

Emin İBİLİ

eminibili@gmail.com

Abstract

In this study, the e-readiness levels of university students studying in the field of health sciences were examined in terms of different variables. In this context, whether the level of e-readiness differs according to gender, department, class level, type of education, device ownership, working status and economic level has been examined. In addition, the relationship between e-readiness level and academic success was investigated. The research sample consists of 923 health science students studying in different departments. The results of the research show that gender, learning type, device type and income level are important factors on the e-readiness level. In addition, the e-readiness levels of the nursing department students, normal (daytime) teaching, 1st year students were found to be low in the study. As the difficulty level of the courses increased, the level of e-readiness was found to be an important factor on academic achievement. The results obtained from this research provide important clues for academicians as well as institutions and organizations providing services in the field of health sciences who want to switch to distance education. In addition, some suggestions were made in the light of this research results.

Keywords: E-readiness levels, university students, health science university.

1. Introduction

The world health organization announced that COVID-19, which is spreading rapidly in many countries, is described as a pandemic. Schools have been closed and education stopped in more than 130 countries due to quarantine or social isolation rules. This affects approximately 80% of students. Education and training institutions continue their educational activities with e-learning method in many countries where anxiety level has increased and people feel frightened and sad due to this situation. In this process, many digital learning methods, communication tools and learning management systems have been used. In this context, all schools and universities in Turkey continue their education and training by distance learning. It is necessary to consider carefully whether the distance education will be successful or not, especially for the health sciences students, who receive applied education for a significant part of their courses. E-learning is defined as a way of learning, in which the interaction between educator, student and course content is carried out synchronously or asynchronously via electronic communication systems such as internet, video, telephone, computer, etc. Other common names of e-learning are known as online learning, virtual learning, distance education, network and web-based learning and distributed learning (Işık, Hakan & Güler, 2008). The use of e-learning systems has advantages such as eliminating the cost of printing required for teaching materials, providing ease of distribution, updating when desired, and providing support and ease of interaction (Ibili, Resnyansky & Billinghurst, 2019). Thanks to the ability to customize e-learning systems according to the level and content of education (Benhamdi, Babouri & Chiky 2017) and the possibility of repeating as much as the student needs without time limitation (Duran, Önal & Kurtuluş, 2006), it creates equal

opportunities for individual differences (Hakkari et al., 2008). One of the important advantages of e-learning systems compared to formal education is that it enables student to understand the teaching content that is impossible to display in a physical environment because of its difficulty or high cost, in a short time with the appropriate visuals and animations as well as to reinforce what he / she has learned by experimenting with simulations and repeating it as much as he wishes. In other words, in e-learning environments, accessing richer and more comprehensive content through visual and audio sources and accessing learning content on demand without the need for time and space increases the effectiveness and efficiency of teaching.

In addition, providing a wide range of options according to the cognitive styles of the students, e-learning both increases the motivation of the student and facilitates the achievement of the mastery learning's goal (the whole class) (Grundman, Wington & Nickol, 2000). On the other hand, obtaining statistical data related to educational activities carried out in e-learning environments more easily and quickly gives important clues in order to increase the quality of education and the necessary education as well as training methods can be applied quickly. For the first time, Thorndike (1971) defined readiness as "mental preparation for learning" and stated that there are basically three important points on this subject. First of all, he emphasized that letting the activity be done when the individual is ready for an activity makes him happy. In addition, it was stated that an individual feels anger when the individual is ready for the activity, but he is prevented from doing the activity or is forced to do the activity even though he is not ready (Thorndike, 1971). E-learning readiness is defined as being mentally and physically ready for e-learning experiences and activities (Borotis & Poulymenakou, 2004). The e-learning process is divided into ten sub-factors by some researchers. These are planning, e-readiness, management, support, pedagogy, technology, skill, institution, assessment and ethics (Al- Fraihat, Joy & Sinclair, 2017). However, in terms of students, the level of e-readiness is one of the most important factors (İlhan & Çetin, 2013). For this reason, it can be said that one of the most important reasons for the failure of the e-learning process is the low-level readiness of students for the use of e-learning systems (Piskurich, 2003).

It is emphasized that the student's not being ready for e-learning will lead the student to have a negative learning experience and to be biased towards e-learning (Guglielmino & Guglielmino, 2003). Smith (2005) emphasized the importance of having the skills such as technological skills, motivation, time management in addition to having basic knowledge and skills related to the course in order to be ready for e-learning and added that performing the teaching process by taking the cognitive style differences of the students into account is also important. Mafenya (2013) divided the readiness for e-learning into six sub-titles: psychological, sociological, environmental, technological readiness, content and equipment preparation. On the other hand, according to some researchers, readiness for e-learning is composed of computer-internet-online communication self-efficacy, self-learning, student control, learning motivation factors (Hung et al., 2010). Similar to this idea, Watkins R, Leigh D and Triner (2004) reported that students' access to technology, technical abilities, motivation status and usefulness of e-learning environments are effective on their e-readiness levels.

1.1. Related Literature

Studies on readiness have shown that individuals with a high level of readiness have a positive attitude towards the course (Altun, 2003; Güngör & Aşkar, 2004; Öner et al., 2018), and their motivation and academic success are high (Sakal, 2017; Öner et al., 2018). One of the most important reasons for this is that students' interest and attitudes to the lesson increase due to students' less cognitive effort required during learning (Güngör & Aşkar, 2004). On the other hand, the level of readiness is one of the basic steps not only for formal courses but also for online courses. Altun (2003) stated in his study that e-readiness is an important factor on

attitudes of pre-service teachers towards e-learning and that attitudes of those who took computer courses towards e-learning are higher than those who did not take computer courses. In addition, studies about its effect on academic success show that students who take computer lessons for the first time and who have a lower level of e-readiness have low academic success in online courses (Güngör & Aşkar, 2004; Altun, 2003, Öner et al., 2018). In addition, the effects of cognitive style on e-learning supported education were also revealed in the studies. For example, Güngör et al. (2004) found that field independent students are more successful than field dependents. Therefore, these researchers have argued that instant discussion and e-mail applications increase success in the e-learning process for dependent students. Similarly, it has been demonstrated by different researchers that students with computer and e-mail use experience have a positive attitude towards e-learning (Panda & Mishra, 2007; Brinkerhoff & Koroghlanian, 2005). In addition, it helps students feel sufficient and adapt to e-learning more easily when they have high ability to use e-learning materials (Venkatesh & Davies, 1996).

The high student motivation ensures that the success increases in parallel (Yılmaz & Özkaynak, 2012). When studies conducted on the effect of gender on the level of readiness for e-learning systems are analyzed, it is seen that different results emerge. The results show that e-readiness levels of male students are higher than female students (Coşkun, Özeke, Budakoğlu & Kula, 2018;), they feel more comfortable in e-learning (Wei & Johnes, 2005) and their e-learning satisfaction is higher. (Lu & Chiou, 2010). However, some studies have found that gender does not affect readiness for e-learning (Changiz, Haghani & Nowroozi, 2013; Yacob, Kadir, Zainudin & Zurairah, 2012; Hung, Chou, Chen & Own, 2010). According to age, it has been stated in studies related to the level of e-readiness that students under the age of 30 feel more comfortable in e-learning environments and this is due to the fact that this age group interacts more with technology (Adams, Sumintono, Mohamed & Noor, 2018; Wang, Wu & Wang, 2009).

E-learning has become a more important educational tool in this recent COVID-19 pandemic and the social isolation imperative that we must have. It is evident that the world must adapt quickly to changes and distance education in this period. Technological and scientific developments will continue as the world turns, so it is an imperative need to transfer these developments and to continue education in all areas under all circumstances. It is necessary to accept that e learning, which is still discussed in the world and not yet adopted for students, has become the most important part of education in today's conditions. In today's world, learners are composed of groups working in various positions, various age groups, or not working in any job. For this reason, planning should be made by considering the quality of the content used in e-learning, the way of communication, the transfer of information to the student, and the variables for the departments (Tuncer & Taşpınar, 2008). It is evident that readiness for e-learning is also important for health professionals. In the literature, it is emphasized that nursing and medical students are not at the desired level in terms of readiness for e-learning. As seen in the studies, as the experience increases, the satisfaction of students towards e-learning, their desire to use technology and their motivation increase. It is important to increase the effectiveness of e-learning in the health community and to make the necessary arrangements for e-learning quickly. Otherwise, educational effectiveness will be limited. For this reason, e-learning should provide equal opportunities considering the characteristics of each individual and department and necessary arrangements should be made in terms of individuals' adaptation.

In this research, the following research questions were investigated:

a. Does the e-readiness levels of students differ according to

- Gender,

- Learning Type,
- Department,
- Grade level,
- Accommodation place,
- Income rate,
- Mobile device type?

b. Is there any relationship between students' E-Readiness levels and academic achievement?

2. Method

2.1. Research Method

Paying attention to the accessibility factor in the sample selection, E-Readiness Scale (ERS) was applied to students studying in different faculties and colleges of Afyonkarahisar Health Sciences University in 2019-2020 education year before the Covid 19 quarantine. In addition, the demographic information form includes students' gender, department, type of education, class, working status, accommodation, family economic status, mobile technologies and distance education courses. In this context, the demographic characteristics of 923 students participating in the study are shown in Table 1. Family income is categorized as low income for those below 5,000 TL, medium income for those between 5000-1000 TL and high income for those above 10,000 TL. Moreover, the data of 7 students studying 5th and 6th grades of the Medicine Faculty were combined with the 4th grades and grouped as 4th grade and above. In this study, E-Readiness levels of the Health Science University students were measured. Therefore, the study was carried out in the relational screening model since the data obtained were presented as they existed and analyses were made by comparison (Karasar, 2005).

2.2. Data Collection Tools

In the research, E-readiness Scale (ERS) for e-learning developed by Yurdugül and Demir (2017) was used to measure the e-readiness levels of students. The scale items are arranged with a 7-point Likert type rating according to the options ranging from not suitable for me tocompletely suitable for me. E-Readiness scale consists of six sub-dimensions. Computer Use Self-Efficacy Perception consists of 5 items, Internet Use Self-efficacy perception consists of 4 items, Online Communication consists of 5 items, Self-Learning consists of 8 items, Learner Control consists of four items, motivation for e-learning consists of 7 items. Yurdugül and Demir (2017) calculated the overall Cronbach Alpha reliability coefficient of the scale, which was developed with the participation of 1802 students studying at the Faculty of Education, consisting of 33 items in total, as 0,93. It is seen that the subscale reliability coefficients ranged from 0.84 to 0.95. According to the results of the confirmatory factor analysis conducted by the researchers, the fit indices were found as RMSA = 0.08, NNFI = 0.96, NFI = 0.96, CFI = 0.96 and GFI = 0.96. In this study, the Cronbach's Alpha (α) coefficient of the whole scale was found to be 0.957, while the Cronbach's Alpha (α) coefficient of the sub-factors was found between 0.875 and 0.958. The scale explains 72.96% of the total variance. Based on these results, it was decided that the scale is sufficiently valid and reliable in order to measure the readiness levels for E-learning which is intended to be measured within the scope of the study. In addition, it can be said that the scale is acceptable and has good fit values according to the fit indexes (Hu and Bentler 1999).

Table 1. *Distribution of participants by demographic profile*

Features	**Category**	**Frequency**	**%**
Gender	Female	727	78.8
	Male	196	21.2
Department	Nutrition and Dietetics	158	17.1
	Physio Therapy V.H.S.	103	11.2
	Physical therapy and rehabilitation	96	10.4
	Healthcare Management	87	9.4
	Medical Laboratory Techniques V.H.S.	87	9.4
	Nursing	83	9.0
	Medical Documentation V.H.S.	75	8.1
	Electroneuro Physiology V.H.S.	55	6.0
	Dentist	48	5.2
	First and Emergency Aid V.H.S.	32	3.5
	Medical Imaging V.H.S.	29	3.1
	Medical School	20	2.2
	Pharmacy	20	2.2
	Other	30	3.3
	Total	923	100
Education Type	Normal Education (Daytime Education)	726	78.7
	Secondary Education (Evening Education)	197	21.3
Education Level	Vocational High School (2-Year Education)	411	44.5
	Faculty (4-6 Years Education)	512	55.5
Grade	I	457	49.5
	II	284	30.8
	III	104	11.3
	IV +	78	8.5
Working Status	No	883	95.7
	Yes	40	4.3
Accommodation place	Dormitory	641	69.4
	Apart	202	21.9
	Family	80	8.7
Economical	Low	733	79.4
	Middle	163	17.7
	High	27	2.9

2.3. Data Analysis

Arithmetic mean, standard deviation, t test for unrelated measurements, one-way analysis of variance, Bonferroni test and Pearson correlation coefficients were used in the analysis of the data by the means of SPSS 23 software. It was determined whether normality, linearity and homogeneity assumptions were met before analyzing the data and interpreting the findings (Tabachnick & Fidell, 2001). In order to test the compliance of the data distribution of the measured variables with the statistical analyses to be performed, the kurtosis and skewness coefficients of the variables were examined. It can be said that the data show normal distribution because the kurtosis and skew coefficients of the data are between 1 and – 1 values (West, Finch and Curran, 1995). While the homogeneity assumption of variances is tested with Levene's test, it was decided that the normality assumption is met in each combination of independent variables of the study's dependent variables($p > 0.05$). Pearson's chi-square test is preferred for comparisons between groups (Hinkle, Wiersma and Jurs, 2003).

3. Findings

In this section, the findings obtained for the purposes of the research are given tables and explanations.

Whether gender plays a role in the subscale mean scores of the scores obtained from the E-Readiness Scale of the students was examined by t-test analysis and the results are given in Table 2.

Table 2. *Results of t-test analysis of students' ERS subscale scores by gender*

	Mean ($\acute{X}$)		t	p
	Male(N=196)	Female(N=727)		
Use of computer	26.6	21.4	9.19	< .001
Using Internet	25.4	23.9	4.19	< .001
Online Communication	29.0	25.7	5.95	< .001
Self Learning	43.4	42.5	1.07	.286
Learner Control	23.1	22.2	2.23	.026
Motivation	34.9	29.8	5.40	< .001
Total	182.3	165.6	6.18	< .001

**: 0.05 significance level; **: 0.01 significance level*

According to the data in Table 2, when we look at the subscale mean scores for the E-readiness levels of the students, it is seen that there is a differentiation in favor of men in terms of the mean scores and total score averages except Self Learning ($p > .05$).

Whether the students' E-Readiness level subscale score averages differ according to their education type was examined by t-test analysis for the independent samples and the results are given in Table 3.

Table 3. *Results of t-test analysis of students' ERS subscale scores according to their education type*

	Mean ($\acute{X}$)		t	p
	Normal Education (N=726)	Secondary Education (N=197)		
Use of computer	22.2	23.8	-2.83	.005**
Using Internet	24.0	24.8	-2.19	.029*:
Online Communication	26.1	27.7	-2.95	.003**
Self Learning	42.4	43.7	-1.73	.085
Learner Control	22.1	23.3	-2.91	.004**
Motivation	30.6	32.3	-1.81	.071
Total	167.4	175.7	-3.02	.003**

**: 0.05 significance level; **: 0.01 significance level*

According to the data in Table 3, it is seen that there is a statistically significant difference in favor of students attending evening education in terms of the total score averages for their E-readiness levels (p <.01). In terms of e-readiness scale subfactors, while there is a statistically significant difference in favor of evening education students regarding the use of Computer, Online Communication, Learner Control (p <.01) and Using Internet (p <.05), there is no differentiation in terms of Self-Learning and Motivation subfactors.

The results of the t-test analysis regarding whether the students' E-Readiness score averages differ according to their working status are given in Table 4.

Table 4. *Results of t-test analysis of students' ERS subscale scores according to their working status*

	Mean ($\acute{X}$)		t	p
	No (N=726)	Yes (N=197)		
Use of computer	22.4	25.3	-2.433	.015*
Using Internet	24.2	23.6	0.882	.378
Online Communication	26.4	26.9	-0.474	.636
Self Learning	42.7	43.3	-0.419	.675
Learner Control	22.3	23.3	-1.173	.241
Motivation	30.7	35.6	-2.608	.009**
Total	168.7	178.1	-1.682	.093

**: 0.05 significance level; **: 0.01 significance level.*

According to the data in Table 4, the ERS mean scores of the students who work in an institution are higher than the ERS mean scores of the students who do not work in any

institution in terms of the Computer Aid and Motivation scores, and this difference is statistically significant. However, there is no statistically significant difference in terms of other sub-factors and total score averages.

One-Way Variance Analysis (ANOVA) results regarding whether the sub-scale mean scores obtained by the students from the E-Readiness scale differ according to the department are given in Table 5.

Table 5. *ANOVA results of students' course subscale scores according to the departments*

	N	$\acute{X}$	SS	df	F	p
Use of computer	923	22.53	7.33	13	1.56	.091
Using Internet	923	24.19	4.47	13	1.49	.116
Online Communication	923	26.41	7.00	13	2.05	.015*
Self Learning	923	42.71	9.54	13	1.63	.071
Learner Control	923	22.38	5.05	13	1.68	.061
Motivation	923	30.92	11.77	13	2.26	.006**
Total	923	169.13	34.34	13	2.45	.003**

**: 0.05 significance level; **: 0.01 significance level.*

According to the results of ANOVA in Table 5, the total score averages as well as the Average Communication and Motivation ERS averages of the students show statistically significant difference, while the other subscale average scores of the scale do not differ according to the type of the department. Bonferroni test and Post Hoc comparison results are given in Table 6.

Table 6. *Results of E-readiness scale subscale scores by Bonferroni test and Post Hoc by department type.*

Measurement	Department	n	$\acute{X}$	Sd	F	p	Difference
Online Communication	HM	87	28.21	7.11	2.05	.019*	HM - NU
	NU	83	24.31	7.87			
Motivation	HM	87	33.45	5.69	2.26	.025*	HM - NU
	NU	83	28.37	4.16			
Total	PH	10	175.66	37.7	2.44	.034*	PH - NU
	NU	83	157.76	29.6			
	HM	87	178.70	35.2		.005*	HM - NU

*: 0.05 significance level; **: 0.01 significance level.
HM: Health Management, NU: Nursing. PH: Physiotherapy

As can be seen in Table 6, the Online Communication and Motivation subscale scores of the Health Management students are significantly higher than those of the Nursing students. In addition, the E-readiness scale total score averages of both Health Management and Vocational School Physiotherapy Department students are significantly higher than the students of the nursing department. There is no difference between the other subscale mean scores by

departments. On the other hand, according to the level of education (2-Year Vocational School Education or 4-6-year Faculty Education), both the total average scores and the subscale scores are not different (p> .05).

One-way variance analysis results regarding whether the subscale mean scores of the students obtained from the E-Readiness scale differ according to the grade level are given in Table 7.

Table 7. *ANOVA results of students' ERS subscale scores according to grade level*

	N	$\acute{X}$	SS	df	F	p
Use of computer	923	22.53	7.33	3	8.99	.000***
Using Internet	923	24.19	4.47	3	2.22	.084
Online Communication	923	26,41	7,00	3	4.63	.003**
Self-Learning	923	42,71	9,54	3	2.59	.052
Learner Control	923	22,38	5,05	3	1.70	.167
Motivation	923	30,92	11,77	3	2.86	.036*
Total	923	169,13	34,34	3	5.91	.001***

: 0.05 significance level; **: 0.01 significance level; *: 0.001 significance level*

According to the results of ANOVA in Table 7, besides the total scores of the students obtained from the ERS scale; Computer Usage, Online Communication and Motivation subscale scores differ statistically according to the grade level. Bonferroni test and Post Hoc comparison results are given in Table 8.

Table 8. *Post Hoc analysis result of students' ERS subscale scores according to grade level*

Measurement	Class	n	$\acute{X}$	Sd	F	p	Difference
Use of computer	I	457	21.56	7.35	8.99	.000***	I - IV
	II	284	22.93	7.35			
	III	104	23.13	7.02		.007**	II - IV
	IV	78	25.92	6.36			
Motivation	II	457	30.13	11.79	2.86	.038*	I - IV
	III	284	31.50	11.82			
	IV	104	30.39	11.37			
	II	78	34.06	11.63			
Total	III	457	165.13	35.14	5.91	.001***	I - IV
	IV	284	171.73	33.79			
	II	104	170.63	32.34			
	III	78	181.08	30.73			

: 0.05 significance level; **: 0.01 significance level; *: 0.001 significance level*

As can be seen in Table 8, Computer Usage subscale score averages of Grade 4 and above students show a statistically significant difference compared to first grade students. In addition, 4th grade students' motivation subscale mean scores and total mean scores are higher than 1st grade students. There is no difference between the other subscale mean scores by class.

ANOVA results regarding whether the subscale mean scores of the students obtained from the E-Readiness scale differ according to the accommodation place are given in Table 9.

Table 9. *ANOVA analysis results of students' ERS subscale scores according to accommodation place*

Accommodation	N	$\acute{X}$	SS	df	F	p
Use of computer	923	22.53	7.33	2	9.24	.000***
Using Internet	923	24.19	4.47	2	2.72	.067
Online Communication	923	26.41	7.00	2	2.83	.059
Self-Learning	923	42.71	9.54	2	5.47	.004**
Learner Control	923	22.38	5.05	2	4.84	.008**
Motivation	923	30.92	11.77	2	2.07	.126
Total	923	169.13	34.34	2	6.53	.002**

: 0.05 significance level; **: 0.01 significance level; *: 0.001 significance level*

According to the results of one-way variance analysis in Table 9, as well as the total scores of the students obtained from the ERS scale, the Computer Usage, Self-Learning and Learner Control subscale scores show statistically important difference ($p < .05$). Bonferroni test and Post Hoc comparison results are given in Table 10.

Table 10. *Post Hoc analysis result of students' ERS subscale scores according to accommodation place*

Measurement	Accommodation	n	$\acute{X}$	Sd	F	P	Difference
Use of computer	Family	80	24.5	7.5	9.24	.007**	Dormitory-Family
	Apartment	202	23.9	7.3			
	Dormitory	641	21.9	7.2		.002**	Dormitory-Apartment
Using Internet	Family	80	26.7	7.1	5.49	.005**	Dormitory-Family
	Apartment	202	27.4	7.3			
	Dormitory	641	26.1	6.9			
Self-Learning	Family	80	23.4	4.8	4.84	.041*	Dormitory-Apartment
	Apartment	202	23.1	5.0			
	Dormitory	641	22.1	5.1			
	Family	80	177.1	32.6			

Total	Apartment	202	174.4	35.1	6.53	.026*	Dormitory-Family
	Dormitory	641	166.5	34.0		.012*	

**: 0.05 significance level; **: 0.01 significance level*

As it can be seen in Table 10, the self-learning levels of the students staying with families show a statistically significant difference compared to the individuals living in the dormitory. The learner control subscale mean scores of students staying in the apartments are significantly higher than the students staying in the dormitories. When the total average scores are taken into consideration, the average scores of the students staying with the family and staying in the apartments are significantly higher than the students staying in the dormitory. In the other subscale mean scores, there is no difference according to accommodation.

One-way variance analysis results regarding whether the sub-scale mean scores obtained by students from the E-Readiness scale differ according to income rate are given in Table 11.

Table 11. *ANOVA analysis results of students' ERS subscale scores according to income rate*

Measurement	N	$\acute{X}$	SS	df	F	p
Use of computer	923	22.53	7.33	2	9.54	.000***
Using Internet	923	24.19	4.47	2	5.01	.007**
Online Communication	923	26.41	7.00	2	5.66	.004**
Self Learning	923	42.71	9.54	2	3.55	.029*
Learner Control	923	22.39	5.053	2	3.32	.037*
Motivation	923	30.916	11.78	2	.003	.997
Total	923	169.13	34.34	2	3.73	.024*

: 0.05 significance level; **: 0.01 significance level; *: 0.001 significance level*

According to the results of one-way variance analysis in Table 11 there is a significant difference between the total score averages that the students obtained from the scale of ERS ($p < .05$). In addition, there is a statistically significant difference in the other subscale mean scores except the Motivation subscale mean scores. Bonferroni test and Post Hoc comparison results are given in Table 12.

Table 12. *Post Hoc analysis results of students' ERS subscale scores according to their income status*

Measurement	Income	n	$\acute{X}$	Sd	F	p	Difference
Use of computer	X_1	733	22.00	7.39	9.54	.000***	X_1 - X_2
	X_2	163	24.67	6.39			
	X_3	27	23.93	8.51			
Using Internet	X_1	733	23.98	4.60	5.01	.005**	X_1 - X_2
	X_2	163	25.18	3.51			

	X_3	27	23.78	5.47			
Online Communication	X_1	733	26.02	7.12	5.66	.007**	X_1 - X_2
	X_2	163	27.86	6.15			
	X_3	27	28.30	7.54			
Self-Learning	X_1	733	42.56	9.50	3.55	.038*	X_2 - X_3
	X_2	163	43.98	8.92			
	X_3	27	39.04	12.86			
Learner Control	X_1	733	22.25	5.06	3.32	.029*	X_1 - X_2
	X_2	163	23.20	4.70			
	X_3	27	21.07	6.43			
Total	X_1	733	167.72	34.74	3.73	.020*	X_1 - X_2
	X_2	163	175.77	30.67			
	X_3	27	167.19	40,51			

: 0.05 significance level; **: 0.01 significance level; *: 0.001 significance level*
X_1: Low Income Level, X_2: Middle Income Level, X_3: High Income Level

According to the data in Table 12, the total point average of the students with middle income level is higher than the students with low income level ($p < .05$). Similarly, the mean scores of middle-income students' Computer Usage, Using Internet, Online Communication, and Learner Control subscale are significantly higher than students with low income ($p < .01$). On the other hand, the self-learning subscale score averages of middle-income students are significantly higher than the students with high income levels. There is only no difference in Motivation subscale point averages according to income status.

The desktop computer ownership plays a role in the subscale score averages obtained by the students from the e-readiness scale was examined with t-analysis for independent samples and the results are given in Table 13.

Table 13. *T-test analysis results of students' ERS subscale scores according to PC ownership*

	Mean ($\acute{X}$)		**t**	**p**
	No (N=851)	Yes (N=72)		
Use of computer	22.2	26.5	-4.904	< .001***
Using Internet	24.1	24.8	-1.309	.191
Online Communication	26.2	28.8	-3.016	.003**
Self-Learning	42.6	44.4	-1.586	.113
Learner Control	22.3	23.1	-1.224	.221
Motivation	31.0	30.4	0.364	.716

Total	168.4	178.1	-2.317	.021*

: 0.05 significance level; **: 0.01 significance level; *: 0.001 significance level*

According to the data in Table 13, when the average scores of the students for their e-readiness levels are analyzed, Computer Usage, Online Communication and Total score averages differ significantly in favor of those with desktop computers.

The laptop ownership plays a role in the subscale score averages obtained from the E-Readiness scale of the students was examined with the t-analysis for independent samples and the results are given in Table 14.

Table 14. *Results of t-test analysis of students' ERS subscale scores according to laptop ownership*

	Mean ($\acute{X}$)		t	p
	No (N=565)	Yes (N=358)		
Use of computer	21.4	24.3	-6.10	< .001***
Using Internet	23.6	25.1	-4.98	< .001***
Online Communication	25.5	27.8	-4.98	< .001***
Self-Learning	41.8	44.2	-3.78	< .001***
Learner Control	21.9	23.1	-3.34	< .001***
Motivation	30.3	31.9	-2.11	.036*
Total	164.5	176.5	-5.25	< .001***

: 0.05 significance level; **: 0.01 significance level; *: 0.001 significance level*

According to the data in Table 14, when the average scores of the students' E-readiness levels are analyzed, both the sub-scale mean scores and the total mean scores differ significantly in favor of those with a laptop computer. There is no difference in other subscale mean scores according to desktop computer ownership.

The tablet ownership plays a role in the subscale score averages obtained by the students from the E-Readiness Scale was analyzed with the t-test for independent samples and the results are given in Table 15.

Table 15. *Results of t-test analysis of students' ERS subscale scores according to tablet computer ownership*

	Mean ($\acute{X}$)		t	p
	No (N=800)	Yes (N=123)		
Use of computer	22.1	25.2	-4.451	< .001***
Using Internet	24.1	25.0	-2.284	0.023*
Online Communication	26.2	28.1	-2.809	0.005**
Self-Learning	42.5	43.7	-1.301	0.194

Learner Control	22.3	22.6	-0.552	0.581
Motivation	30.7	32.3	-1.386	0.166
Total	167.9	177.0	-2.735	0.006**

: 0.05 significance level; **: 0.01 significance level; *: 0.001 significance level*

According to the data in Table 14, when it is looked at the average scores for students' E-readiness levels, there is a significant difference in favor of those who have a tablet computer in terms of Computer Usage, Using Internet, Online Communication and total score averages. There is no difference in other subscale mean scores according to the ownership of tablet computers. On the other hand, according to the ownership of the smart phone, both the total score averages and the subscale score rates differ (P> .05).

Bilateral correlation results of students' E-readiness scale subscale scores and courses taken by students via distance education are given in Table 16.

Table 16. *The relationship between ERS scale sub-factors and academic success (pearson r)*

	Academic Success Average			
	Turkish Language I (n=858)	Turkish Language II (n=463)	History I (n=768)	History II (n=409)
Use of computer	.077*	.145**	.085*	.155**
Using Internet	.067*	.092*	.075*	.131**
Online Communication	.037	.117*	.041	.133**
Self-Learning	.093**	.106*	.079*	.129**
Learner Control	.075*	.071	.081*	.112*
Motivation	.044	-.002	.039	.011
Total	.085*	.105*	.083*	.132**

*: 0.05 significance level; **: 0.01 significance level; ***: 0.001 significance level

While there is no significant relationship between the academic success averages of Turkish Language I and History I courses and online communication skills of the variables in Table 15, there is a significant relationship between the academic achievement averages of Turkish Language II and History II courses. Besides, the learner control does not have a significant relationship with only the academic achievement averages of Turkish Language II course but has a significant relationship with the other subscale mean scores. On the other hand, while it is seen that the highest relationship was between the Academic success average of History II course and Computer use subscale score, the lowest meaningful relationship was observed between internet usage skills and Turkish Language I course.

4. Discussion and Results

In this study, the readiness of students studying in the thirteen faculties and vocational schools of the Health Sciences University regarding online learning was examined in terms of different variables. According to this, it has been investigated whether the level of e-readiness of students differs according to their gender, accommodation, computer or mobile device ownership, department in which they are studying, job status, education types (daily or evening

education), distance education experience. In addition, the relationship between e-readiness and academic achievement was examined.

In the study, it was found that students' levels of E-readiness differ according to their gender. In terms of sub-dimensions, the average score of male students is higher in all other sub-dimensions except Self-Learning sub-dimension. In his study, Sakal (2017) found that there was a significant difference in the online communication dimension in favor of male students, but other sub-dimensions did not differ by gender. Toplu and Gökçearslan (2012) reported that male students at the university have higher self-efficacy beliefs towards e-learning. Adnan and Boz (2017) reported that the readiness of engineering students for e-learning does not differ by gender. However, in the same study, it was emphasized that the sub-dimensions of personal characteristics and technological skills in the expectation scale of readiness were higher in male students. It was also emphasized that male students with e-learning experience have more positive attitudes towards e-learning than female students (Adnan & Boz, 2017). In this study, while there was no gender difference in the self-learning dimension, in accordance with the literature, all sub-dimensions of the e-readiness scale were found high in favor of male gender in terms of computer use, internet use, online communication, learner control and motivation subscales.

In the study, E-readiness levels of Health Management and Vocational School Physiotherapy Department students were found to be higher than the students of the nursing department. In a study examining midwifery department students, it was found that the e-readiness scores and motivation of e-learning were high (Öner et al., 2018). In another study, it has been found that first year students of computer and civil engineering have sufficient personal characteristics, access to technology and sufficient technological skills for e-learning (Adnan & Boz, 2017). Accordingly, the researchers found that the readiness level of students to e-learning is high. However, they did not find any difference in terms of inter-departmental readiness levels. In the same study, these students were found to have high motivation for e-learning. Based on these results, researchers stated that students' better experience with internet technologies will not affect their success in e-learning environments. The researchers stated that the reason for this is that the students do not have enough orientation education for e-learning. Coşkun, Kaymakoğlu and Gök (2007) determined that the first, second and third grade students of the medical faculty have low levels of e-learning knowledge, as well as e-learning and video conference systems are not used. In the same study, it was observed that students used the internet while conducting research. In addition, it was found that medical students' requests to take lessons in the electronic environment were low (Coşkun, Kaymakoğlu & Gök, 2007). Yurdugül and Demir (2017) reported that e-readiness of prospective teachers is at a good level in a study involving approximately thirteen different education department students. As a result of the study, the researchers found that the students of Foreign Language Education Department, Secondary School Science and Mathematics Education Department and Computer Education Instructional Technology Department (CEIT) had a high level of e-readiness. In addition, they found that the majority of students in the Guidance and Psychological Counseling and Primary Education departments had low level of e-readiness. Especially, it was emphasized that the facts that the higher computer and internet self-efficacy subscales of CEIT students compared to all departments and foreign language students to be actively using e-learning for a long time played an important role in these results (Yurdugül & Demir, 2017). In this study, it was found that online communication and motivation subscale scores of Health Management and Vocational School Physiotherapy students were higher than the students of the nursing department. Other e-readiness sub-dimensions did not differ according to the departments. Accordingly, in the study of Öner et al. (2018), it can be thought that the ease of access to internet and computer for midwifery students receiving distance

education also affected their motivations. In this study, it can be said that the use of internet and computers for teaching purposes is higher for Health management and Physiotherapy students rather than the students of the nursing department. As seen in other studies, as the rate of internet-related lessons and the ease of access to technology increase, the increase in many readiness sub-dimension scores such as motivation, online communication, and technical skills is observed. It can be thought that the low-level readiness of the Nursing Department and the Faculty of Medicine students derives from that these departments are more focused on practical work and their experience in terms of e-learning is not enough.

In the study, it was found that E-Readiness levels of students differ according to their grade level. In a study conducted with the first, second, and third classes pre-service teachers, it was found that the attitudes of students who have taken a computer course before to e-learning are higher than those who have never taken a computer course (Altun, 2003). In another study, it was reported that fourth year students of undergraduate teacher education got higher scores in all sub-dimensions of e-learning readiness compared to the first-grade students (Yurdugül & Demir, 2017). On the other hand, Öner et al (2018) stated that the readiness scores for e-learning between the first and second grades did not differ; however, the second-grade students had higher motivation scores. In this study, in accordance with the literature, it can be said that fourth grade students have higher scores compared to first grade students in terms of computer usage and motivation dimension. According to these results, it can be said that as e-learning experience increases, readiness and especially motivation increase.

In this study, it was found that students' E-Readiness levels differ according to their working status. Öner et al. (2018) examined e-readiness levels of people who are graduates of health high schools and work in health institutions, and those who receive midwifery education via distance education, and reported that the first group's scores are higher in terms of computer use and e-learning motivation. In this study, in accordance with the literature, it was found that students working in any institution have higher levels of Computer Use Self-Efficacy and Motivation compared to students who do not work. It can be said that distance education offering an equal opportunity for the students working is an important factor for this.

Toplu and Gökçearslan (2012) found that the status of university students in the computer ownership does not affect their self-efficacy believes in the internet use. The researchers attributed this to the inadequate use of the internet today and to the inadequate diverting of students to the use of computers for e-learning purposes in high school education. Öner et al. (2018) reported that 96.5% of the students in their study have internet connection at home and 75% of them use the internet for e-learning purposes. Researchers reported that the students of midwifery department were not different in terms of e-readiness. They thought this derived from their almost equal access to technology (Öner et al., 2018). In this study, it was found that students with desktop computers had higher perception of computer use and online communication self-efficacy compared to students without desktop computers, while students with laptop computers had high scores in all sub-factors of e-readiness scale. Students with tablet computers were found to have high average scores on Computer Usage, Using Internet, Online Communication and total. On the other hand, students who have smart phones do not differ in their total scores and subscale scores. According to this, it can be said that owning laptop computers and accessing to technology allow students to work anywhere and anytime, and it has a positive effect on e-readiness, but as mobile devices get smaller, they have lost their impact on e-learning.

Adnan and Boz (2017) argued thate-learning readiness levels did not affect the previous e-learning experience. However, it was reported that the technological skills, attitude and motivation sub-dimensions of the students who have received e-learning education earlier were

higher than the students who received the e-learning education for the first time. It has also been reported that students with previous e-learning experience have higher e-learning satisfaction. Toplu and Gökçearslan (2012) stated that taking a computer lesson has no effect in terms of self-efficacy belief in e-learning or educational internet use. In this study, in line with the literature, a positive correlation was found between distance education experience and motivation. In another study, it was found that as the readiness increased, academic success increased; especially high technical skills and motivation were found to affect success very well (Korkmaz, Çakır & Tan, 2015). It was found that there was no relationship between motivation and academic success. In this study, the relationship between the success of Turkish Language II and History II courses and online communication skills was found. In addition, no relationship between the Turkish Language II achievement average and the sub-dimensions other than learner control and motivation factor was identified. It was found that the highest correlation was between the achievement averages of History II course and the self-efficacy perception of Computer Use. According to this, it can be considered that as the experience increases, students' technical skills, motivation levels and attitudes are positively affected.

5. Conclusion and Recommendations

In this study, the e-readiness levels of university students studying in the field of health sciences were examined in terms of different variables. Research results show that gender, education type and income level are important factors in students' readiness levels. It was found that students' level of computer use and motivation differed from the e-readiness scale sub-factors according to their work status. No effect of the type of education was found for other sub-factors. E-readiness levels were lower than the students of the nursing department, the students of the health management department and the students of the vocational high school physiotherapy department. E-readiness scores of 4th grade students were found higher than 1st grade. E-readiness levels are lower in terms of total scores, as well as computer use, Using Internet and learner control sub-factors compared to students staying in homestays or in apartments. In terms of device ownership, the e-readiness level of students who have a laptop computer was found to be the highest. While smartphone ownership has no effect on the level of e-readiness, it has been found that desktop ownership and tablet computer ownership differ in terms of computer usage and online communication sub-factors in addition to the total scores of E-readiness. As the level of e-readiness increases, the relationship between academic achievement increases in terms of lessons which are more difficult in academic terms. According to the results of this research, the following suggestions were made.

Due to the low level of e-readiness of female students, distance education may be ineffective in health programs, the majority of which are female students. For this reason, e-readiness levels of these students can be increased by providing pedagogical trainings to female students prior to distance education as well as technical trainings for the use of the system.

There is a high level of readiness in distance education for secondary education students, some of whom are working or have to go to school in the evening. For this reason, e-readiness levels of normal education students can be increased through online communication or video conference applications.

E-readiness levels of students with moderate economic income were higher than students with low income. This result is related to the findings showing that laptop ownership is an important advantage. Therefore, having low income students having a laptop will have a significant impact on the level of e-readiness of these students.

E-readiness levels of nursing students were lower in the study. The fact that the number of female students is high in this section may be an important factor in the emergence of this

result, at the same time, it may be effective in this result that students of this department receive more practical courses. For this reason, the inclusion of similar departments in online communication applications and activities that will increase their motivation in distance education will contribute on e-readiness levels.

E-readiness levels of students staying in homestays or in apartments are higher. This result is due to disadvantageous reasons such as limited internet access of students living in dormitories. In addition, the fact that most of the students living in state dormitories are composed of students with low economic level is effective in this result. For this reason, providing some basic facilities such as free internet to these students will be an important factor in increasing their e-readiness levels.

History I and Turkish language I courses are easier than History II and Turkish language II courses. For this reason, less online communication, using internet or advanced computer skills are required. This result shows that e-readiness is an important factor with increasing difficulty level of lessons. For this reason, it is recommended that lecturers provide more guidance in terms of readiness for e-learning in high difficulty courses.

In this study, the lesser participation of the medical faculty students created a limitation in the research. On the other hand, in addition to the e-readiness level of the students, it is suggested to the next researchers to collect learning styles, cognitive loads and qualitative data related to these data together.

6. Conflict of Interest

The author declares that there is no conflict of interest.

7. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Adams, D., Sumintono, B., Mohamed, A., & Noor, N.S. (2018). M.E-Learning readiness among students of diverse backgrounds in a leading Malaysian Higher Education Institution. *Malaysian Journal of Learning and Instruction*, 15(2). 227-256.

Adnan, M., & Boz, Y.B. (2017 Profile of engineering undergraduates on readiness and satisfaction for e-learning. *Turkish Journal of Computer and Mathematics Education*, 8(2), 218-243.

Al-Fraihat, D., Joy, M., & Sinclair, J. (2017, June). Identifying success factors for e-learning in higher education. In *International conference on e-learning* (pp. 247-255). Academic Conferences International Limited).

Altun A. (2003). Ögretmen adaylarinin bilissel stilleri ile bilgisayara yönelik tutumlari arasindaki iliskinin incelenmesi. *TOJET: The Turkish Online Journal of Educational Technology*, 2.1.

Benhamdi, S., Babouri, A., & Chiky, R. (2017). Personalized recommender system for e-learning environment. *Education and Information Technologies*, *22*(4), 1455-1477.

Brinkerhoff, J., & Koroghlanian, C. M. (2005). Student computer skills and attitudes toward internet-delivered instruction: An assessment of stability over time and place. *Journal of Educational Computing Research*, *32* (1), 27-56.

Borotis, S., & Poulymenakou, A. (2004). e-Learning readiness components: Key issues to consider before adopting eLearning interventions. In J. Nall, & R. Robson (Eds.), Proceedings of world conference on e-Learning in corporate, government, healthcare, and higher education (pp. 1622e1629). Chesapeake, VA: AACE.

Changiz, T., Haghani, F., & Nowroozi, N. (2013). Are postgraduate students in distance medical education program ready for e-learning? A survey in Iran. *Journal of education and health promotion*, *2*.2.

Coşkun, G., Kaymakoğlu, B., & Gök, E. (2007). The Internet Usage of Medical School Students and Their Attitudes Towards e-learning: An Application for Başkent University, *IV. National Medical Informatics Congress,72-77.*

Coşkun, Ö., Özeke, V., Budakoğlu, İ., & Kula, S. (2018). The levels of readiness of medical faculty members for e-learning: Gazi University Case. *Ankara Medical Journal*, *18*(2), 175-185.

Duran, N., Önal, A., & Kurtuluş, C. (2006). E-Öğrenme Ve Kurumsal Eğitimde Yeni Yaklaşım Öğrenim Yönetim Sistemleri, Bilgi Teknolojileri Kongresi IV, 9-11 Şubat 2006, Bildiriler Kitabı, 97-101.

Grundman, J., Wigton, R., & Nickol, D. (2000). You Have Got Mail: Distance Education. Academic Medicine, 75(10): 47-49.

Guglielmino, L. M., & Guglielmino, P. J. (2003). Identifying learners who are ready for e-learning and supporting their success. In G. Piskurich (Ed.), Preparing learners for e-learning (pp. 18-33). San Francisco: Jossey-Bass.

Gülbahar, Y. (2005). Learning Styles and Technology, *Educalion and Science*, *30*(138).

Gülbahar, Y., & Alper, A. (2014). Development of e-learning styles scale for electronic environments. *Educalion and Science*, *39*(171).

Güngör, C., & Aşkar (2004), P. E-öğrenmenin ve bilişsel stilin başarı ve internet öz yeterlik algısı üzerindeki etkisi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 27.27.

Hakkari, F., İbili, E., Kantar, M., Boy, Y., Bayram, F., & Doğan, M. (2008). Uzaktan Eğitimde Ders Materyallerinin Hazırlanmasında Ders İçeriklerinin Tasarımı ve Senaryolaştırılması, 2. *Uluslararası Gelecek İçin Öğrenme Alanında Yenilikler Konferansı, İstanbul*.

Hinkle, D. E., Wiersma, W., & Jurs, S. G. (2003). *Applied statistics for the behavioral sciences* (Vol. 663). Houghton Mifflin College Division.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, *6*(1), 1-55.

Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y. (2010). Learner readiness for online learning: Scale development and student perceptions. *Computers & Education*, *55*(3), 1080-1090.

Işık, İ., Hakan, A., & Güler, İ., (2008), Using the 3D Web Technologies in Distance Education, International Journal of Informatics Technologies, 75-77

İlhan, M., & Çetin, B. (2013). The validity and reliability study of the Turkish version of an online learning readiness scale. *Educational Technology Theory and Practice*, *3*(2), 72-101.

Karasar, N. (2015). Scientific Research Method (28th edition.). Ankara: Nobel Yayın Dağıtım.

Korkmaz, Ö., ÇAKIR, R., & Tan, S. S. (2015). Students E-learning Readiness and Satisfaction Levels and Effects on the Academic Achievement. *Journal of Kirsehir Education Faculty*, *16*(3).

Lu, H. P., & Chiou, M. J. (2010). The impact of individual differences on e-learning system satisfaction: A contingency approach. *British Journal of Educational Technology*, *41*(2), 307-323.

Mafenya, P. N. (2013). An investigation of first-year students' pedagogical readiness to e-learning and assessment in open and distance learning: an University of South Africa context. *Mediterranean Journal of Social Sciences*, *4*(13), 353.

Öner, S. Ç., Çelik, G., Bay, H., Yeşil, Y., & Turfan, E. Ç. (2018). Evaluation of midwifery distance education students e-learning readiness. *Medical Sciences*, *13*(1), 10-18.

Panda, S., & Mishra, S. (2007). E-Learning in a Mega Open University: Faculty attitude, barriers and motivators. Educational Media International, 44(4), 323- 338.

Piskurich, G. M. (2003). *Preparing learners for e-learning*. San Francisco: John Wiley & Sons.

Smith, P. J. (2005). Learning preferences and readiness for online learning. *Educational psychology*, *25*(1), 3-12.

Tabachnick, B. G., & Fidell, L. S. (2001). Using multivariate statistics. Allyn and Bacon. *Needham Heights, MA*.

Toplu, M., & Gökçearslan, Ş. (2012). Development of E-learning and Reflections of the Internet on the Process of Education: A Case Study at Gazi University. *Turkish Librarianship*, *26*(3), 501-535.

Thorndike, R. L. (Ed.): 1971, Educational Measurement, American Council on Education, Washington. DC.

Tuncer, M., & Taşpınar, M., (2008). The future of education and training in virtual environments and possible problems, *Journal of Social Sciences*, 10(1) 124.

Venkatesh, V. & Davis, F. D. (1996). A model of the antecedents of perceived ease of use: development and test. Decision Sciences, 27 (3), 451–481.

Wang, Y. S., Wu, M. C., & Wang, H. Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British journal of educational technology*, *40*(1), 92-118.

Watkins, R., Leigh, D., & Triner, D. (2004). Assessing Readiness for E-Learning. Performance Improvement Quarterly,17(4), 66-79.

Wei, Y., & Johnes, J. (2005). Internet tools in teaching quantitative economics: why gaps between potential and reality? Journal of Further and Higher Education. 2005, 29(2):125–41.

West, S. G., Finch, J. F., & Curran, P. J. (1995). Structural equation models with nonnormal variables: Problems and remedies.

Yacob, A., Kadir, A. Z. A., Zainudin, O., & Zurairah, A. (2012). Student awareness towards e-learning in education. *Procedia-Social and Behavioral Sciences*, *67* (93-101).

Yılmaz, H., & Özkaynak, E. (2012). A Motivational Tool in Internet-Based Education: Ice Breakers, *XIV. Academic Informatics Conference, 1 - 3 February, Uşak University*, 155-162.

Yurdugül, H., & Demir, Ö. (2017). An investigation of Pre-service Teachers' Readiness for E-learning at Undergraduate Level Teacher Training Programs: The Case of Hacettepe University. *Hacettepe University Journal of Education*, 32(4), 896-915.

Sarıçoban, A., & Kırmızı, Ö. (2020). The correlation between metacognitive awareness and thinking styles of pre-service EFL teachers. *International Online Journal of Education and Teaching (IOJET)*, *7*(3). 1032-1052. https://iojet.org/index.php/IOJET/article/view/921

Received: 26.04.2020
Received in revised form: 29.05.2020
Accepted: 01.06.2020

THE CORRELATION BETWEEN METACOGNITIVE AWARENESS AND THINKING STYLES OF PRE-SERVICE EFL TEACHERS

Research Article

Arif Sarıçoban

Selcuk University

saricobanarif@gmail.com

Özkan Kırmızı

Karabuk University

ozkankirmizi@gmail.com

Dr. Arif SARIÇOBAN has worked as an associate professor of ELT at Hacettepe University for 20 years and currently works at the Department of ELL at Selçuk University as a full professor. Dr. Sarıçoban the editor-in-chief for an international journal.

Dr. Özkan Kırmızı works as an associate professor at English Language and Literature Department at Karabuk University. He completed his Ph.D at Hacettepe University, English Language and Teaching Department. His interest areas are L2 teacher education and pedagogical content knowledge.

THE CORRELATION BETWEEN METACOGNITIVE AWARENESS AND THINKING STYLES OF PRE-SERVICE EFL TEACHERS

Arif Sarıçoban

saricobanarif@gmail.com

Özkan Kırmızı

ozkankirmizi@gmail.com

Abstract

Metacognition is an umbrella term encompassing thinking and memory, learning, motivation, and cognitive development as indicated by Metcalfe & Shimamura (1994). As is generally believed, metacognition has direct linkage with higher order thinking skills, which is all about regulating and functioning on cognitive processes of learning. According to Livingstone (2003: 2), "activities such as planning how to approach a given learning task, monitoring comprehension, and evaluating progress towards the completion of 'that' task is metacognitive in nature." As to the educational practices, learners thinking styles and metacognitive awareness should be attached importance in the sense that both are considered influential factors on learning and thinking. Therefore, the current study aims to scrutinize this possible relationship that takes place in foreign language education specifically. For this purpose, a representative group of 121 pre-service EFL teachers enrolled in English Literature Department was the participant group of this study. *Thinking Styles Inventory (TSI)* and *Metacognitive Awareness Inventory (MAI)* were used to collect data. The results were statistically analyzed through the application of SPSS 22.0 version. Based on the findings of the study, it can be said that the participants have a moderate level of metacognition, the most prominent thinking styles are *legislative, judicial, monarchic,* and *anarchic* thinking styles, and *legislative, executive, monarchic,* and *internal* thinking styles predict metacognition.

Keywords: metacognitive awareness, thinking styles, pre-service EFL teachers, English language teaching

1. Introduction

There is no doubt that metacognitive awareness or metacognition are essential constructs in second or foreign language learning (Efklides, 2014; Panadero, 2017; Ohata & Fukao, 2014; Öz, 2015). In particular, Öz (2016; 110) stated that "understanding the nature of metacognitive awareness and ways of developing and regulating this knowledge in L2 learners is of great importance in dealing in detail with self-regulated and self-determined language learning."

The concept of thinking styles was introduced to the literature in 1988 by American psychologist Robert Sternberg. His theory came to be known as "mental self-government", in which he claimed that one can control or manage his or her daily activities in many different ways, which are called "thinking styles". As such, thinking style can be defined as a "preferred way of thinking" (Yong, 2012; 63). Specifically, thinking styles come to mean "what a person prefers to do and how he/she likes to do it" (Betoret, 2007, p. 220). There are 13 thinking styles categorized into 5 groups proposed by Sternberg: function (legislative, executive, and judicial),

form (monarchic, hierarchic, oligarchic, anarchic); level (global and local); scope (internal, external); and leaning (liberal, conservative).

Metacognition is generally defined as the ability to understand and monitor one's own learning process. It is generally viewed as an essential element in learning and plays a crucial role in the development of learner autonomy (Wenden, 1991; Wilkins, 1996). "Metacognitive Awareness enables person to plan, sequence and monitor his or her learning so that the improvements can be seen directly in performances" (Kallio et al, 2017). As such, metacognitive awareness can be viewed as one of the most important elements in fostering learning and learner autonomy. The significance of metacognitive awareness stems from the fact that it provides opportunity for "individuals to plan, sequence, and monitor their learning in a way that directly improves performance" (Schraw & Dennison, 1994; 460).

In literature, there is a tendency to separate knowledge of cognition (metacognitive knowledge) and regulation of cognition (metacognitive regulation) (Aydin & Ubuz, 2010; Schraw & Dennison, 1994; Tanner, 2012; Young & Fry, 2008). According to Schraw and Dennison (1994), these two components of metacognition, knowledge of cognition and regulation of cognition, work in tandem and this enables students to enhance academic performance. Schraw and Moshman (1995) categorized knowledge of cognition into three sub-dimensions which are *declarative knowledge, procedural knowledge,* and *conditional knowledge. Declarative knowledge* refers to cognition as students' awareness of themselves. *Procedural knowledge* covers learning procedures/strategies, and *conditional knowledge* encompasses the situations under which a specific strategy is the most efficient. In the present study, metacognition is considered as comprising of knowledge of cognition and regulation of cognition.

On the other hand, *regulation of cognition* refers to mental processes which are vital for students to plan, monitor, and evaluate their own learning. *Planning* is related with the ways students plan their cognition through setting goals, selecting strategies, and scheduling time and strategies. According to Schraw and Moshman (1995, p. 355), *mentoring* is "on-line awareness of task comprehension and task performance". Evaluation is about assessments of regulatory processes.

1. *Knowledge of cognition*: explicit knowledge concerning ourselves as learners, procedural knowledge about strategies (including how and where to use which strategy), etc. (Sadler-Smith, 2012)

2. *Regulation of cognition*: the ability to plan (selection of correct strategies and the effective use of cognitive resources), manage information, monitor development, correct performance errors (debugging), and evaluate the process. (Sadler-Smith, 2012)

When it comes to thinking styles, they are viewed as significant behavioral variables by researchers. Sternberg's self-government theory (1997) holds that thinking styles are, in very broad terms, the ways of people or individuals about thinking the environmental affairs.

Thinking styles are grouped under five broad categories. These are *functions, forms, levels, scopes, and leanings.* Each thinking styles under these five categories are as follows:

1. Functions: legislative, executive, and judicial

2. Forms: monarchic, oligarchic, and hierarchical

3. Level: anarchic, locals, and global

4. Scopes: internal and external

5. Leanings: liberal and conservative

Studies indicate that thinking styles correlate with problem-solving, decision-making, academic achievement, etc., and variables such as culture, gender, age, field of study, record of service, parents' styles, etc. affect individuals thinking styles. Research indicates that students with legislative thinking style have a potential to have high self-efficacy in innovation and invention. Students with judicial thinking style are adept at assessment and judgment in suitable cultural and situational context.

In addition, of the 13 thinking styles legislative, executive, and judicial styles tend to come to fore. The legislation style is about re-creating, imagining, devising, and planning. The executive style carries out the actions prescribed by the legislative thinking style; and the judicial is responsible for judging, evaluating, and comparing.

Furthermore, Sternberg claims that people tend to organize their daily activities based on their thinking styles. Yet, thinking styles should not be viewed as fixed constructs; rather, they are preferences, not abilities (Sternberg, 1997; Lee & Tsai, 2004). This means that such styles may change based on the situation (Apaydin & Cenberci, 2018). Another important point is that it is possible to teach, measure, and change thinking styles (Zhang, 2002; Dinçer, 2009). Thus, teachers or practitioners may benefit from the findings of studies conducted on thinking styles, and according to Lee and Tsai (2004), what matters is to provide conducive environments for various thinking styles.

2. Literature Review

There are studies that focus on thinking styles relative to other variables. Tuzer (2016), for example, focused on thinking styles in relation to age, gender, educational background and no statistically significant relation was found. In another study, Çelik (2016) worked on 11th grade students, comparing their learning styles to thinking styles. That study found correlation between judicial thinking styles and repetition and organization strategy, between the global thinking style and the understanding of monitoring comprehension strategies.

Thinking styles were also studied in relation to variables such as literacy self-sufficiency, reflective thinking, and thinking needs. Çınar (2016), for example, investigated the correlation between thinking styles and reflective trends and found the correlation between the judicial thinking and investigative reflective style was high. The study also found that there was strong positive correlation between hierarchical thinking and investigative reflective thinking styles and between hierarchical thinking and intrinsic reflective thinking styles.

Research on thinking styles studied them relative to academic achievement, or gender. The relation between thinking styles and its relationship with academic achievement was studied by Nazarifar et al (2011), who found that the students enrolled in psychology and educational sciences departments turned out to have higher in the executive thinking style while engineering students were higher in the legislative thinking style. In that study, male students were found to have higher levels of legislative thinking style. In regard to gender, Khosravi (2010) figured out that gender predicts legislative, executive, and judicial thinking styles.

In a recent study, Teng (2019) worked on the relation between metacognition and its relationship with the writing skill at tertiary level. The results of this study indicated that there was strong positive correlation between EFL writing performance and sub-dimensions of metacognition, namely declarative knowledge, procedural knowledge, conditional knowledge, planning, monitoring, and evaluating.

Sungur and Senler (2009) worked on high school students and found that Turkish high school students have more declarative and conditional knowledge rather than procedural knowledge and debugging strategies. Raoofi et al. (2014) found that metacognitive interventions have the potential to enhance language performance.

The relation between learner autonomy in EFL reading and metacognitive strategies was studied by Sarıçoban and Alyas (2016). This study found remarkable correlation between most metacognitive reading strategies and reading autonomy. In another study, Sarıçoban (2015) investigated metacognitive awareness and the higher order thinking process of pre-service EFL teachers. This study found that pre-service EFL teachers had positive attitudes towards their metacognitive awareness in their academic studies.

One very relevant study was conducted by Heidari and Bahrami (2013). They studied the relationship between thinking styles and metacognitive awareness of Iranian EFL university students enrolled in English Literature, English Translation, and English Language Teaching. The results of this study indicated significant positive correlation between hierarchical, anarchic, and external styles and metacognitive awareness.

When it comes to research on thinking styles, it can be said that it has produced various insights. In the first place, their relationship with academic achievement has been indicated by a number of studies (Bernardo, Zhang, & Callueng, 2002; Cano-Garcia & Hughes, 2000; Zhang, 2000; Zhang & Sternberg, 2000). In particular, the findings of Zhang's study (2004) indicated that thinking styles were more influential than other factors included in that study in academic success. A similar finding was reported by Fan et al. (2010), who showed that thinking styles predicted academic achievement more than personality traits and motivation in hypermedia-based learning environments.

There are also other insights gained from research on thinking styles. Workman (2004), for example, discovered a correlation between global thinking style and better performance in computer-aided education. Some other studied (Fan et al., 2010; Zhang & Sternberg, 2000) found that thinking styles offer more precision value than ability, personality, and achievement motivation in predicting academic achievement. Cano-Garcia and Hughes's (2000) study figured out that executive, and internal styles best predicted academic achievement among a Spanish middle school students, whereas the legislative thinking style was negatively correlated with academic success. Another interesting finding is reported by Zhang and Sternberg (2000). They indicated that thinking styles related to creativity (legislative, judicial, hierarchical, global, and liberal) had significantly negative correlations with academic achievement while thinking styles that required conformity (executive, conservative, monarchic, and local) correlated with academic achievement.

There are no studies that focus on language learning process from the perspective of thinking styles. Similarly, there is very limited research that focuses on the relation between thinking styles and metacognition, although they are close psychological factors. As such, the present study aims at investigating the relation between thinking styles and metacognition in relation to pre-service EFL teachers. The present study aims to answer the following research questions:

1. What are the levels of metacognitive awareness of the participants in terms of knowledge of cognition, and (2) regulation of cognition?

2. What are the levels of metacognitive awareness of the participants in language learning process with special knowledge *(a) declarative knowledge, (b) procedural knowledge, (c) contextual knowledge, (d) planning, (e) information management strategies, (f) comprehension monitoring, (g) debugging strategies, and (h) evaluation?*

3. Which thinking styles are prominent among the participants of the study?

4. Which thinking style or styles predict knowledge of regulation as a component of metacognition?

5. Which thinking style or styles predict regulation of cognition as a component of metacognition?

3. Methodology

The present study is a quantitative study. It uses descriptive analysis to lay out the general overview and then uses regression analysis to see which variable(s) predict the dependent variable, which is metacognition.

3.1. Data Collection

In the present study, the data collection tools were used: (1) Thinking Styles Inventory (TSI), and (2) Metacognitive Awareness Inventory (MAI). Nearly 40-45 minutes were given to the participants to fill in the questionnaires.

1.1.1. Data collection tools

Two questionnaires were used in the present study to collect data: (1) Thinking Styles Inventory (Sternberg & Wagner, 1992), and (2) Metacognitive Awareness Inventory (Schraw & Dennison, 1994).

1. Thinking Styles Inventory: This inventory was designed by Sternberg and Wagner (1991). It is a comprehensive tool containing 104 items. There are 13 subscales (given below), with 8 items each.

Table 1. *Key characteristics of each thinking style*

Thinking style		**Key characteristics**	**Tasks preferred**
functions	Legislative	Like doing thinks in on their own way. They prefer to work on tasks that require creative strategies.	Like doing science project, writing, poetry stories or music, and creating original artworks.
	Executive	Like to be told what they should do or how they should do it. They prefer to work on tasks with clear instructions and structures	Like to solve problems, write papers on assigned topics, do artwork from models, build from designs, learned assigned information.
	Judicial	Prefer tasks that enable them to analyze, judge, and evaluate thinks and ideas	Like to critique others, write critical essays, give feedback and advice
forms	Monarchic	Prefer to work on tasks that allow complete focus on one thing at a time	like to immerse self in a single project, whether art, science, history
	Oligarchic	Prefer to work on multiple tasks in the service of multiple objectives, without setting priorities	Like to devote sufficient time to reading comprehension items to may not finish standardized verbal ability tests
	Hierarchical	Like to prioritise tasks and distribute attention to them according to their value	like to budget time for doing homework so that more time and energy is devoted to important assignments
	Anarchic	Prefer to work on tasks without norms and instructions. They like	Write an essay in stream of consciousness form in conversation, jump from one point

		flexibility about what, where, and how to work	to another, start things but don't finish them.
levels	Locals	Local people prefer to work with details. They tend to notice the trees more than the forest. (Focus on concrete ideas)	Write an essay describing the details of a work of art and how they interact.
	Global	Prefer to deal with wide and frequently abstract questions. They tend to see the forest more than the trees inside (Focus on abstract ideas)	Write an essay on the global message and meaning of a work of art
scopes	Internal	Are usually introverted, reserved people with fewer social connections than others; as a result, prefer to work alone (Enjoy working independently)	Prefer to do science or social studies projects on their own
	External	Tend to be extroverted, open, and with greater social and interpersonal inclinations (enjoy working in groups)	Prefer to do science or social studies project with other members of a group
Leanings	Liberal	Prefer to work on tasks that involve novelty and ambiguity (use new ways to deal with tasks)	Prefer to figure out how to operate new equipment even if it is not the recommended way, prefer open-class setting
	Conservative	Prefer to work on traditional tasks that must follow similar rules and procedures to these previously used (use traditional ways to deal with tasks)	Prefer to operate new equipment in traditional way, prefer traditional classroom settings.

2. Metacognitive Awareness Inventory (MAI): This questionnaire was developed by Schraw and Dennison (1994). It includes 52 items assessing various facets of metacognition. There are two main categories in this inventory: (1) Knowledge of cognition, and (2) regulation of cognition. There are seventeen items measuring knowledge of cognition, and the remaining thirty-four items measure regulation of cognition. Knowledge about cognition consists of three sub-dimensions, namely:

(1) declarative knowledge (8 items),

(2) procedural knowledge (4 items), and

(3) conditional knowledge (5 items).

Regulation of knowledge includes five sub-dimensions:

(1) Planning (7 items),

(2) information management strategies (10 items),

(3) comprehension monitoring (7 items),

(4) debugging strategies (5 items), and

(5) evaluation (6 items).

The answers given to MAI range from never or almost never true of me to always or almost always true of me. The reliability level of the inventory was calculated as .90 by Schraw & Dennison, (1994), who also validated the two-factorial structure of the inventory. For the present study, the reliability values were as follows: ,833 for knowledge cognition, ,867 for regulation of knowledge, ,883 for thinking styles inventory, and ,907 for total reliability. The results are given below.

Table 2. *Reliability analysis of the two instruments*

Sub-scales	number of items	Cronbach's alpha value
Knowledge of cognition	17	,833
Regulation of knowledge	35	,867
Thinking Styles Inventory	102	,883
Total	154	,907

3.2. Participants

The participants of the study were 121 English Language and Literature department students. The number of male students were 27 (%22,3) and female students 90 (%74,4). The number of 1st grade students is 39, 2nd grade students 33, 3rd grade 25, and 4th grade students is 20. Four students failed to provide their grade level.

Table 3. *Characteristics of the participants*

		grade				Total
		1st grade	2nd grade	3rd grade	4th grade	
gender	female	27	24	19	20	90
	male	12	9	6	0	27
Total		39	33	25	20	117

4. Findings

The levels of metacognitive awareness. In order to present the overall situation in terms of thinking styles and metacognition level, descriptive statistics were utilized. Then, to see which thinking style or styles predict metacognition, regression analysis was conducted. First of all, we will present the findings regarding metacognition with its sub-dimensions.

4.1. Findings as to Metacognition

Findings regarding metacognition are firstly presented as a whole in Table 4. Then, each dimension is presented separately.

Table 4. *Findings about knowledge about cognition and regulation of knowledge*

Variables	**Low**		**Moderate**		**high**	
	f	*%*	*f*	*%*	*f*	*%*
Knowledge about cognition	**54**	**48,21**	5	5	53	47,32
Declarative knowledge	46	40	14	12,12	**55**	**47,82**
Procedural knowledge	47	40,17	20	16,5	**50**	**42,73**
Conditional knowledge	**48**	**41,73**	20	16,5	47	40,86
Regulation of knowledge	53	47,74	4	3,3	**54**	**48,64**
Planning	49	42,60	12	9,9	**54**	**46,95**
Information management strategies	47	40,51	15	12,4	**54**	**46,55**
Comprehension monitoring	48	41,37	11	9,1	**57**	**49,13**
Debugging strategies	49	41,88	18	14,9	**50**	**42,73**
Evaluation	50	44,64	12	9,9	50	44,64

Table 4 indicates that the participants rated themselves rather low in terms of knowledge of cognition (n=54). Under this category, the participants also rated themselves low in terms of conditional knowledge. Items in conditional knowledge category cover issues like when people learn best, different strategies used by participants, the ability to motivate oneself and use one's intellectual strengths. Therefore, in terms of issues like this the participants seem to have a low level of cognition. When it comes to regulation of knowledge, the participants rated themselves high (n=54). Under this category, the participants rated themselves rather high in terms of planning (n=54), information management strategies (n=54), comprehension monitoring (n=49,13), and debugging strategies (n=50). When it comes to evaluation, the participants rated themselves equal between low (n=50) and high (n=50). Debugging strategies cover issues like asking others when there is need, changing strategies when one fails to understand, re-evaluating the assumptions when one gets confused, and revising new information

4.1.1. Declarative knowledge

This section also provides a detailed analysis of the findings regarding the subcategories of metacognition. A careful analysis of Table 5 indicates that teacher candidates almost agree about their capacities in terms of declarative knowledge. They, however, strongly agree that they learn more when they are interested in the topic under discussion (M=4,56), and they understand their intellectual strengths and weaknesses (M=3,99). It is also important to know the kind of information for learning (M=3,89). They think that they are effective judgers of how well they understand something (M=3,82). They are aware of their teachers' expectations from them to learn (M=3,80) and they believe to have control over how well they learn (M=3,67). On the other hand, they moderately agree about their abilities in organizing information (M=3,53) and remembering information (M=3,56). Relying on these findings, it can be said that they need to be trained in how to organize and recall the information during their in-classroom studies, though they have strong interest in the subject matter.

4.1.2. Procedural knowledge

As to the procedural knowledge, the participants of the current study have reported that they have moderately agreed on their effective use of leaning strategies (M=3,74). The findings are presented in Table 4. They seem to be aware of the strategies they use (M=3,88) and utilize the ones that worked previously (M=3,77), and had a specific purpose for each of the strategy they employ (M=3,74). Another striking finding obtained in the study is that they feel undecided to determine which strategy is helpful for their own learning (M=3,58).

Table 6. *Descriptive statistics about procedural knowledge*

items	N	Minimum	Maximum	Mean	Std.
I try to use strategies that have worked in the past	117	1,00	5,00	3,7778	,81061
I have a specific purpose for each strategy I use.	117	1,00	5,00	3,7436	,83205
I am aware of what strategies I use when I study	117	1,00	5,00	3,8889	,79630
I find myself using helpful learning strategies automatically.	117	1,00	5,00	3,5812	,88317
TOTAL				3,74	

4.1.3. Contextual knowledge

Contextual knowledge of the participants seems to be at a moderate positive level (M=3,74). They agree to learn best when they have background knowledge about the topic (M=4,21), use different learning strategies depending on the context of situation (M=3,77), and thus become self-motivated (M=3,66). However, they are not certain about their use of intellectual strengths to compensate for their weaknesses (M=3,46) and know when each strategy they use will be most effective (M=3,56). These findings simply indicate the importance of background knowledge and the activation of schemata theory in understanding new information they need for their language learning studies. That means individuals need to establish a link between their prior knowledge and the new information.

Table 7. *Descriptive statistics about contextual knowledge*

items	N	Minimum	Maximum	Mean	Std.
I learn best when I know something about the topic	116	1,00	5,00	4,2500	,91247
I use different learning strategies depending on the situation	117	1,00	5,00	3,7778	,78905
I can motivate myself to learn when I need to.	117	1,00	5,00	3,6667	1,07479
I use my intellectual strengths to compensate for my weaknesses.	117	1,00	5,00	3,4615	,82565
I know when each strategy I use will be most effective.	116	1,00	5,00	3,5690	,78268
Total	115			3,74	

4.1.4. Planning

As is known, planning is an important stage in the learning process as well as the effective use of learning strategies and employing actions in the classroom. The participants have surprisingly reported almost a moderate level of planning phase in their own learning process (M=3,68). They obviously read instructions carefully before beginning a task (M=3,88), think about what they really need to learn before beginning a task (M=3,82), and set specific goals before that task (M=3,72). Most importantly, they believe that they should think of several ways to solve a problem (M=3,87). However, there is a striking finding in asking themselves questions about the material before they begin the task (M=3,54) and organize their time to best accomplish their goals (M=3,47). An appropriate speculation can be made about the importance of planning a task and setting it in motion for the best learning to take place. Any learners should plan in advance, set their own goals, and act accordingly.

Table 8. *Descriptive statistics about planning*

items	N	Minimum	Maximum	Mean	Std. Deviation
I pace myself while learning in order to have enough time	117	1,00	5,00	3,4786	,89634
I think about what I really need to learn before I begin a task.	117	1,00	5,00	3,8205	,79454
I set specific goals before I begin a task.	116	1,00	5,00	3,7241	,88057
I ask myself questions about the material before I begin.	117	1,00	5,00	3,5470	,97817
I think of several ways to solve a problem and choose the best one.	117	1,00	5,00	3,8718	,76043
I read instructions carefully before I begin a task.	116	1,00	5,00	3,8879	,90190
I organize my time to best accomplish my goals	117	1,00	5,00	3,4786	1,06349
TOTAL	115			3,68	

4.1.5. Information management strategies

According to social constructivist theory, it is important to reach knowledge, construct and use it for one's specific goals. This section of the study is simply about employing information management strategies. Surprisingly enough, the overall finding obtained in the current study indicates a highly unexpected level of that strategy use by the learners (M=3,60). They simply report only a favorable strategy use in focusing on the meaning and significance of new information (M=3,91) by paying attention to the importance of the new information (M=3,87). They seem to slow down when they encounter new information (M=3,74) and try to translate this new information into their own words (M=3,78). They have a moderate level of strategy use in creating their own examples to make the new information meaningful (M=3,65). They try to break studying down into smaller units (M=3,65) and establish relationship between what he reads and what he already knows and use the organizational structure of the text to help them learn (M=3,58). They try to focus on overall meaning rather than specifics (M=3,31). Lastly, they report that they are almost undecided to make use of visual techniques such as pictures or diagrams to help understand new information (M=2,96). It can be speculated that the participants prefer to employ bottom-up strategies for their own learning. They try to see

the whole focusing on the parts of it; they attach importance to details to attain the gist at the end.

Table 9. *Descriptive statistics about information management strategies*

items	N	Minimum	Maximum	Mean	Std
I slow down when I encounter important information	117	1,00	5,00	3,7436	,88233
I consciously focus my attention on important information.	117	1,00	5,00	3,8718	,76043
I focus on the meaning and significance of new information.	117	1,000	5,000	3,91453	,772062
I create my own examples to make information more meaningful.	117	1,00	5,00	3,6581	1,09986
I draw pictures or diagrams to help me understand while learning	117	1,00	5,00	2,9658	1,18126
I try to translate new information into my own words.	117	1,00	5,00	3,7863	1,07342
I use the organizational structure of the text to help me learn.	116	1,00	5,00	3,5862	,90476
I ask myself if what I'm reading is related to what I already know.	117	1,00	5,00	3,5812	,91198
I try to break studying down into smaller steps.	117	1,00	5,00	3,6581	,87259
I focus on overall meaning rather than specifics.	117	1,00	5,00	3,3162	1,16449
Total	116			3,60	

4.1.6. Comprehension monitoring

In language learning studies, comprehending a text plays the utmost important role in understanding the overall meaning. Therefore, learners should carefully employ comprehension strategies in order to best understand the message given in the text for them. That will also help them understand the real life in which they are involved. To do so, they need to consider several alternatives to a problem before they answer (M=3,76). At this vein, they report that they almost believe the effectiveness of checking options to solve a problem (M=3,69). They need to understand the relationships between ideas in a text (M=3,57). For this purpose, they specifically need to analyze the usefulness of comprehension strategies during their learning process (M=3,53). They are almost undecided to check their comprehension through their studies by giving regular pauses (M=3,10). However, there is another unexpected and striking finding obtained in the study regarding asking themselves questions about how well they are doing while learning something new (M=2,13). These findings once again attach importance of employing comprehension strategies in dealing with any types of texts, either oral or written in order to become successful users of the target language for their problems.

Table 10. *Descriptive statistics about comprehension monitoring*

items	N	Minimum	Maximum	Mean	Std
I ask myself periodically if I am meeting my goals.	116	1,00	5,00	3,4138	,94242
I consider several alternatives to a problem before I answer	117	1,00	5,00	3,7607	,77292
I ask myself if I have considered all options when solving a problem.	117	1,00	5,00	3,6923	,81433
I periodically review to help me understand important relationships.	117	1,00	5,00	3,5726	,85416
I find myself analyzing the usefulness of strategies while I study.	117	1,00	5,00	3,5385	,93346
I find myself pausing regularly to check my comprehension.	121	1,00	4,00	3,1074	,60279
I ask myself questions about how well I am doing while learning something new.	117	,00	5,00	2,1368	1,95601
Total	116			3,31	

4.1.7. Debugging strategies

In language learning studies, the most problematic issues the learners usually fear about their mistakes and how to effectively cope with them. Mistakes are inevitable part of language learning process in the sense that one can also learn form their own mistakes. The findings obtained in this current study once again attach importance on the awareness of one's own mistakes (M=3,95). The participants have reported that they should stop and reread when they get confused (M=4,24), stop and go back over new information that is not clear (M=4,00), ask others for help when they do not understand something (M=3,92), simply change strategies when they fail to understand (M=3,87), and as a last resort re-evaluate their assumptions when they get confused (M=3,73). One can speculate that the best learning can take place through one's own mistakes simply because these mistakes reflect and help self-learning strategies; thus, improves self-confidence. It is crystal clear that mistakes function as a diagnostic procedure in nature; they help learners to see their own strengths and weaknesses and find ways to overcome them.

Table 11. *Descriptive statistics about debugging strategies*

Items	N	Minimum	Maximum	Mean	Std.
I ask others for help when I don't understand something.	117	1,00	5,00	3,9231	1,11536
I change strategies when I fail to understand	117	1,00	5,00	3,8718	1,03839
I re-evaluate my assumptions when I get confused	117	1,00	5,00	3,7350	,73570
I stop and go back over new information that is not clear.	117	1,00	5,00	4,0085	,87588
I stop and reread when I get confused	117	1,00	5,00	4,2479	,85001
Total	117			3,95	

4.1.8. Evaluation

Evaluation seems to be the end step of learning process; however, this is not the case. The learner should be open to new learnings that can be realized through the possible best evaluation. It may lead you to new learnings or revise the topic under discussion once again to see your own weak points. Thus, it is spiral and a dynamic process. Keeping all these in mind, the findings indicate that they need to reconsider the importance of evaluation in their own learning process (M=3,65). They report that they become aware of how well they accomplish their goals and know how well they did once they finish a task or a test (M=3,70). They try to find an easy way to do things (M=3,67), try to summarize what they have learned and so see how much they have learned (M=3,62), and see if they have considered all the options before they solve a problem (M=3,61). Therefore, the results are said to contribute to the ultimate importance of evaluation process in order to see one's own learning and progress.

Table 12. *Descriptive statistics about evaluation*

items	N	Minimum	Maximum	Mean	Std. Deviation
I know how well I did once I finish a test.	116	1,00	5,00	3,7069	,90426
I ask myself if there was an easier way to do things after I finish a task	117	1,00	5,00	3,6752	,93614
I summarize what I've learned after I finish.	116	1,00	5,00	3,6293	1,06755
I ask myself how well I accomplish my goals once I'm finished	117	1,00	5,00	3,7094	,78849
I ask myself if I have considered all options after I solve a problem.	116	1,00	5,00	3,6121	,83167
I ask myself if I learned as much as I could have once I finish a task.	117	1,00	5,00	3,6239	,83796
Total	114			3,65	

4.2. Findings Regarding Prominent Thinking Styles

One of the aims of the study was to determine which thinking styles are common and prominent among the participants of the study. Table 13 gives the statistical information about this issue. We can understand from the table that the most prominent thinking styles among the prospective L2 teachers are legislative (n=53, 46,49%), judicial (n= 54, 48,21%), monarchic (n=53, 46,90%), and anarchic thinking styles (n=50, 45,87%). The thinking styles that were found to be low are executive (n=55, 49,54%), hierarchic (n=51, 45,94%), oligarchic (n=54, 48,64%), global (n=53, 46,90%), internal (n=55, 49,10%), external (n= 54, 49,54%), liberal (n=50, 46,72%), and conservative (n=55, 49,54%).

Table 13. *Descriptive statistics about thinking styles*

Variables	Low		Moderate		high	
	f	%	*f*	%	*f*	%
Legislative	49	42,92	12	9,9	**53**	**46,49**
Executive	**55**	**49,54**	13	10,7	43	38,73
Judicial	45	40,17	13	10,7	**54**	**48,21**
Monarchic	51	45,13	9	7,4	**53**	**46,90**
Hierarchic	**51**	**45,94**	15	12,4	45	40,54
Oligarchic	**54**	**48,64**	9	7,4	48	43,24
Anarchic	44	40,36	15	12,4	**50**	**45,87**
Global	**53**	**46,90**	11	9,1	49	43,36
Local	49	45,79	9	7,4	49	45,79
Internal	**55**	**49,10**	9	7,4	48	42,85
External	**54**	**49,54**	8	6,6	47	43,11
Liberal	**50**	**46,72**	11	9,1	46	42,99
Conservative	**55**	**49,54**	11	9,1	45	40,54

4.2.1. Thinking styles as predictors of cognition

4.2.1.1. Regulation of cognition

In order to see which thinking styles predict regulation of cognition, standard multiple regression analysis was conducted. The data analysis given in Table 14 indicates that the relation between the thinking styles and regulation of cognition is significant (F=9,051, sig. 000a). The results suggest that the nine thinking styles account for 61,4% (Table 14) of the total variance regulation of cognition. Among the independent variables *executive (sig. 000<.05), monarchic* (sig. 017*<.05), internal (sig. 033<.05),* and *legislative (sig. 041<.05)* were found to be significant predictors of regulation of cognition (Table 14).

Table 14. *Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,784a	,614	,546	10,29920

a. Predictors: (Constant), legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal, conservative
b. Dependent Variable: recognition of cognition

Table 15. *ANOVA results*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12482,277	13	960,175	9,052	,000a
	Residual	7849,439	74	106,073		
	Total	20331,716	87			

a. Predictors: (Constant), legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal, conservative
b. Dependent Variable: recognition of cognition

4.2.1.2. Knowledge of cognition

Knowledge of cognition encompasses issues like understanding one's intellectual strengths and weaknesses, knowing how to organize information, having control over how well one learns. People with *legislative thinking styles* tend to work on tasks that require creative strategies and prefer to choose one's own activities. People with *executive thinking style* like working on tasks with clear instructions and structures and prefers to implement tasks with set guidelines. Those who have *monarchic thinking style* work on tasks that allow complete focus on one thing at a time. And finally, those with an *internal thinking style* work on tasks that allow one to work as an independent unit. This finding indicates that having more creative strategies (legislative), working on tasks with clear instructions (executive), focusing one particular point at a time (monarchic), and working as an independent unit (internal) are important determinants of knowledge of cognition.

Standard multiple regression analysis was run in order to see which thinking styles predict knowledge of cognition. As to the analysis in Table 16 the relation between the thinking styles and r knowledge of cognition is significant (F=7,221, sig. 000[a]). The results obtained in the study indicate that the thirteen thinking styles account for 55,9% (Table 15) of the total variance knowledge of cognition. Among the independent variables *executive (sig. 001<.05), anarchic* (sig. 018<*.05),* legislative *(sig. 027<.05),* and *monarchic (sig. 034<.05)* were found to be significant predictors of knowledge of cognition (Table 17).

Table 16. *Model summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,748[a]	,559	,482	5,69665

a. Predictors: (Constant), legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal, conservative
b. Dependent Variable: knowledge of cognition

Table 17. *ANOVA results*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3046,192	13	234,322	7,221	,000[a]
	Residual	2401,433	74	32,452		
	Total	5447,625	87			

a. Predictors: (Constant), legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal, conservative
b. Dependent Variable: knowledge of cognition

Among the independent variables *executive (sig. 001<.05), anarchic* (sig. 018<*.05),* legislative *(sig. 027<.05),* and *monarchic (sig. 034<.05)* were found to be significant predictors of knowledge of cognition.

Similar to the thinking styles that predict knowledge of cognition, *executive* and *legislative* thinking styles also predict regulation of cognition. This means that people who can choose one's own activities (legislative) and work on tasks with clear instructions (executive) tend to have a higher level for knowledge of cognition. In addition to those, people who work on tasks that allow complete focus on one thing at a time (monarchic) and work on tasks that allow one to work as an independent unit (internal) tend to have higher levels of knowledge of cognition.

5. Discussion and Conclusion

The primary aim of the present study was to determine the metacognitive levels of prospective L2 teachers, their thinking styles and the relation between them. The results indicated that as for metacognition, the participants seem to have a moderate to low level of competency in knowledge of cognition, which encompasses issue like declarative knowledge, procedural knowledge, and conditional knowledge. Conditional knowledge refers to issues like when people learn best, different strategies used by participants, the ability to motivate oneself and use one's intellectual strengths. Moreover, in regard to regulation of knowledge, the participants have a slightly higher level in terms of planning, information management strategies, comprehension monitoring, and debugging strategies. When it comes to evaluation, the participants rated themselves equal between low and high. Debugging strategies cover issues like asking others when there is need, changing strategies when one fails to understand, re-evaluating the assumptions when one gets confused, and revising new information. In short, with regard to metacognition, prospective L2 teachers can be said to have a moderate level of metacognition.

When it comes to thinking styles, the findings indicated that the most prominent thinking styles among the participants were legislative, judicial, monarchic, and anarchic thinking styles. On the other hand, the less common and less frequent thinking styles were found to executive, hierarchic, oligarchic, global, internal, external, liberal, and conservative.

The fundamental aim of the present study was to see whether there is a correlation between sub-dimensions of metacognition, namely knowledge of cognition and regulation of cognition. The results of the study indicate that the thinking styles that predict knowledge of cognition are *legislative*, *executive, monarchic*, and *internal* thinking styles. Depending on these findings, it can be said that preference over activity types, clear instructions, focusing on one thing at a time, working independently are important determinants for regulation of cognition, which covers students' awareness of themselves. learning procedures/strategies, and the situations under which a specific strategy is the most efficient. When it comes to knowledge of cognition, the thinking styles that determine it range from *legislative, executive*, *monarchic*, to *internal*. This means in addition to clear instructions, preference over activity types, focusing on one thing at a time and working independently are vital for knowledge of cognition. To sum up, *legislative*, *executive, monarchic*, to *internal* are important for metacognition.

The ultimate aim of this study was to scrutinize the possible relationship between thinking styles and metacognitive awareness of Turkish ELL learners. For this purpose, the researchers, at the outset, aimed to see the levels of metacognitive awareness and what type of thinking styles the ELL learners have in their language learning studies. As to metacognitive awareness, eight subdimensions have been investigated. The results have simply indicated that participants almost agree about their capacities in terms of *declarative knowledge, procedural knowledge, contextual knowledge,* and *debugging strategies.* However, as to *planning, information management strategies, comprehension monitoring,* and *evaluation,* they have displayed almost moderate level of capacity in their learning.

The tertiary purpose of the present study was to see which thinking styles predict regulation of cognition and knowledge of cognition. It was found that *executive, monarchic, internal,* and *legislative* thinking styles predict regulation of cognition. On the other hand, *executive, anarchic*, legislative, and *monarchic* were found to be significant predictors of knowledge of cognition. Similar results are reported in literature. Heidari and Bahrami (2013) indicated significant positive correlation between *hierarchical, anarchic, and external* styles and metacognitive awareness.

The most striking finding obtained in this study is that executive thinking styles is the ultimate predictor of both knowledge and regulation of cognition. In that sense, one can easily assert that the participants follow the rules and regulations in the discussion of their views with others and/or in writing them. They obviously stick to the most appropriate methods in solving a problem, prefer projects that have a simple and plain structure and purpose, check the procedures and the techniques to employ before launching a project or a study, and prefer their roles which are clearly defined in that project. Moreover, they try to understand how to solve these problems by following these pre-determined rules and regulations.

Relying on the findings of the study, it is recommended that teachers should guide the learners how to plan, help them improve their information strategies, provide them with more comprehension activities and how to evaluate their own learning through a variety of evaluation techniques such as self-evaluation and peer evaluation, which will cultivate their metacognition and improve their thinking styles. They should be guided how to attain, construct, and use knowledge for their real-life needs. Therefore, as language educators we should train our prospective language teachers to foster their creativity through creativity generating activities such as problem-solving, task-based, cooperative learning, etc. However, they should also be supported, helped, and guided by their teachers through scaffolding process.

It must be stated that it is possible to change thinking styles of people. According to literature, students tend to perform better academically when they are taught in accordance with their thinking styles (Negahi, Nouri, and Khoram, 2015). Similarly, as was indicated by Schleifer & Dull (2009), it is also possible to improve metacognition through domain knowledge and expertise. Therefore, we should tailor our instruction so that it channels learners thinking styles correctly and enables metacognition to be developed.

Another significant point is that, according to Veenman, Van Hout-Wolters, and Afflerbach (2006), it is during childhood that metacognition develops and during the education process it becomes more developed. These authors also claimed that regulation of cognition, as one of the main components of metacognition, develops after the other components of metacognition develop. Therefore, further studies can focus on the role of formal education and especially L2 education in the development of students' metacognition.

According to Sternberg & Grigorenko (1995), thinking styles are changeable for tasks. This means that learners' preferred way of may differ from task to task and thus they are "adaptive" (Yong, 2012). In particular, a learner's preferred thinking styles may differ from school subject to school subject. Therefore, future studies can focus on which thinking styles are valid for different school subjects and English as well and whether it is possible to draw certain patterns in these thinking styles. Another important point is that, as was pointed out by Zhang (2001), thinking styles may change with age, gender, or socioeconomic status. Therefore, future studies can focus on the predictive impact of these variables on thinking styles.

What is more, studies on thinking styles seem to provide positive correlations in terms of academic achievement; however, there are also controversial results depending on tests, learning tasks, or specific disciplines under different cultural and educational contexts or specific assessment situations (Fan & He, 2012). Therefore, more research is needed to ascertain their place in the learning process, and language teaching in particular.

One of the limitations of the present study was that it did not dwelled on gender differences or differences in grade levels in terms of thinking styles or metacognition. The reason for this is that the main focus of the study was to determine the overall level of the participants' thinking styles and metacognition and to see the correlation between these two constructs.

Future studies can focus on investigating gender differences or differences in terms of grade level.

6. Conflict of Interest

The authors declare that there is no conflict of interest.

7. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Apaydin, B.B. & Cenberci, S. (2018). Correlation Between Thinking Styles and Teaching Styles of Prospective Mathematics Teachers, *World Journal of Education 8(*4), 36-46.

Aydin, U., & Ubuz, B. (2010). Turkish Version of the Junior Metacognitive Awareness Inventory: The Validation Study. *Education and Science*, 35(157), 30-45.

Bernardo, A. B. I., Zhang, L. F., & Callueng, C. M. (2002). Thinking styles and academic achievement among Filipino students. *Journal of Genetic Psychology*, 163(2), 149–164.

Betoret, F. D. (2007). The influence of students' and teachers' thinking styles on student course satisfaction and on their learning process. *Educational Psychology*, 27(2), 219-234

Cano-Garcia, F., & Hughes, E. H. (2000). Learning and thinking styles: An analysis of their interrelationship and influence on academic achievement. *Educational Psychology*, 20(4), 413–430

Celik, D. (2016). *Sinif ogrencilerinin Dusunme stilleri, ogrenme stratejileri ve dusunme stilleri ile ogrenme stratejileri arasindaki ilişki,* M.Sc Thesis, Pamukkale University Educational Science Institute, Denizli, Turkey

Cinar, G. (2016). *Ögretmen adaylarinin dusunme stilleri ile yansitici dusunme egilimleri arasindaki iliski*, M.Sc Thesis, Ondokuz Mayıs University Educational Science Institute, Samsun, Turkey.

Dincer, B. (2009). *Ögretmen adaylarının düşünme stilleri profillerinin çesitli değiskenler açısından degerlendirilmesi,* M.Sc. Thesis, Adnan Menderes University Social Science Institute, Aydin.

Efklides, A. (2014). How Does Metacognition Contribute to the Regulation of Learning? An Integrative Approach. *Psychological Topics*, 23, 1-30.

Fan, W. & He, Y. (2012). Academic Achievement and Intellectual Styles, In Li-fang Zhang, Robert J. Sternberg, Stephen Rayner (eds) (2012). *Handbook of Intellectual Styles Preferences in Cognition, Learning, and Thinking*, Springer.

Fan, W., Zhang, L. F., & Watkins, D. (2010). Incremental validity of thinking styles in predicting academic achievements: An experimental study in hypermedia learning environments. *Educational Psychology*, 30(5), 605–623.

Heidari, F. & Bahrami, Z. (2012). The Relationship between Thinking Styles and Metacognitive Awareness among Iranian EFL Learners, *International Journal of Linguistics*, *4(*3), 721-733.

Kallio, H., Virta, K., Kallio, M., Virta, A. Hjardemaal, F.R. & Sandven, J. (2017). The utility of the metacognitive awareness inventory for teachers among in-service teachers, *Journal of Education and Learning*, 6(4). 78-91.

Khosravi, A. A. (2010). The relationship between thinking styles and cognitive style, conceptual style and learning style of students. *Iranain Journal of Medical Education*, 2(5), 78-94.

Lee, C. I., & Tsai, F. Y. (2004). Internet project-based learning environment: The effects of thinking styles on learning transfer. *Journal of Computer Assisted Learning*, 20(1): 31–39.

Nazarifar, F., Abolghasemi Najafabadi, M., Kamali, F. & Hosseini,T. (2011). Examination of relationship between thinking styles performance and academic success among scholars

of technical and engineering academy of Tehran University. *Iranian Journal of Engineering Education*, 12(47), 49-62

Negahi, M., Nouri, N., and Khoram, A. (2015). The Study of Learning Styles, Thinking Styles, and English Language Academic Self-efficacy among the Students of Islamic Azad University of Behbahan Considering Their Field of Study and Gender, *Theory and Practice in Language Studies, (5)*8, pp. 1722-1729.

Ohata, K., & Fukao, A. (2014). L2 learners' conceptions of academic reading and themselves as academic readers. *System*, 42, 81-92 http://dx.doi.org/10.1016/j.system.2013.11.003

Öz, H. (2015). Investigating pre-service English teachers' metacognitive awareness. In H. Öz (Ed.), *Language and communication research around the globe: Exploring untested ideas* (pp. 35-58). New York: Untested Ideas Research Center

Öz, H. (2016). Metacognitive Awareness and Academic Motivation: A CrossSectional Study in Teacher Education Context of Turkey, *Procedia - Social and Behavioral Sciences 232*, 109 – 121, doi: 10.1016/j.sbspro.2016.10.035

Panadero, E. (2017). A Review of Self-Regulated Learning: Six Models and Four Directions for Research. *Frontiers in Psychology*, 8, 422. https://doi.org/10.3389/fpsyg.2017.00422

Raoofi1, S. Chan, S.H., Mukundan, J. & Rashid, S. (2014). Metacognition and Second/Foreign Language Learning, English Language Teaching, *7*(1), 36-49.

Tuzer, L. (2016). *Sınıf ögretmenlerinin düşünme stillerinin çeşitli değişkenler açısından incelenmesi*, M.Sc. Thesis, Kahramanmaras, Turkey

Sadler-Smith, E. (2012). Metacognition and Styles, In Li-fang Zhang, Robert J. Sternberg, Stephen Rayner (eds) (2012). *Handbook of Intellectual Styles Preferences in Cognition, Learning, and Thinking*, Springer.

Sarıçoban, A, & Alyas, A. (2016). Metacognitive Strategies and Learner Autonomy in EFL Reading. *Modern Journal of Language Teaching methods*, *2*(2), 45-68.

Sarıçoban, A. (2015). Metacognitive awareness of preservice English language teachers in terms of various variables. *Procedia- Social and Behavioral Sciences*, *186*, 664 – 669 https://doi.org/10.1016/j.sbspro.2015.04.135

Schleifer, L. L. F., & Dull, R. B. (2009). Metacognition and performance in accounting classrooms. *Issues in Accounting Education*, 24(3), 339–367

Schraw, G., & Dennison, R. S. (1994). Assessing Metacognitive Awareness. *Contemporary Educational Psychology*, 19, 460-475. https://doi.org/10.1006/ceps.1994.1033.

Schraw, G., & Moshman, D. (1995). Metacognitive theories. *Educational Psychology Review*, 7, 351–371.

Sternberg, R. J. (1988). Mental self-government: A theory of intellectual styles and their development. *Human Development, 31*, 197-224.

Sternberg, R. J., & Grigorenko, E. L. (1993). Thinking styles and the gifted. *Roeper Review*, 16(2), 122-120.

Sternberg, R.J. (1997). *Thinking styles*. Cambridge: Cambridge University Press.

Sungur, S., & Senler, B. (2009). An analysis of Turkish high school students' metacognition and motivation, *Educational Research and Evaluation*, *15(*1), 45–62.

Tanner, K. D. (2012). Feature Approaches to Biology Teaching and Learning Promoting Student Metacognition. *CBE—Life Sciences Education*, 11, 113-120.https://doi.org/10.1187/cbe.12-03-0033

Teng, F. (2019). The role of metacognitive knowledge and regulation in mediating university EFL learners' writing performance, *Innovation in Language Learning And Teaching* https://doi.org/10.1080/17501229.2019.1615493.

Veenman, M.V.J., Van Hout-Wolters, B.H.A.M., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition and Learning*, *1*, 3–14.

Wenden, A. (1991). *Learning strategies for learner autonomy: Planning and implementing learner training for language learners.* Hemel Hemstead, Hertfordshire: Prentice Hall.

Wilkins, S. (1996). Fostering independence with metacognition. *In Proceedings of Auton1omy 2000: The development of learning independence in language learning* (pp. 254-263).

Yong, B.C.S. (2012). Comparison Between the Thinking Styles of Students in a Science School and a Mainstream School, *Journal of Science and Mathematics*, *35*(1), 60 – 83.

Young, A., & Fry, J. D. (2008). Metacognitive Awareness and academic achievement in college students. *Journal of the Scholarship of Teaching and Learning*, 8(2), 1-10.

Zhang, L. F. (2000). University students' learning approaches in three cultures: An investigation of Biggs' 3P model. *Journal of Psychology: Interdisciplinary and Applied*, 134(1), 37–55.

Zhang, LF. (2001). Do styles of thinking matter among Hong Kong secondary school students? *Personality and Individual Differences*, 31 (3), 289-301.

Zhang, L.F. (2002). Thinking Styles and Cognitive Development, *The Journal of Genetic Psychology*, 2002, 163(2), 179–195.

Zhang, L. F., & Sternberg, R. J. (2000). Are learning approaches and thinking styles related? A study in two Chinese populations. *Journal of Psychology*, 134(5), 469–489.

Zhang, L. F. (2004). Revisiting the predictive power of thinking styles for academic performance. *Journal of Psychology: Interdisciplinary and Applied*, 138(4), 351–370.

Workman, M. (2004). Performance and perceived effectiveness in computer-based and computer-aided education: Do cognitive styles make a difference? *Computers in Human Behavior*, 20, 517–534.

Ertem-Akbaş, E., & Cancan, M. (2020). Metaphors formed by 6th and 7th grade students regarding the difficulties they experienced in the process of learning the subject of circle. *International Online Journal of Education and Teaching (IOJET), 7*(3). 1054-1075.
https://iojet.org/index.php/IOJET/article/view/871

Received: 20.04.2020
Received in revised form: 29.05.2020
Accepted: 04.06.2020

METAPHORS FORMED BY 6TH AND 7TH GRADE STUDENTS REGARDING THE DIFFICULTIES THEY EXPERIENCED IN THE PROCESS OF LEARNING THE SUBJECT OF CIRCLE

Research Article

Elif Ertem Akbaş

Yuzuncu Yil University

eertema@gmail.com

Murat Cancan

Yuzuncu Yil University

mcancan@gmail.com

Elif Ertem Akbaş is an assistant professor in the Faculty of Education at Yuzuncu Yil University. She completed her doctoral study in mathematics education. She works on the integration of technology into education.

Murat Cancan is an associate professor in the Faculty of Education at Yuzuncu Yil University. He completed her doctoral study in mathematical analysis and topology. He works on mathematical analysis, topology and mathematics education.

METAPHORS FORMED BY 6TH AND 7TH GRADE STUDENTS REGARDING THE DIFFICULTIES THEY EXPERIENCED IN THE PROCESS OF LEARNING THE SUBJECT OF CIRCLE

Elif Ertem Akbaş

eertema@gmail.com

Murat Cancan

mcancan@gmail.com

Abstract

In this study, the purpose was to make use of metaphors to determine the difficulties experienced by secondary school 6th and 7th grade students in the process of learning the subject of circle. In the study, the phenomenological research design, one of qualitative research methods, was used. The research data were collected from a total of 140 secondary school students (80 6th grade, 60 7th grade), who were asked to fill in the blanks in the statement of "While learning the geometric shape of circle, I experience the biggest difficulty in …. because …". For the analysis of the data, content analysis method was used. The results revealed 42 different valid metaphors. These metaphors were gathered under seven categories. Among these categories, the most frequently produced ones were *problems related to the shapes drawn in a circle* and *tangent problems with circles*. Moreover, in the study, it was found that when compared to the 6th grade students, the 7th grade students produced more metaphors related to the difficulties experienced in the teaching process of circle. Based on all these results and the students' perceptions, suggestions were put forward regarding the development of students' positive perceptions and understanding of geometry teaching.

Keywords: geometry, circle, difficulties, secondary school students, perceptions, metaphor.

1. Introduction

Mathematics is one of the main courses involving the use of mathematical language and abstract concepts in processing and producing the information, and geometry constitutes the observable aspect of this basic course full of abstract concepts (Aydın & Monaghan, 2011; Hacısalihoğlu, Mirasyedioğlu & Akpınar, 2004). Obviously, most of the objects in nature like trees, flowers, fruits, playgrounds, buildings and classrooms, which are all found in the physical world of an individual, are associated with geometric shapes (Aydın & Monaghan, 2011). Geometry, which cannot be limited to geometric shapes, not only helps understand the nature and define our world systematically (Yolcu, 2008) but also is a sub-discipline which helps students give meaning to their physical world throughout their development processes. In this respect, students can develop upper-level meanings by associating the physical world (which they begin to give meaning to at early ages) with geometric thinking at later ages. In addition, this developing upper-level understanding will allow students to anticipate the axiomatic structure of geometry, to develop positive attitudes (Altun, 2000; Ubuz, 1999) and to understand the characteristics of the geometric structures in their environment and the relationships between these structures (National Council of Teachers of Mathematics [NCTM], 2000). In this respect, students recognizing the importance of viewing a geometric shape from

different perspectives could be said to envisage how that shape would look in two-dimension or three-dimension; in other words, they would be able to develop their spatial visualization skills. The purpose of geometry teaching is to give meaning to the shapes in their own physical and intellectual worlds (Özkeleş-Çağlayan, 2010) and to develop their thinking and reasoning processes regarding the space (Van de Walle, Karp & Bay-Williams, 2010). In the process of achieving these goals, it is important to consider not only the way geometric models and shapes are perceived and but also the difficulties experienced in relation to the teaching of these shapes.

When the importance of geometric shapes in mathematics teaching (Sherard, 1981) is taken into account, the importance of geometric shapes and geometry, which features the axiomatic structure of mathematics (Ersoy, 2003), cannot be denied. In this respect, with the help of the subjects covered by geometry, a sub-branch of mathematics, which is of great importance among all other basic sciences, it would not be wrong to say that geometry sheds light on the abstract side of mathematics. Certain difficulties are likely to be experienced in understanding geometric concepts due to a number of factors influential on the learning process despite its observable aspect. Considering the fact that these difficulties are related to the geometric shapes found in the sub-learning of geometry, one of the best ways to reveal the difficulties experienced by students while learning these shapes is to make use of their metaphors because metaphors are regarded as a mental tool which reflects and concretizes our thoughts about difficult, abstract and complex concepts or phenomena and which makes use of simile and allows basing an unknown difficult-looking thing on our previous experiences (Balcı, 2003; Saban, 2004; Saban, Koçbeker & Saban, 2006).

The word "metaphor" originates from the Old Greek word "metaphrein" and has a meaning such as conveying, transferring and transmitting, and it etymologically derives from "metaphora", which is considered to be a combined word (meta+ phora) (Kılcan, 2017). To sum up, with the combination of the words "meta" meaning "replacement" and "phrein" meaning "conveying", "metaphor" is a Greek-origin word meaning "changing" (Kılcan, 2017; Levine 2005). With the contemporary metaphor theory, the concept of metaphor gained a new dimension (Lakoff & Johnson, 1980), and it was defined as individuals' expressing their thoughts with the help of similar concepts found in their intellect related to the concept in question (Lakoff, 1993). In our language, the word metaphor, which is used in a meaning different from its actual meaning as a result of a simile, is now used to mean 'borrowing' (Turkish Language Society [Türk Dil Kurumu], 1998). Parallel to this definition, in some studies, metaphors are referred to as a way of thoughts or viewpoints regarding how individuals perceive the concepts, phenomena or processes within the framework of their own knowledge, skills and attitudes (Inbar, 1996; Kurt, 2010 cited in Otyzbayeva, 2006; Saban, 2009). Similarly, according to Jensen (2006), who attributed the concept of metaphor to Plato, metaphors are words used to explain the meaning of abstract concepts difficult to understand, and Aslan (2013) defines metaphor as statements that allow explaining a concept by resembling it to another one within the context of their common features. In addition, metaphors are regarded as a tool that allows individuals to explain, with the help of similes, how they view the life, circumstances, phenomena, concepts and objects (Cerit, 2008); as a mechanism of mental mapping in the process of individuals' giving meaning to the circumstances in their lives (Arslan & Bayrakçı, 2006); and as words that allow individuals to use different aspects of a situation which they can normally explain with the help of linguistic and mental processes (Cebeci, 2013). Whether defined as a viewpoint about a situation or a phenomenon or as a way of thinking, metaphors could be regarded as strong mental concepts and tools that individuals can use to perceive, understand and explain the abstract and complex phenomena and processes they meet (Cerit, 2008; Inbar, 1996, Lakoff & Johnson, 2005; Saban, 2009; Yob, 2003). From

this point of view, in the present study, metaphors were taken as a tool used by individuals to explain the difficulties with the help of a concrete concept while teaching the concept of circle, which is an abstract and complex concept among the geometric shapes found in the sub-learning domain of geometry.

Parallel to the fact that the metaphor used in various disciplines in the scientific world is viewed as an effective tool for giving meaning to educational processes (Balcı, 1999), it is seen in educational studies that metaphors are used in the processes of increasing the comprehensibility of difficult subjects or certain abstract concepts and collecting related data. In addition, it is also seen in educational studies that metaphors are used as a data collection tool in the process of revealing participants' perceptions regarding a concept or subject and that metaphors are generally based on qualitative research methods (Kılcan, 2017). When metaphor studies conducted in the field of education are examined, it is seen that metaphors are used to determine the perceptions regarding *curricula and learning/teaching; educational technologies; various teaching methods; school and ideal school; and teacher and the profession of teaching* (Adıgüzel, 2009; Akkaya, 2012; Aktürk, Mihçi & Çelik, 2015; Arslan & Bayrakçı, 2006; Aydoğdu, 2008; Balcı, 1999; Cerit, 2008; Çoklar & Bağcı, 2010; Dönmez-Usta, Durukan & Hacıoğlu, 2016; Kabadayı, 2008; Ocak & Gündüz, 2006; Saban, 2004; Semerci, 2007; Taşdemir & Taşdemir, 2011). Besides all these studies, there are several other metaphor studies conducted in the field of mathematics education to examine the *concept of mathematics* (Cassel & Vincent, 2011; Erdoğan, Yazlık & Erdik, 2014; Güner, 2013; Gür, Hangül & Kara, 2014; Güveli et.al., 2011; Keleş, Taş & Aslan, 2016; Oflaz, 2011; Özgün-Koca, 2010; Sam, 1999; Sam & Ernest, 1998; Schinck et.al., 2008; Sterenberg, 2008; Şahin, 2013; Şengül & Katrancı, 2012; Toluk-Uçar et.al., 2010); *mathematics course; mathematics teacher; mathematician concepts* (Ada, 2013; Fleener, Pourdavood & Fry, 1995; Güler, Öçal & Akgün, 2011; Picker & Berry, 2000; Şahin, 2013; Şengül, Katrancı & Gerez-Cantimer, 2014; Toluk-Uçar et.al., 2010); *learning mathematics; concepts of teaching mathematics* (Allen & Shiu, 1997; Güner, 2012; Reeder, Utley & Cassel, 2009); *mathematics problem; concepts of mathematics problem solving and problem posing* (Kılıç, 2014; Turhan-Türkkan & Yeşilpınar-Uyar, 2016; Yee, 2012); and *concept of proving* (Cansız-Aktaş & Aktaş, 2013). In addition to these concepts, it is also seen that the *concept of geometry* (Bahadır, 2016; Horzum & Yıldırım, 2016) and the geometry-related metaphors owned by students were examined. Consequently, a number of metaphors and conceptual categories were obtained in relation to the concepts or phenomena examined in all these studies. In this respect, Yob (2003) pointed out that the variety of the perceptions of the participants was effective in obtaining numerous metaphors and conceptual categories.

Parallel to all these studies, there are a number of studies on the use of metaphors in mathematics teaching, yet there is not enough research on metaphors in literature regarding geometry, geometric concepts or geometric shapes. However, geometric models, samples and shapes obviously have an important place in mathematics teaching. Undoubtedly, geometric models and shapes play an important role in students' own physical world as well as in the process of understanding the phenomena related to the universe (Özkeleş-Çağlayan, 2010). In this respect, in the Secondary School Mathematics Curriculum revised in 2018, the learning domain of Geometry and Measurement was included in all the class grades (5th, 6th, 7th and 8th grades) (Ministry of Education [MoNE], 2018). In relation to this learning domain, 6th and 7th grade students are expected to achieve the following outcomes related to circle: "can solve problems requiring calculation of the circle length" (problems related to drawing a circle are included); and "can determine the features of a circle" (exercises requiring the calculation of the length of a circle piece and exercises requiring the calculation of the area of a circle and circle slice are included; making use of ratio while relating the central angle to the area of the

circle slice (MoNE, 2018). On the other hand, it is seen that in the process of acquisition of these gains, several difficulties are experienced while teaching the sub-learning domain of circle (Cantimer & Şengül, 2017) and that the metaphors owned by students regarding these difficulties have not been evaluated sufficiently. Therefore, within the scope of the present study, it was necessary to examine the metaphors produced by the secondary school 6th and 7th grade students in relation to the difficulties they experienced in the process of acquiring the gains related to the sub-learning domain of circle. In this respect, with the help of metaphors, the present study aimed to determine the secondary school 6th and 7th grade students' perceptions (for in-depth understanding) regarding the difficulties they faced while achieving the outcomes found in the sub-learning domain of circle. In line with this purpose, the following research questions were directed in the study:

1) What are the metaphors that secondary school 6th and 7th grade students have regarding the difficulties they experience in the process of learning the sub-learning domain of circle?
2) What are the categories formed on the basis of the common features of the metaphors obtained?

2. Method

2.1. Research Model

In the study, the phenomenological method, one of qualitative research designs, was used. Qualitative studies allow the researcher to examine the phenomena found in natural environment with all their complexities (Fraenkel & Wallen, 2000). By focusing on individuals' past experiences which they are aware of or which they fail to understand fully, phenomenological studies based on the qualitative research approach aim to describe how these individuals can problematize their own conditions (Marshall & Rossman, 2006; Yıldırım & Şimşek, 2011). The definitions obtained regarding the phenomenon examined in phenomenological studies are divided into categories to reveal what individuals think (Çekmez, Yıldız & Bütüner, 2012). With the help of metaphors, this qualitative study was carried out to determine the secondary school 6th and 7th grade students' perceptions regarding the difficulties they experienced in the process of learning the sub-learning domain of circle, and the study further aimed to categorize the metaphors obtained. For this purpose, the study was designed using the descriptive research design and metaphorical data analysis. Moreover, the phenomenological design was used for in-depth examination of the meanings attributed by the secondary school 6th and 7th grade students to the difficulties they faced in the process of learning circle.

2.2. Study Group

The present study was conducted with a total of 140 students from two different secondary schools in the city of Van in Eastern Anatolia in Turkey in the academic year of 2019-2020. The participants in the study were selected on voluntary basis and with the purposeful sampling method. In this respect, the participants were secondary school 6th and 7th grade students who had knowledge regarding the outcomes related to the sub-learning domain of circle. Among the 140 participants, 80 of them were 6th grade students (57.14%), and 60 of them were 7th grade students (42.86%).

2.3. Data Collection

In order to reveal the perceptions of the secondary school 6th and 7th grade students with the help of metaphors regarding the difficulties they experienced in the process of learning the sub-learning domain of circle, each of them was asked to complete the statement of "While learning the geometric shape of circle, I experience the biggest difficulty in …. because …". These descriptions provided by the students with their own handwritings constituted the basic data source as "document" for the researcher. In the first blank, the students were asked to write down a metaphor related to the difficulty they experienced while learning circle. In the second blank after the word 'because', the students were asked to explain the reasons for the metaphor they produced and wrote. The logical reasons for the metaphors can be identified via responses to the question of "why?" as different individuals could attribute different meanings to the same metaphors (Yıldırım & Şimşek, 2011). In the data collection process in the study, the students were informed about metaphors and asked to define the difficulties they experienced while learning circle and to explain for what purposes they provided these descriptions. It took the students about 15 minutes to complete the statements in the document.

2.3. Data Analysis

The qualitative data collected in the study were examined using content analysis to clarify the data within a certain framework and to obtain the related codes and categories (Silverman, 2000). The data analysis process was completed in the following phases (Saban, 2009).

2.3.1. Phase 1: Labelling

In this phase, all the statements written down by the students in the documents (all the metaphors regardless of whether they were valid or invalid were listed temporarily. In this process, the students' statements which were unclear were revised without changing the meaning and coded as metaphors. It was seen that almost all the students produced metaphors and that some of the metaphors were put forward by more than one student. Furthermore, in this phase, the documents which did not include any metaphor or which were left blank were marked for "elimination".

2.3.2. Phase 2: Elimination

In this phase, the metaphors produced by the students were revised with respect to the "subject of the metaphor, its source and the relationship between its subject and its source" (Fordcenville, 2002). The responses without any source, those belonging to more than one category, those inappropriate to the purpose of the study and the documents left blank were eliminated from the data collected. For example, "While learning the geometric shape of circle, I experience the biggest difficulty in doing laces placed on the edge of a circle because the circle reminds me of those difficult laces done by my mother and reminds me of a Turkish song named '*çemberimde gül oya*' (which includes the word circle in its name). As can be seen, although the subject of the metaphor was a circle and a difficult job, the student reported his/her thoughts irrelevant to the subject for the metaphor source. In this way, the responses like this one, which did not serve the purpose of the study or which included inappropriate and irrelevant relationships, were excluded. In this respect, 20 responses of the 6th grade students and 16 responses of the 7th grade students were not included in the analysis because they lacked a metaphor source, because they belonged to more than one category or because they were not appropriate to the purpose of the study. In addition, 33 documents of the 6th grade students and 9 documents of the 7th grade students were excluded from the analysis because they were left blank partially or completely. Consequently, a total of 78 responses (36 invalid and 42 left blank) were not subjected to analysis, and 62 responses were analyzed.

2.3.3. Phase 3: Code and category development

In this phase, the 42 remaining metaphors produced by the students were gathered under seven categories with respect to the common features of the difficulties experienced by the students in the process of learning the sub-learning domain of circle. These categories were named as follows: *Difficulty in drawing a circle for which standard and open equations are given; difficulty related to the arc-length measurements; difficulty related to the degree and radian; difficulty related to the concepts of interior, exterior, central and peripheral angles; difficulty related to the angles in shapes drawn in a circle; difficulty of problems related to the shapes drawn in a circle; and difficulty of tangent problems with circles*.

2.3.4. Phase 4: Ensuring validity

An important criterion for validity is the detailed explanation of how the results have been obtained after detailed reporting of the data collected in qualitative studies (Yıldırım & Şimşek, 2013). Therefore, in order to ensure validity in the present study, the data collection and analysis processes and the way the participants were determined were explained in detail. Moreover, in the section of findings, the categories formed in line with the common features of the metaphors obtained were supported with direct quotations from the examples of the metaphors written in the documents by the students, and the categories were explained in detail.

2.3.5. Phase 5: Ensuring reliability

For the reliability of the study, the metaphors and the categories determined by the researchers were presented to expert view, and the expert was asked to reassign the metaphors to the categories formed. Following this, by using the reliability formula of [Reliability=Agreement/(Agreement+Disagreement)*100] suggested by Miles and Huberman (1994), the percentage of the agreement between the researchers and the expert regarding the metaphors they assigned to the categories was calculated. As a result, the agreement ratio was found to be 96%.

3. Findings

The metaphors produced by the 6th and 7th grade students in relation to the difficulties they experienced in the process of learning circle were gathered under seven categories, and for the presentation of the findings, these categories were used. The categories were as follows: *drawing a circle for which standard and open equations are given; arc-length measurements; degree and radian; the concepts of interior, exterior, central and peripheral angles; the angles in shapes drawn in a circle; problems related to the shapes drawn in a circle; and tangent problems with circles*. Figure 1 shows the frequencies and the total frequency distribution of the metaphors produced by the 6th and 7th grade students regarding the categories obtained.

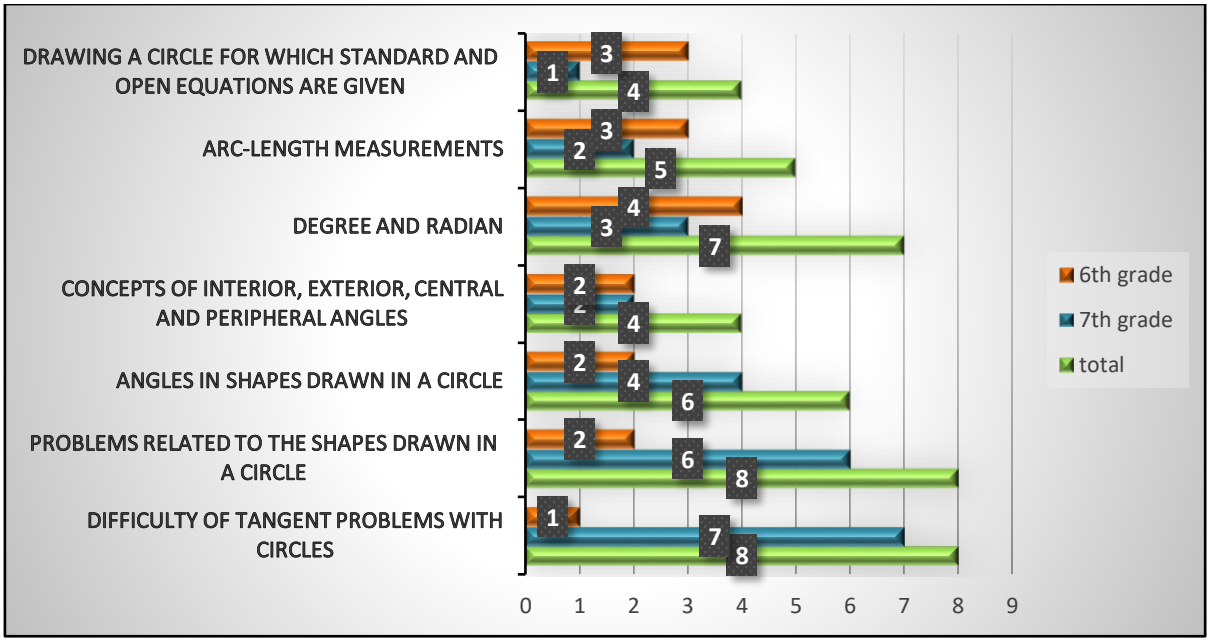


Figure 1. Frequency distribution of the metaphors with respect to the class grades and the total

According to Figure 1, the 6th grade students produced more metaphors than the 7th grade students in relation to the categories of *drawing a circle for which standard and open equations are given (6th grade =3; 7th grade=1), arc-length measurements (6th grade=3; 7th grade=2) and degree and radian (6th grade=4; 7th grade=3)*. In addition, the 7th grade students produced more metaphors than the 6th grade students regarding the categories of *angles in shapes drawn in a circle (6th grade=2; 7th grade=4), problems related to the shapes drawn in a circle (6th grade=2; 7th grade=6)* and *tangent problems with circles (6th grade=1; 7th grade=7)*. When Figure 1 is examined in general, it is seen that the metaphor produced most belonged to the categories of *problems related to the shapes drawn in a circle (total=8)* and *tangent problems with circles (total=8)* and that the 7th grade students *(total=25)* produced more metaphors when compared to the 6th grade students *(total=17)*. Table 1 presents the findings obtained in relation to the metaphors produced by the students with respect to the categories; the distribution of the student frequencies with respect to the metaphors and class grades; and the total frequency and total percentage values with respect to the categories.

Table 1. *Frequency and distribution of the students' metaphors with respect to the categories*

Categories	**Metaphors produced**	**6th grade frequency**	**7th grade frequency**	**Total frequency (f)**	**(f) and (%)**
Drawing a circle for which standard and open equations are given	point M and distance r	1		1	5 (8.06%)
	numbers and letters	2		2	
	standard equation	1		1	
	discriminant in the circle equation		1	1	
Arc-length measurements	eyebrow	1		1	7 (11.30%)
	tyre		1	1	
	alpha angle		1	1	
	arrow-arc	1		1	
	pie piece	3		3	

Degree and radian	ring		2	2	12 (19.35%)
	pi and arc angle		2	2	
	transformation	2		2	
	degree and radian	3		3	
	angle opposite the intersection of the olympic circles		1	1	
	measurement	1		1	
	degree×(π/180)	1		1	
Concepts of interior, exterior, central and peripheral angles	hour-hand and minute-hand	1		1	4 (6.45%)
	tangents and chords		1	1	
	wheel rim		1	1	
	practical slicer for melon and watermelon	1		1	
Angles in shapes drawn in a circle	slice of baklava on a tray	1		1	8 (12.90%)
	tortoiseshell		1	1	
	triangle cheese		1	1	
	butterfly drawn in a circle	2		2	
	square of chords		1	1	
	interior triangles and squares		2	2	
Problems related to the shapes drawn in a circle	manhole cover		1	1	11 (17.74%)
	twisting disc		1	1	
	frisbee		1	1	
	tennis racket		2	2	
	polygons in circle	1		1	
	basketball hoop		1	1	
	circle slices and area	2		2	
	target board		2	2	
Tangent problems with circles	pilates circle		1	1	15 (24.20%)
	nutcracker		1	1	
	roundabout		1	1	
	radius and tangent		3	3	
	point and tangent	2		2	
	exterior shapes tangent to the circle		2	2	
	square formed by the exterior tangent with the radius		4	4	
	square of tangents		1	1	
TOTAL	**42**	**26**	**36**	**62**	**100%**

According to Table 1, the results of the analysis of 62 responses considered to be valid revealed that a total of 42 different metaphors were produced. Of all these metaphors, 26 of them were produced by the 6th grade students, and 36 of them were produced by the 7th grade students. The frequency of the metaphors ranged between 1 and 4. The most frequent metaphor was *"square formed by the exterior tangent with the radius"* produced by 4 7th grade students, which was followed by the metaphors of *"pie piece"*, *"degree and radian"* and *"radius and tangent"* produced by 3 6th grade students and 3 7th grade students; and by the metaphors of

"numbers and letters", "ring", "pi and arc angle", "transformation", "butterfly drawn in a circle", "interior triangles and squares", "tennis racket", "circle slices and area", "target board", "point and tangent" and *"exterior shapes tangent to the circle"* produced by 2 6th grade students and 2 7th grade students. In this respect, it could be stated that the 6th and 7th grade students produced various metaphors regarding the difficulties they experienced in the process of learning circle. In addition, considering the number of the metaphors produced and the number of the participants, it was seen that the 7th grade participants produced more metaphors *(25 metaphors)* with a higher frequency *(36 students)* though the number of the participants in the 7th grade *(60 students)* was lower than that of the participants in the 6th grade *(80 students)*.

Within the scope of the study, while assigning the metaphors to the categories presented in Table 1, the explanations referring to the source of the metaphor were taken into account. For example, in relation to one 7th grade student's response of *"While learning the geometric shape of circle, I experience the biggest difficulty in finding the perimeters of shapes on a manhole cover because it is very difficult to find the perimeters of shapes drawn in a circle, which looks similar to a manhole cover",* the explanation referring to the source of the metaphor revealed that the student experienced difficulties in dealing with the problems related to the shapes drawn in a circle.

Moreover, according to the categories in Table 1, when the total frequency and percentage values were examined, it was seen that the total frequency and percentage values *(15 participants, 24.20%) were highest* for the category of *"tangent problems with circles"*, for which most metaphors (8) were produced as well. This category was followed by the category of *"degree and radian"* with 7 metaphors *(12 participants, 19.35%)*, by the category of *"problems related to the shapes drawn in a circle"* with 8 metaphors *(11 participants, 17.74%)*, by the category of *"angles in shapes drawn in a circle"* with 6 metaphors *(8 participants, 12.90%), and by the category of "arc-length measurements"* with 5 metaphors *(7 participants, 11.30%)*. In addition, the total frequency and percentage values for the category of *"concepts of interior, exterior, central and peripheral angles"* with the fewest metaphors (4) were lowest *(4 participants, 6.45%)*, and the total frequency and percentage values for the category of *"drawing a circle for which standard and open equations are given"* with 4 metaphors were low as well *(5 participants, 8.06%)*. Below are the categories formed and the 6th and 7th grade students' descriptions for the related difficulties they experienced in the process of learning circle.

Category 1: Drawing a circle for which standard and open equations are given

In this category, there were 4 metaphors produced by a total of 5 students (8.06%), 4 of whom were 6th grade students and 1 of whom was 7th grade student. In the category, the metaphor of "numbers and letters" (f=2) produced by the 6th grade students was prominent. Below are sample statements forming the metaphors in this category:

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the circle equation in the case of a given point M and a distance r because I cannot understand the relationship between the circle and forming an equation with a point and distance"

"While learning the geometric shape of circle, I experience the biggest difficulty in forming an equation with such numbers and letters because I don't understand how we can form an open or closed equation with them, and I thus memorize them."

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the discriminant of that circle because it is already difficult to find the circle equation. It is

difficult to cope with the coefficients of x and y to find whether that equation is a circle or not, and it is even more difficult to memorize them all."

When these metaphors were examined, it was seen that according to the students' statements, they experienced difficulties in forming the circle equation for which certain descriptions were provided in the process of learning circle (central point, radius length, a point on the circle) or in examining a circle whose equation was given. In addition, they focused on memorizing certain theoretical information to overcome these difficulties.

Category 2: Arc length measurements

In this category, there were 5 metaphors produced by 7 students (11.30%) 5 of whom were 6th grade students and 2 of whom were 7th grade students. In the category, the metaphor of "pie slice" produced by the 6th grade students was prominent (f=3). Below are sample statements forming the metaphors in this category:

"While learning the geometric shape of circle, I experience the biggest difficulty in thinking about how long the math teacher's eyebrow might be because our teacher, who has arc-like but knitted eyebrows, always knits his eyebrows when he asks us to find the length of an arc with a given angle, and his knitted eyebrows cause me to think about the length of his eyebrows."

"While learning the geometric shape of circle, I experience the biggest difficulty in finding not the peripheral length of a car tyre but the length of a part of it because I cannot conceive how much distance a tyre will cover when it rotates with a 53-degree angle although I know that a tyre can cover a distance which is as long as the peripheral length of its one cycle"

"While learning the geometric shape of circle, I experience the biggest difficulty in solving problems related to pie slices because we have to deal with the perimeter of the pie and with the angles of the slices so that we can slice the pie for people a lot in number and get equal slices for everyone."

When these metaphors were examined, it was seen that according to the students' statements, they experienced difficulties regarding certain question types related to arc length associated with daily life. In addition, strikingly, the students focused on interesting visible objects (e.g. pie slice, tyre, arc-arrow, eyebrow).

Category 3: Degree and radian

In this category, there were 7 metaphors produced by a total of 12 students (19.35%) 7 of whom were 6th grade students and 5 of whom were 7th grade students. In the category, the metaphors of "degree and radian" (f=3) and "transformation" (f=2) produced by the 6th grade students and the metaphors of "pi and arc angle" (f=2) and "ring" (f=2) produced by the 7th grade students were prominent. Below are sample statements forming the metaphors in this category:

"While learning the geometric shape of circle, I experience the biggest difficulty in understanding the subjects of degree and radian because I cannot understand how a radian can be a length"

"While learning the geometric shape of circle, I experience the biggest difficulty in relation to the transformation procedures because we take the angle as length."

"While learning the geometric shape of circle, I experience the biggest difficulty in subjects like the pi and arc angle, in which we transform 360° into length, because I always do memorization to find the arc length corresponding to the angle degree, and I really hate memorizing formulas."

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the perimeter of a ring as radian; well, yes you may find this funny, because at the end of that lesson, my girlfriend asked me: 'When you buy a ring for me, a 1-cm ring corresponding to a 120-degree angle will fit my finger. If so, what is the radian value? and I still couldn't find the answer!"

When these metaphors were examined, it was seen that according to the students' statements, they experienced difficulties in transforming a degree into radian or a radian into degree. Based on the explanations regarding the metaphors in this category, it could be stated that the students failed to understand that "the measure of the central angle across the arc with the radius is 1 radian"; furthermore, it could be stated that they had difficulty in relating the length to the angle and that they memorized 2π radian = 360°'to overcome this difficulty.

Category 4: Concepts of interior, exterior, central and peripheral angles

In this category, there were 4 metaphors produced by a total of 4 students (6.45%) 2 of whom were 6th grade students and 2 of whom were 7th grade students. In the category, each of the students produced 1 metaphor (f=1), and none of the 4 metaphors was prominent. These metaphors were "hour-hand and minute-hand of a clock", "tangents and chords", "wheel rim" and "practical slicer for melon and watermelon". Below are sample statements forming the metaphors in this category:

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the angles between two tangents or between the tangent and the chord because I cannot figure out whether it is a peripheral angle or an interior angle"

"While learning the geometric shape of circle, I experience the biggest difficulty in determining the correct angle for placing the watermelon slicer to have equal slices of watermelon for everyone because we have such a slicer at home; my mother is a teacher, and when she asks me such questions, I can't give an answer. Therefore, I become upset, and I don't like that slicer."

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the angle between the hour-hand and minute-hand of the clock because I can't solve questions involving different angles in a circle-shape clock with the minute-hand past 2 and the hour-hand past 3"

When these metaphors were examined, it was seen that according to the students' statements, they experienced difficulties in not only understanding the concepts of interior, exterior and peripheral angles formed in circle-like shapes but also finding these angles. In addition, it was striking that while expressing the difficulties they experienced in relation to the concept of angles in circles, the students used the tools they met in their daily lives (watch, wheel rim, practical slicer for melon and watermelon).

Category 5: Angles in shapes drawn in circle

In this category, there were 6 metaphors produced by a total of 8 students (12.90%) 3 of whom were 6th grade students and 5 of whom were 7th grade students. In the category, the metaphor of "butterfly drawn in a circle" (f=2) produced by the 6th grade students and the metaphor of "interior triangles and squares" (f=2) produced by the 7th grade students were prominent. Below are sample statements forming the metaphors in this category:

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the angle of triangular baklava slices on a huge tray because some slices are so big that I wonder whether they have equal angles or not."

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the angles of the square shapes on a tortoiseshell because these shapes resemble the squares we draw in a circle in class. I wonder whether these angles and the ones on the tortoiseshell are similar or not, but I can't find it!"

"While learning the geometric shape of circle, I experience the biggest difficulty in calculating the interior angles of the butterfly shape drawn because these angles are not always the same as in similar triangles."

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the interior angles drawn in triangles and squares because I confuse whether to use my knowledge about circles or my knowledge about triangles and squares."

When these metaphors were examined, it was seen that according to the students' statements, they experienced difficulties in finding the angles of the shapes drawn in a circle. Based on the explanations regarding the metaphors in this category, it could be stated that the students were indecisive about whether to benefit from the features of geometric shapes or from the features of a circle to find the angles drawn in a circle.

Category 6: Problems related to shapes drawn in a circle

In this category, there were 8 metaphors produced by a total of 11 students (17.74%) 3 of whom were 6th grade students and 8 of whom were 7th grade students. In the category, the metaphor of "circle slices and area" (f=2) produced by the 6th grade students and the metaphors of "tennis racket" (f=2) and "target board" (f=2) produced by the 7th grade students were prominent. Below are sample statements forming the metaphors in this category:

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the areas of shapes which become smaller on round things like the Frisbee because I can't solve the problems related to the areas of shapes drawn in a circle."

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the perimeter of the foot shape formed of points on a round twisting disc that I use while doing physical exercises because when our teacher asked us to prepare a problem related to a circle, I prepared such a question, but I can't solve it now!"

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the measures of the wires in a good-quality tennis racket and in calculating the spaces between the wires because I like playing tennis a lot, and I wanted to find the wire measures of my tennis racket after I solved questions related to the shapes drawn in a circle, but I had a great difficulty in doing so."

"While learning the geometric shape of circle, I experience the biggest difficulty in solving the problems related to polygons drawn in a circle because I can't make use of the features of a circle while finding the lengths and angles of shapes drawn in a circle."

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the areas of the triangular slices and the areas of the nested circles on my target board because I believe I will play dart better when I find the areas of the shapes in a circle."

When these metaphors were examined, it was seen that according to the students' statements, they experienced difficulties in solving the problems related to the shapes drawn in a circle. The explanations regarding the metaphors in this category revealed that the students tried to adapt the problems to their daily life objects (e.g. twisting disc, tennis racket, target board) but experienced difficulties in doing so.

Category 7: Tangent problems in circles

In this category, there were 8 metaphors produced by a total of 15 students (24.20%) 2 of whom were 6th grade students and 13 of whom were 7th grade students. In the category, the metaphor of "point and tangent" (f=2) produced by the 6th grade students and the metaphors of "square formed by the exterior tangent with the radius" (f=4), "radius and tangent" (f=3) and "exterior shapes tangent to the circle" (f=2) produced by the 7th grade students were prominent. Below are sample statements forming the metaphors in this category:

"While learning the geometric shape of circle, I experience the biggest difficulty in dealing with questions like 'Is the point where the nutcracker touches the walnut really perpendicular to the radius of the circle?' because at school, I can't understand and solve the questions related to tangents to circles, so I try to adapt these questions to my life."

"While learning the geometric shape of circle, I experience the biggest difficulty in establishing a relationship between shapes and radius formed of lines that are exterior tangents to the circle because I can't solve the questions related to tangents to circles."

"While learning the geometric shape of circle, I experience the biggest difficulty in thinking about why my father close-shaves a roundabout while turning around it because in class, we learned that the closet distance of a line to a circle should be the tangent, but I find it difficult to associate this with our car and with the roundabout."

"While learning the geometric shape of circle, I experience the biggest difficulty in finding the perimeter of squares that are tangent to a circle because I can't find the tangent distances to a circle."

When these metaphors were examined, it was seen that according to the students' statements, they had difficulties in solving the tangent problems with circles. Moreover, based on the explanations related to the metaphors, it could be stated that the students found tangent problems with circles difficult to understand and that they thought there were obstacles in front of associating these problems with daily life.

3. Discussion, Conclusion and Suggestions

In this study, the secondary school 6th grade and 7th grade students' perceptions regarding the difficulties they experienced in the process of learning the subject of circles. At the end of the study, it was found that the students' perceptions regarding the difficulties they experienced in the process of learning circle were gathered under 7 categories with a total of 42 valid Metaphors. When these categories were evaluated in general, it was seen that the most frequent metaphors belonged to the categories of *tangent problems with circles (24.20%), degree and radian (19.35%)* and *problems related to the shapes drawn in a circle (17.74%)* and that the least frequent metaphors belonged to the categories of *concepts of interior, exterior, central and peripheral angles (6.45%)* and *drawing a circle for which standard and open equations are given (8.06%)*. Similarly, studies conducted on the sub-learning domain of circle revealed that students experience several difficulties which are mostly related to examples and shapes drawn in a circle (Özerbaş & Kaygusuz, 2012; Özsoy & Kemenkaşlı, 2004; Tikekar, 2009). This result shows that in the process of learning the subject of circle, students experience difficulty mostly in relation to tangent problems with circles requiring conceptual knowledge as well as in relation to shapes drawn in a circle. Moreover, it could be stated that students have less difficulty in dealing with problems involving angles in circles and with circle equations requiring procedural knowledge. This result is thought to be due to the fact that students are better at making use of their procedure-based knowledge to overcome the difficulties they experience regarding circles. In relation to this, Bekdemir (2012) points out that students' procedural knowledge about the learning domain of circle is better than their related conceptual knowledge.

Within the scope of the study, when the number of the participants and their class grades were taken into account, it was seen that the 7th grade students produced more metaphors with a higher frequency than the 6th grade students although the number of the 7th grade students was lower than that of the 6th grade students. In addition, the 6th grade students produced more metaphors regarding the categories of *circle equation, arc measures* and *degree and radian, while the 7th grade students produced more metaphors regarding the categories of tangents to circle* and *problems and angles in shapes drawn in a circle*. This result could be associated with the fact that the outcomes related to the sub-learning domain of circle in the mathematics curriculum (MoNE, 2018) are different for the 6th grade and 7th grade students. Moreover, this result is consistent with the findings that individuals from different age groups and class grades will produce different metaphors (Allen & Shiu, 1997; Cassel & Vincent, 2011; Gowin, 1983; Horzum & Yıldırım, 2016; Levine, 2005; Özdemir, 2012; Yee, 2012; Yob, 2003) and that students from different class grades will experience different difficulties regarding the subject of circle (Cantimer & Şengül, 2017).

The frequencies of the metaphors considered to be valid within the scope of the study revealed that the frequencies ranged between f=1 and f=4 and that the most frequent metaphors were "square formed by the exterior tangent with the radius" (f=4); "pie piece", "degree and radian" and "radius and tangent" (f=3). In this respect, it could be stated that almost all the students produced different metaphors regarding the difficulties they experienced in the process of learning circle. This situation is parallel to the findings obtained in other studies which reported that different metaphors are favoured by different individuals in relation to a concept or a situation (Erdem, 2018; Erdoğan, Yazlik & Erdik, 2014; Horzum & Yıldırım, 2016; Yee, 2012).

In the study, when the metaphors produced by the participants were examined in general, it was seen that according to the explanations referring to the sources of the metaphors, the students made associations between their daily lives and the difficulties they experienced in the process of learning circle. These associations could be exemplified with the following metaphors produced by the students: "eyebrow, tyre, pie piece, ring, olympic circles, hour-hand and minute-hand of a clock, wheel rim, practical slicer for melon and watermelon, slice of baklava on a tray, tortoiseshell, triangle cheese, manhole cover, twisting disc, frisbee, tennis racket, basketball hoop, target board, pilates circle, nutcracker and roundabout." In line with these examples, the metaphors produced by the students could be said to be fairly rich and striking. Considering the fact that metaphors are produced with the help of similes (Kittay, 1989), it could be concluded that metaphors may involve the objects that people face in their daily lives. Based on this result, the metaphors produced by the students in relation to the difficulties they experienced in the process of learning the geometric concept of circle could be associated with the fact that geometry interacts with daily life. Moreover, in relation to this result, it was another striking finding that in relation to learning circle, the students tried to produce problems based on the objects they faced in their daily lives. This result is also evident in the following response of one of the students: *"While learning the geometric shape of circle, I experience the biggest difficulty in finding the perimeter of the foot shape formed of points on a round twisting disc that I use while doing physical exercises because when our teacher asked us to prepare a problem related to a circle, I prepared such a question, but I can't solve it now!*". This result might have occurred due to the fact that teachers refer to daily life while giving in-class examples in the process of teaching geometry. Therefore, if teachers associate geometric concepts with daily life in the process of geometry teaching, this association might contribute to the achievement of the intended outcomes. Similarly, in related literature, it was reported that the methods and techniques used in the teaching process contributed to the development of the students' research, practice and learning skills and had positive influence

on their learning (Aydın & Monaghan, 2011; Barnett et.al., 2011; Ebenezer et.al., 2012; Ertem-Akbaş, 2019; Majerek, 2014; Tüysüz & Aydın, 2007; Gök & Ertem-Akbaş, 2019; Yılmaz, Ertem & Çepni, 2010). In addition, it was seen in the present study that the metaphors produced by the students were made up of more than one word rather than a single word or concept (angle opposite the intersection of the olympic circles, hour-hand and minute-hand of a clock, practical slicer for melon and watermelon, butterfly drawn in a circle, slice of baklava on a tray, pilates circle, roundabout, basketball hoop, nutcracker, exterior shapes tangent to the circle and so on). The production of these metaphors could be associated with the nature of the research problem. Besides the basic concepts in geometry teaching, the relationships between these concepts and the problems posed are examined as well (Cantimer & Şengül, 2017; Tikekar, 2009). Therefore, it was a striking result that the students participating in the present study associated the difficulties in the process of learning circle with the difficulties they experienced in their daily lives rather than using a single word or concept to express the difficulties they experienced in the process of learning circle. This result could be associated with the fact that geometry is a way of portraying our world (Hacısalihoğlu et.al., 2004; Özkeleş-Çağlayan, 2010) and that students can make better use of their current skills and intellectual indicators while describing their real-life worlds. Based on this result, it could be stated that making associations with the abstract objects in students' environments could allow them to overcome the probable difficulties in the process of learning with the help of their current skills. This is also evident in the following response of one of the students: *"While learning the geometric shape of circle, I experience the biggest difficulty in finding the measures of the wires in a good-quality tennis racket and in calculating the spaces between the wires because I like playing tennis a lot, and I wanted to find the wire measures of my tennis racket after I solved questions related to the shapes drawn in a circle, but I had a great difficulty in doing so."*

In the study, it was found that 36 of the invalid metaphors produced by the students lacked a metaphor source, belonged to more than one category and lacked a relationship with the difficulties experienced in the process of learning circle. It was also seen that 42 of the metaphors were left either completely or partially blank. This result shows that the students had difficulty expressing the difficulties they experienced in the process of learning circle. Similarly, in one study, Bahadır (2016) concluded that the participants had difficulty expressing their thoughts and emotions regarding certain subjects. In this respect, it is important to provide participants with environments in which they can feel confident and freely express their thoughts. In addition, it is thought that the students had difficulty in expressing the difficulties they experienced in their learning process probably because they failed to internalize the information about the abstract concepts related to the subject of circle. This situation is supported with the finding of other studies that students lack background knowledge about circles and sometimes fail to envisage the abstract concepts related to circle (Cantimer and Şengül, 2017; Özsoy and Kemankaslı, 2004). Moreover, considering the fact that in geometry teaching, it is more important to see the relationships between concepts rather than just knowing the definition of the concepts, teachers could create learning environments in which geometric concepts are discussed and associated with daily life with the help of appropriate tools and activities.

The findings obtained in the present study demonstrate that secondary school 6th and 7th grade students experience various difficulties in relation to the subject of circle. Based on the results of this qualitative study involving metaphor analysis, it cannot be claimed that students' perceptions regarding the difficulties they experience in relation to the subject of circle are true for all secondary school geometry subjects. However, in the process of learning geometry subjects, especially the subject of circle, students could be said to have various perceptions

regarding the difficulties they experience in the process. Obviously, geometry-related outcomes, which are included in the scope of mathematics curriculum, have an important place not only in their education lives but in their daily lives as well. In this respect, rather than the difficulties related to geometric concepts, it is necessary to develop students' positive perceptions and understanding. For this purpose, teachers could associate geometry subjects with the problems students face in their daily lives so that students can develop positive perceptions. In this respect, a similar study could be conducted with preservice teachers and with teachers who teach geometry, and the results to be obtained could be compared with those reported in related literature. Metaphor is the way individuals present their perceptions and understanding regarding a situation (Lakoff & Johnson, 2005). Furthermore, in another study, an interview technique could be applied for in-depth examination of the findings to be obtained. In addition, considering the fact that the only focus subject was circle in the present study, future studies could focus on other concepts and subjects related to geometry. In this respect, these studies could not only help determine how geometry subjects are perceived and but also contribute to the correct perception and understanding of these subjects.

4. Conflict of Interest

The authors declare that there is no conflict of interest.

5. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Ada, S. (2013). *Öğrencilerin matematik dersine ve matematik öğretmenine yönelik algılarının metafor yardımıyla belirlenmesi.* Unpublished master thesis, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Adıgüzel, H. Ö. (2009). Determination and comparison of German and Turkish participants' perceptions of creative drama through the metaphor (Simile) method. *Eğitim ve Bilim, 34*(153), 25-37.

Akkaya, E. (2012). *Ortaöğretim öğrenci ve öğretmenlerin okul ve ideal okul algılarının metafor yoluyla analizi.* Unpublished doctoral thesis, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Aktürk, A. O., Mihçi, S., & Çelik, İ. (2015). Metaphors of high school students about the concept of "interactive whiteboard". *International Journal of Education in Mathematics, Science and Technology, 3*(2), 120-131.

Allen, B., & Shiu, C. (1997). Learning mathematics is like...'- views of tutors and students beginning a distance taught undergraduate course. In *Proceedings of the British Society for Research into Learning Mathematics* (pp. 8-11). University of Oxford.

Altun, M. (2000). İlköğretimde problem çözme öğretimi. *Milli Eğitim Dergisi, 147*, 27-33.

Arslan, M. M., & Bayrakçı, M. (2006). Metaforik düşünme ve öğrenme yaklaşımının eğitim-öğretim açısından incelenmesi. *Milli Eğitim, 35*(171), 100-108.

Aslan, S. (2013). Birleştirilmiş sınıflarda görev yapan öğretmenlerin "öğretmen" kavramı ile ilgili algılarının metaforik incelenmesi. *Electronic Turkish Studies, 8*(6), 43-59.

Aydın, H., & Monaghan, J. (2011). Bridging the divide seeing mathematics in the world through dynamic geometry. *Teaching Mathematics and Its Applications: International Journal of the IMA, 30*(1), 1-9.

Aydoğdu, E. (2008). *İlköğretim okullarındaki öğrenci ve öğretmenlerin sahip oldukları okul algıları ile ideal okul algılarının metaforlar yardımıyla analizi.* Unpublished master thesis, Osmangazi Üniversitesi Fen Bilimleri Enstitüsü, Eskişehir.

Bahadır, E. (2016). Metaphorical perceptions of geometrical concepts by secondary school students identified as gifted and identified as non-gifted. *International Online Journal of Educational Sciences, 8*(1), 118-137.

Balcı, A. (1999). *Metaphorical images of school: School perceptions of students, teachers and parents from four selected schools (in Ankara).* Unpublished doctoral thesis, Orta Doğu Teknik Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.

Balcı, A. (2003). Eğitim örgütlerine yeni bakış açıları: Kuram araştırma ilişkisi. *Kuram ve Uygulamada Eğitim Yönetimi, 33*(33), 26-61.

Barnett, M., Vaughn, M. H., Strauss, E., & Cotter, L. (2011). Urban environmental education: Leveraging technology and ecology to engage students in researching the environment. *International Research in Geographical and Environmental Education, 20*(3), 199-214.

Bekdemir, M. (2012). Öğretmen adaylarının çember ve daire konularında kavram ve işlem bilgilerinin değerlendirilmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 43*(43), 83-95.

Cansız-Aktaş, M., & Aktaş, D. Y. (2013). Matematik bölümü öğrencilerinin ispat yapma ile ilgili algılarının belirlenmesi. *International Online Journal of Educational Sciences, 5*(3), 704-718.

Cantimer, G. G., & Şengül, S. (2017). Ortaokul 7. ve 8. sınıf öğrencilerinin çember konusundaki kavram yanılgıları ve hataları. *Gazi Eğitim Bilimleri Dergisi, 3*(1), 17-27.

Cassel, D., & Vincent, D. (2011). Methaphors reveal preservice elementary teachers' views of mathematics and science teaching. *School Science and Mathematics, 111*(7), 319-324.

Cebeci, O. (2013). *Metafor ve şiir dilinin yapısal özellikleri*. İstanbul: İthaki Yayınları.

Cerit, Y. (2008). Öğretmen kavramı ile ilgili metaforlara ilişkin öğrenci, öğretmen ve yöneticilerin görüşleri. *Türk Eğitim Bilimleri Dergisi, 6*(4), 693-712.

Çekmez, E., Yıldız, C., & Bütüner, S. Ö. (2012). Phenomenographic research method. *Balıkesir Üniversitesi Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi, 6*(2), 77-102.

Çoklar, A. N., & Bağcı, H. (2010). What are the roles of prospective teachers on the educational technology use: A metaphor study. *World Journal on Educational Technology, 2*(3), 186-195.

Dönmez Usta, N., Durukan, Ü. G., & Hacıoğlu, Y. (2016). Bilgisayar ve öğretim teknolojileri öğretmeni adaylarının "teknoloji" algıları. *Journal of Computer and Education Research, 4*(7), 24-46.

Ebenezer, J., Columbus, R., Kaya, O.N., Zhang, L., & Ebenezer, D.L. (2012). One science teacher's professional development experience: A case research exploring changes in students' perceptions of their fluency with innovative technologies. *Journal of Science Education and Technology, 21,* 22-37.

Erdem, C. (2018). Identifying university students' perceptions of 'English' through metaphors. *International Online Journal of Education and Teaching (IOJET), 5*(3), 565-577. http://iojet.org/index.php/IOJET/article/view/415/254

Erdoğan, A., Yazlik, O. D., & Erdik, C. (2014). Mathematics teacher candidates' metaphors about the concept of "mathematics". *International Journal of Education in Mathematics, Science and Technology, 2*(4), 289-299.

Ersoy, Y. (2003). Teknoloji destekli matematik egitimi-1: Gelismeler, politikalar ve stratejiler. *Elementary Education Online, 2*(1), 18-27.

Ertem-Akbaş, E. (2019). Eğitim bilişim ağı (EBA) destekli matematik öğretiminin 5. sınıf kesir konusunda öğrenci başarılarına etkisi. *Journal of Computer and Education Research, 7*(13),120-145.

Fleener, M. J., Pourdavood, R. G., & Fry, P. G. (1995). A study of preservice teachers' metaphors for the diffrent roles of the mathematics teachers. In *The Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 2-7). Columbus, OH.

Forcenville, C. (2002). The identification of target and source in pictorial metaphors. *Journal of Pragmatics, 34,* 1-14.

Fraenkel, J. R., & Wallen, W. E. (2000). *How to design and evaluate research in education*. (4th Edt.). Boston: McGraw-Hill.

Gowin, D. B. (1983). Metaphors and conceptual change: Once more with feeling. In H. Helm & J. Novak (Eds.), *Proceedings of the International Seminar Misconceptions in Science and Mathematics*. Ithaca, NY: Cornell University, 38-41.

Gök, M., & Ertem-Akbaş, E. (2019). Examining the attitude change of pre-service elementary school teachers towards a course of mathematics education within the framework of Theory of Didactical Situations. *International Online Journal of Education and Teaching (IOJET), 6*(4), 879-904.

Güler, G., Öçal, M. F., & Akgün, L. (2011). Pre-service mathematics teachers' metaphors about mathematics teacher concept. *Procedia Social and Behavioral Sciences, 15*, 327-330.

Güner, N. (2012). Using metaphor analysis to explore high school students' attitudes towards learning mathematics. *Education, 133*(1), 39-48.

Güner, N. (2013). Öğretmen adaylarının matematik hakkında oluşturdukları metaforlar. *NWSA-Education Sciences, 8*(4), 428-440.

Gür, H., Hangül, T., & Kara, A. (2014). Ortaokul ve lise öğrencilerinin "matematik" kavramına ilişkin sahip oldukları metaforların karşılaştırılması. *The Journal of Academic Social Science Studies, 25,* 427-444.

Güveli, E., İpek, A. S., Atasoy, E., & Güveli, H. (2011). Sınıf öğretmeni adaylarının matematik kavramına yönelik metafor algıları. *Turkish Journal of Computer and Mathematics Education, 2*(2), 140-159.

Hacısalihoğlu, H. H., Mirasyedioğlu, Ş., & Akpınar, A. (2004). *İlköğretim 6-8 matematik öğretimi: matematikte işbirliğine dayalı yapılandırıcı öğrenme ve öğretme* (1.Baskı). Ankara: Asil Yayın Dağıtım.

Horzum, T., & Yıldırım, G. (2016). Lise öğrencilerinin geometri hakkında oluşturdukları metaforlar. *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi, 40,* 357-374.

Inbar, D. (1996). The free educational prison: Metaphors and images. *Educational Research, 38*(1), 77-92.

Jensen, D. F. N. (2006). Metaphors as a bridge to understanding educational and social contexts. *International Journal of Qualitative Methods, 5*(1), 1-17.

Kabadayı, A. (2008). Analysing the metaphorical images of Turkish preschool teachers. *Teaching Education, 19*(1), 73-87.

Keleş, O., Taş, I., & Aslan, D. (2016). Metaphor perceptions of pre-service teachers towards mathematics and mathematics education in preschool education. *Educational Research and Reviews, 11*(14), 1338-1343.

Kılcan, B. (2017). Metafor ve eğitimde metaforik çalışmalar için bir uygulama rehberi. *Pegem Atıf İndeksi,* 1-115. DOI: 10.14527/9786052410806

Kılıç, Ç. (2014). Sınıf öğretmenlerinin problem kurmayı algılayış biçimlerinin belirlenmesi. *Kastamonu Eğitim Dergisi, 22*(1), 203-214.

Kittay, E. F. (1989). *Metaphor: Its cognitive force and linguistic structure*. Oxford: Clarendon Press.

Kurt, H. S. (2010). *Kuantum fiziğinde kullanılan metaforların öğrencilerin fizik algısı üzerine etkisi.* Unpublished master thesis, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Lakoff, G. (1993). How metaphor structures dreams: The theory of conceptual metaphor applied to dream analysis. *Dreaming, 3*(2), 77-98. https://doi.org/10.1037/h0094373

Lakoff, G., & Johnson, M. (1980*). Metaphors we lived by*. Chicago: The University of Chicago Press.

Lakoff, G., & Johnson, M. (2005). *Metaforlar hayat, anlam ve dil*. (Çev: G. Y. Demir). İstanbul: Paradigma Yayınları.

Levine, P. M. (2005). Metaphors and images of classrooms. *Kappa delta Pi Record, 41*(4), 172-175.

Majerek, D. (2014). Application of Geogebra for teaching mathematics. *Advances in Science and Technology Research Journal, 8*(24), 51-54.

Marshall, C., & Rossman, G. B. (2006). *Designing qualitative research*. London: Sage Publications.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis* (2. Baskı). Newbury Park, CA: Sage.

MoNE. (2018). Matematik dersi öğretim programı (İlkokul ve ortaokul 1, 2, 3, 4, 5, 6, 7 ve 8. sınıflar). Ankara: Milli Eğitim Bakanlığı.

NCTM (National Council of Teachers of Mathematics). (2000). *Principles and standards for school mathematics.* Reston, Va.: NCTM.

Ocak, G., & Gündüz, M. (2006). Eğitim fakültesini yeni kazanan öğretmen adaylarının öğretmenlik mesleğine giriş dersini almadan önce ve aldıktan sonra öğretmenlik mesleği hakkındaki metaforlarının karşılaştırılması. *AKÜ Sosyal Bilimler Dergisi, 8*(2), 293-310.

Oflaz, G. (2011). İlköğretim öğrencilerinin matematik ve matematik öğretmeni kavramlarına ilişkin metaforik algıları. In *the 2nd International Conferance on New Trends in Education and Their Implications* (pp. 884-893). Ankara: Siyasal Kitabevi.

Özdemir, Ç. (2012). Lise öğrencilerinin metaforik okul algılarının çeşitli değişkenler bakımından incelenmesi. *Eğitim ve Bilim Dergisi, 37*(163), 96-109.

Özerbaş, M. A., & Kaygusuz, Ç. (2012). Çember alt öğrenme alanına ait kavram yanılgılarının belirlenmesi. *Gazi Üniversitesi Endüstriyel Sanatlar Eğitim Fakültesi Dergisi, 28*, 78-94.

Özgün-Koca, S. A. (2010). If mathematics were a color…. *Ohio Journal of School Mathematics, 62*, 5-10.

Özkeleş-Çağlayan, S. (2010). *Lise 1. sınıf öğrencilerinin geometri dersine yönelik özyeterlik algısı ve tutumunun geometri dersi akademik başarısını yordama gücü.* Unpublished master thesis, Yıldız Teknik Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.

Özsoy, N., & Kemankaslı, N. (2004). Ortaöğretim öğrencilerinin çember konusundaki temel hataları ve kavram yanılgıları. *The Turkish Online Journal of Educational Technology (TOJET), 3*(4), 140-147.

Picker, S. H., & Berry, J. S. (2000). Investigating pupils' images of mathematicians. *Educational Studies in Mathematics, 43*, 65-94.

Reeder, S., Utley, J., & Cassel, D. (2009). Using metaphors as a tool for examining preservice elementary teachers' beliefs about mathematics teaching and learning. *School Science and Mathematics, 109*(5), 290-297.

Saban, A. (2004). Giriş düzeyindeki sınıf öğretmeni adaylarının "öğretmen" kavramına ilişkin ileri sürdükleri metaforlar. *Türk Eğitim Bilimleri Dergisi, 2*(2), 131-155.

Saban, A. (2009). Öğretmen adaylarının öğrenci kavramına ilişkin sahip oldukları zihinsel imgeler. *Türk Eğitim Bilimleri Dergisi, 7*(2), 281 -326.

Saban, A., Koçbeker, B. N., & Saban, A. (2006). An investigation of the concept of teacher among prospective teachers through metaphor analysis. *Educational Sciences: Theory & Practice*, *6*(2), 461-522.

Sam, L. C. (1999). Using metaphor analysis to explore adults' images of mathematics. *Philosophy of Mathematics Education, 12*. Retrieved from http://people.exeter.ac.uk/PErnest/pome12/article9.htm.

Sam, L. S., & Ernest, P. (1998). A survey of public images of mathematics. *BSRLM Proceedings, 18*(1), 7-14.

Schinck, A. G., Neale, H. W., Pugalee, D. K., & Cifarelli, V. V. (2008). Using metaphors to unpack student beliefs about mathematics. *School Science and Mathematics, 108*(7), 326-333.

Semerci, Ç. (2007). Program geliştirme kavramına ilişkin metaforlarla yeni ilköğretim programlarına farklı bir bakış. *Cumhuriyet Üniversitesi Sosyal Bilimler Dergisi, 31*(2), 125-140.

Sherard, W. H. (1981). Why is geometry a basic skill?. *The Mathematics Teacher*, *74*(1), 19-60.

Silverman, D. (2013). *Doing qualitative research: A practical handbook*. London: SAGE Publications.

Sterenberg, G. (2008). Investigating teachers' images of mathematics. *Journal of Mathematics Teacher Education, 11*, 89-105.

Şahin, B. (2013). Öğretmen adalarının "matematik öğretmeni", "matematik" ve "matematik dersi" kavramlarına ilişkin sahip oldukları metaforik algılar. *Mersin Üniversitesi Eğitim Fakültesi Dergisi, 9*(1), 313-321.

Şengül, S., & Katrancı, Y. (2012). İlköğretim ikinci kademe öğrencilerinin matematik kavramına ilişkin sahip oldukları metaforlar. *Eğitim ve Öğretim Araştırmaları Dergisi, 1*(4), 355-369.

Şengül, S., Katrancı, Y., & Gerez-Cantimer, G. (2014). Ortaöğretim öğrencilerinin "matematik öğretmeni" kavramına ilişkin metafor algıları. *International Journal of Social Science, 25*(1), 89-111.

Taşdemir, M., & Taşdemir, A. (2011). Teachers' metaphors on K-8 curriculum in Turkey "İlköğretım programı üzerine öğretmen metaforları". In *the 2nd International Conference On New Trends in Education and Their Implications* (pp. 795-809). Ankara: Siyasal Kitapevi.

Tikekar, V. G. (2009). Deceptive patterns in mathematics. *International Journal Mathematic Science Education, 2*(1), 13-21.

Toluk-Uçar, Z., Pişkin, M., Akkaş, E. N., & Taşçı, D. (2010). İlköğretim öğrencilerinin matematik, matematik öğretmenleri ve matematikçiler hakkındaki inançları. *Education and Science, 35*(155), 132-144.

Turhan-Türkkan, B., & Yeşilpınar-Uyar, M. (2016). Ortaokul öğrencilerinin "matematik problemi" kavramına yönelik metaforları. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi, 45*(1), 99-130.

Türk Dil Kurumu. (1998). *Türkçe sözlük, Türk tarih kurumu basım evi.* Dokuzuncu Baskı, Ankara.

Tüysüz, C., & Aydın, H. (2007). Web tabanlı öğrenmenin ilköğretim okulu düzeyindeki öğrencilerin tutumuna etkisi. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, *2*(22), 73-84.

Ubuz, B. (1999). 10. ve 11. sınıf öğrencilerinin temel geometri konularındaki hataları ve kavram yanılgıları. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *16*(17), 95-104.

Van de Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (2010). *Elementary and middle school mathematics: Teaching developmentally* (6th ed.). Boston: Pearson Education.

Yee, S. P. (2012). *Students' metaphors for mathematical problem solving*. Unpublished doctoral thesis, Kent State University College of Education, Ohio.

Yıldırım, A., & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri.* Ankara: Seçkin Yayıncılık.

Yıldırım, A., & Şimşek, H. (2013). *Sosyal bilimlerde nitel araştırma yöntemleri* (9. Baskı). Ankara: Seçkin Yayıncılık.

Yılmaz, G. K., Ertem, E., & Çepni, S. (2010). The effect of the material based on the 7E model on the fourth grade students' comprehension skill about fraction concepts. *Procedia-Social and Behavioral Sciences*, *2*(2), 1405-1409.

Yob, I. M. (2003). Thinking constructively with metaphors. *Studies in Philosophy and Education, 22*, 127-138.

Yolcu, B. (2008). *Altıncı sınıf öğrencilerinin uzamsal yeteneklerini somut modeller ve bilgisayar uygulamaları ile geliştirme çalışmaları.* Unpublished master thesis, Osmangazi Üniversitesi Fen Bilimleri Enstitüsü, Eskişehir.

Erarslan A. (2020). The voices of English language teachers regarding professional development: A third space activity for in-service English language teachers. *International Online Journal of Education and Teaching (IOJET)*, *7*(3). 1077-1090. https://iojet.org/index.php/IOJET/article/view/821

Received: 23.01.2010
Received in revised form: 27.05.2020
Accepted: 28.05.2020

THE VOICES OF ENGLISH LANGUAGE TEACHERS REGARDING PROFESSIONAL DEVELOPMENT: A THIRD SPACE ACTIVITY FOR IN-SERVICE ENGLISH LANGUAGE TEACHERS

Research Article

Ali Erarslan

Alanya Alaaddin Keykubat University

ali.erarslan@alanya.edu.tr

Ali Erarslan has been working as an assistant professor in the department of English language teaching at Alanya Alaaddin Keykubat University. He completed his MA at Pamukkale University and his Phd at Çanakkale Onsekiz Mart University in English language teaching.

THE VOICES OF ENGLISH LANGUAGE TEACHERS REGARDING PROFESSIONAL DEVELOPMENT: A THIRD SPACE ACTIVITY FOR IN-SERVICE ENGLISH LANGUAGE TEACHERS

Ali Erarslan

ali.erarslan@alanya.edu.tr

Abstract

Since faculties of education mainly serve in the field of pre-service teacher education, their role for in-service teacher education is questioned for a long time. In Turkey, a partnership protocol signed in 1997 between the Ministry of National Education (MoNE) and the Council of Higher Education (CoHE) to enable pre-service teachers to adapt to the school process and to the act of teaching skills under the guidance of a mentor teacher. Yet, in-service teacher education is widely neglected by universities creating a big gap in terms of providing teachers with in-service teacher training activities by the Faculties of Education. Thus, this study set out to understand English language teachers' perceived needs in terms of in-service teacher education and their expectations from faculty academics. For the study, a partnership agreement was signed between the Directorate of National Education (DoNE) and the Education Faculty and a two-day seminar and workshop was conducted organized as a "Third Space Activity". At the end of the event, teachers' perceived needs for in-service teacher education, their views about the Third Space activity, and their expectations and wants from the academics were investigated. The qualitative data were analysed on the basis of Hutchinson and Waters' needs analysis. Based on findings, this study highlights the significance of a close cooperation between the universities and schools. This study also highlights and questions a neglected function of education faculties in terms of providing in-service teachers with the necessary teacher training activities.

Keywords: school-university partnership, third space, in-service teacher education, professional development, academics

1. Introduction

Because teachers are attributed as one of the most significant stakeholders in the field of education, teacher quality has always been a crucial aspect in the improvement of the education system of a country, which necessitates the need for investment in this particular field, namely the in-service teacher education for their professional lives (Snoek, 2010). With this respect, countries set national teacher education standards in their education policies in line with international policies, and various institutions such as universities and schools collaborate with the aim of increasing teacher quality. Education faculties are the responsible body for initial pre-service teacher education for the purpose of equipping the students with the necessary content and pedagogical knowledge; yet, the commonly known function of education faculties is not only to train teachers with the necessary knowledge and skills for teaching, but also to continue supporting them throughout their professional lives. The provision of in-service teacher education, which is widely underestimated, by education faculties is generally enacted by establishing partnership with the local educational institutions, schools and in-service teachers.

University-School partnership is a collaboration model for the stakeholders involved in teacher education and professional development to increase teacher quality established for serving a number of purposes such as implementation of field experience and practice teaching (Kasapoglu, 2015), consolidation of the teacher education practices as well as induction of pre-service teachers into the educational system (Atmaca, 2017), coordination and closer communication among stakeholders (Grossman & Sands, 2008), transformation of these stakeholders and institutions (E. J. Klein et al., 2013) and turning academic theory into practice for pre-service teachers (Lewis, 2012) or closing the gap between theory and practice. However, it is true that what is generally addressed in the partnership between universities-faculties and schools is the pre-service teacher education and one of the major functions of such partnerships is to introduce the pre-service teachers with the real challenges of teaching in natural classroom setting (Gökmenoglu, 2013). It is worth stressing that the field of education is constantly evolving as with the education technologies and learner profiles. Thus, as a neglected role of education faculties, these institutions may serve to provide teacher training opportunities for in-service teachers to introduce them with the developments and changes in their fields.

One of the recent concepts within the context of university and school partnership is the Third Space Activity (TSA) known also as hybridity theory (Bhabha, 1994), which generally refers to "a neutral Third Space" other than the schools and universities (namely, faculty) in order to deliver teacher education with mutual understanding, vision and equal knowledge sharing (Jackson & Burch, 2019). In fact, the third spaces are the hybrid places where roles and knowledge domains of teaching on the part of the stakeholders involved in teacher education such as faculties, teachers, if exists members of the community are reconstructed to enable transformation in teacher education through reflective collaboration (Flessner, 2014; E. J. Klein et al., 2013). The reason for employing third space in teacher education stems from the idea of diminishing the top-down processes resulting in othering and placing distances among the stakeholders; thus, the Third Space allows depolarization in teacher education (Beck, 2018). Although the Third Space is intended for less hierarchical pre-service teacher education (Zeichner, 2010), within the context of current study, it is employed for in-service English language teacher training.

In Turkey, Ministry of National Education (MoNE) and Universities first initiated a partnership in 1997 under "Faculty-School Partnership Model" to engage pre-service teachers with teaching activities in schools under the mentorship of practicing teachers (Grossman & Sands, 2008; Kasapoglu, 2015). The main objective of this partnership was, in fact, to train prospective teachers in their final years of university education with the support of mentor teachers in their practicum school and the supervisors as faculty members. However, another mission of the faculty-school partnership was to create a link between practicing teachers and education faculties to support teachers throughout their professional lives when needed. Generally, this aspect of the partnership was neglected since the primary purpose appeared to be on mentoring the pre-service teachers within this partnership.

In terms of in-service teacher education, it is known that Ministry of National Education (MoNE) is primarily responsible body for offering training to in-service teachers (Koç, 2016; Ozer, 2004; Yilmaz & Esen, 2015). By this body, regular but limited seminars are offered to the practicing teachers for two weeks at the beginning and at the end of the teaching years. However, for the ongoing professional developments of teachers, a faculty-school cooperation and partnership is also needed (Jackson & Burch, 2019). Regarding the professional developments of teachers in Turkey, one of the highly criticized attributes is that after they start to serve as a teacher within the employment of MoNE schools, they can continue teaching without further need to have professional development which indicates that given the limited

seminar or in-service training services offered by MoNE, most of the practicing teachers do not get professional support from the faculties after graduation (Akbulut Tas & Karabay, 2016; Grossman & Sands, 2008).

When the related literature is reviewed, it is seen that studies mainly focus on pre-service teacher training, issues in teaching practicum, and the professional needs of the in-service teachers (Akbulut Tas & Karabay, 2016; Çakır et al., 2010; Eraslan, 2008; Gokmenoglu et al., 2016; Kasapoglu, 2015). These studies reveal that the faculty-school partnership has a number of drawbacks in terms of pre-service teacher education and teaching practicum as intended to equip teacher candidates to turn theory into practice through real-classroom experience before transition to in-service teaching. As stated by Kasapoglu (2015), when studies investigating the faculty-school partnership are reviewed, it is seen that pre-service teacher education does not yield the intended results due to involuntary academic staff at education faculties, mentor teachers in practicum schools, school and faculty administrators, teacher candidates and the content of the teaching practicum and school experience courses. Regarding content of the courses offered within this partnership, Akbulut Tas and Karabay (2016) state that these courses did not, in fact, offer the necessary content for the development of pre-service teaching skills, and did not include content and pedagogical knowledge as required. Also, Çakır et al., (2010) in their study found that both teacher candidates and school-faculty stakeholders need to be better acknowledged about the implementation of this partnership.

Due to insufficient legal regulations regarding professional teacher development trainings for in-service teachers in Turkey, teachers cannot participate in teacher training programs such as seminars, conferences and congresses. As stated by Gokmenoglu et al. (2016), most teachers in Turkey do not have a strong desire for any professional development programs which may indicate that they do not willingly play the actual role in transforming and achieving any education reform in Turkey. As discussed by Gokmenoglu et al. (2016), they do not want to participate in such training programs. In fact, during the teachers' duration of active teaching in state schools, they are not legally requested any kind of imposition in terms of participation to teacher development programs except for a total of 2-week seminar programs at the opening and closure of the education year. Regarding these in-service training seminars provided by MoNE, studies show that there are a number of limitations in achieving the intended results due to top-down processes implemented rather than taking teachers' need into account (Sıcak & Parmaksız, 2016).

In terms of support for in-service teachers during their professional lives, Gökmenoglu (2013) reports that faculties should have closer connections with the schools to bridge to educate teachers better for the specified outcomes of teacher education programs. It is often the case that faculties of education are meager in having strong coordination with schools which results in imbalance between theory and practice for the teachers. Thus, it is assumed that education faculties should create close relationships with the school administrators and teachers since in-service teachers need the support of faculty members for their on-going professional development. Considering the availability of most universities with education faculties in Turkey, through a collaboration and partnership agreement between faculty and school administrators to organize training programs for in-service teachers, an increase in the quality of teacher education can be consolidated both for pre-service and in-service teachers.

Although this is a small scale study in terms of its limited number of participants and data collection, it intends to fulfil two major gaps in literature regarding in-service teacher training as the unique feature offered. Initially, in spite of the significance of supporting the in-service teachers by education faculties after their graduation, there are scant studies in literature, focusing on continuous support for in-service teachers by the faculties. The second gap is

related to the use of Third Space Activity based on hybridity model proposed by Bhabha (1994). In literature, no studies were found regarding Third Space activity in Turkey. Within the context of this study, the Third Space was utilized for in-service teacher training activity even though it is mainly used for pre-service teacher education. For these aims, the study combined university-school partnership and Third Space activity for in-service teacher training purpose rather than pre-service teacher education as both were neglected aspects in Turkey. Aiming to fulfil these needs in literature, this study seeks to investigate the effects of a joint workshop and a two-day-seminar offered to in-service English language teachers by the academics in the department of English Language Teaching (ELT), Faculty of Education at a state university. For this aim, the following research questions are sought throughout the study;

1-What are the perceived needs of in-service English language teachers in terms of professional development?

2- What are the opinions of in-service English language teachers regarding the joint workshop between teachers and faculty members as a Third Space activity?

3-What are the future expectations of in-service English language teachers from academics in terms of their professional development?

2. Methodology

The study was based on qualitative research design since the primary aims was to reveal practicing teachers' opinions regarding a Third Space teacher education activity which was organized as a joint workshop under an agreement between Faculty of Education and Directorate of National Education (DoNE) as explained below. Qualitative research aims at having an in-depth understanding about a concept, an organization or a phenomenon making use of interviews, observations, opinion forms, etc. (Cohen, L., Manion, L., Morrison, 2000). Thus, in this qualitative study, data were gathered using an opinion form constructed to elaborate on teachers' opinions regarding their needs, opinions and expectations in relation to professional development.

2.1. Setting and Participants

With the purpose of collaboration and in-service teacher education for this study, following the approval of university rector, the dean of Education Faculty and the director of local DoNE (Directorate of National Education) had a partnership agreement in 2017 in Alanya, Turkey in order to activate and develop partnership in the areas of learning and teaching, conducting researches and projects including organizing joint workshops and seminars for practising teachers and students covering all the schools in the city. Under this agreement, the academic members of the ELT Department organized a joint workshop and a two-day seminar under the title of "Contemporary Approaches in English Language Teaching" with the participation of practicing teachers working in state high schools in Alanya, Turkey. These titles were chosen based on the recommendations given by local DoNE administrative as received from the teachers as their perceived needs. After long and strenuous procedures and correspondence with both institutions (Education Faculty and local DoNE), a total of 75 English language teachers, with the legal approval of the MoNE, participated in this organization and three academics from ELT Department gave lectures and implemented activities with the teachers regarding "Lifelong Learning", "the Use of Technology in Language Teaching" and "English Language Teaching Programs in Turkey" in different sessions. Also, to design this activity as a Third Space activity, in-service English language teachers and the academics gathered in a hotel and the activity was completed there. Both participant teachers and the academics had the opportunity to share their experiences after having lunch together.

Although this joint organization was intended for state high school English language teachers, there were also teachers from private high schools. However, these participants were excluded from the data set of this study since the scope of the agreement was focused on state high school teachers. Among the participants, more than half of the participants (65%, n=49) were female and 35% of them were male (n=26). In this regard, all of the participants in this study were the in-service English language teachers working at high schools. When school type distribution is analysed, 23 of the teachers (%30) were from various Anatolian high schools. More than half of them (%61, n=46) worked at vocational high schools. The rest (9%) were from various other school types such as Science High School and Sports High School.

2.2. Data Collection and Data Analysis

In the final day of the workshop, an opinion form containing six open-ended questions was distributed to the teachers to collect data about their opinions regarding their perceived needs for teacher development, the nature of workshop as a Third Space activity, the need for such activities for their professional lives, and the effect of university-school partnership.

The data gathered in the study was analysed based on Hutchinson and Waters' (1987) target needs analysis. Hutchinson and Waters assert that the needs in academic purposes, namely academic purposes in the context of this study, and general purposes differ in terms of the awareness of the needs rather than their existence since this awareness will have a direct effect on the exploitation of the possible potentials; thus, the needs analysis should try to exploit the awareness dimension of the stakeholders. Hutchinson and Waters' needs analysis is based on three major dimensions as "necessities", "lacks" and finally "wants". Since the themes of the seminar and workshop utilized within the context of this research were previously determined by the DoNE based on teachers' demands, the awareness of needs as maintained by Hutchinson and Waters was readily available. Thus, research questions were designed based on the teachers' perceived "necessities", "lacks" and "wants". The qualitative data were analysed by the two researchers using inductive thematic analysis, which involves generating themes and categories from the raw data as a data coding process without a specific presupposed categorisation or framework (Nowell et al., 2017). Thus, within inductive analysis, initially the participants were coded (as P1, P2, etc.) and next, the data were analysed to generate common themes and categories followed by tabulation of these themes and categories with their frequencies and percentages.

3. Findings

Since the practicing English language teachers' needs for professional development from the faculty members were the major focus of this study, related research questions were analysed and findings are presented under three sections separately.

Findings related to the reported needs of in-service English language teachers in terms of professional development

Following the joint organization between faculty and school partnership, English language teachers in the opinion form were first asked their opinions in terms of professional needs. The analysis of their answers revealed three major aspects labelled as *"limited MoNE in-service training",* "*loss of pedagogical knowledge" and "adaptation to new developments in field".*

In terms of *"limited MoNE in-service training",* nearly all teachers stated that the in-service trainings were insufficient for English language teachers and did not meet their expectations or did not promote effective teaching (please see Table 1). Regarding this, to illustrate, T17 stated "*we do not a true in-service training, just receive 10-day training at the beginning and at the end of the teaching year, and that's all. In these days, we just listen to same routines for years*." As stated by the teachers, there were quite limited in-service trainings provided to them by

MoNE. They reported that only two-week seminars offered at the beginning and end of the education years were far from satisfying their perceived needs. Also, they complained about the content of these two-week seminars stating that they did not even know what the topics of the seminars were about. Regarding this, T49 wrote that "*In the days of in-service training, we are not asked what we needed. They just organize everything and explain the content to everyone.*"

Table 1. *Teachers' Perceived Professional Needs*

		f	*%*
Teachers' Perceived Needs	*Limited MoNE in-service training*	68	91
	Scant in-service training opportunity	51	68
	Insufficient content	30	40
	Field Independence	24	32
	Loss of pedagogical knowledge	46	61
	Lack of institutional sources for renewal	40	53
	Difficulty in implementing the new programs	35	46
	Adaptation to new developments in field	27	36

Finally, one of the most important limitations of the in-service trainings was reported to be field independence. Regarding this, teachers stated that in order for the seminars or in-service trainings organized my MoNE to be effective, teachers needed to be given such trainings based on their fields such as English, History, Maths etc. In this respect, two of the teachers (T37 and T56) reported that "*We are given nothing about English language teaching in trainings*."

Based on the "*loss of pedagogical knowledge",* the participants reported that they cut contact with the university long ago after graduation. They stated that they need to keep their knowledge up to date with the help of experts to increase their quality of teaching. In this respect, T10 explained *"I graduated from university 16 years ago and I really forgot many of the things I learned at university… In my school, there are teachers who are about to retire within a few years; there are several teachers in my case who cannot remember the pedagogical knowledge*." At the same time, findings based on teachers' answers to research questions often indicated the lack of opportunities to "*renew their pedagogical knowledge"* under their existing conditions. Thus, one of the most reported needs of the practicing teachers was about renewing their pedagogical content knowledge they gained while studying at university. With respect to this aspect, teachers stressed that the seminar they held which is the focus of this study was the first comprehensive one the teachers took place in as an activity to renew some aspects regarding teaching and learning. In terms of this, T10, T56, T67 and several others in general highlighted the need for renewing the knowledge by writing, "For most of the times, it is the teachers who are blamed for students' lack of communication in English; we are not given any opportunity to renew our knowledge. They should invest on this first. (T56)" Another aspect regarding decrease in content pedagogical knowledge was that teachers could not implement the new or the changing teaching programs in desired way due to lack of knowledge for being away from professional development which could not be

satisfactorily met in in-service trainings offered by MoNE. Thus, they believe that faculties where available may help teachers to sustain and improve their existing knowledge to close the gap which could not be eliminated by limitedly offered in-service trainings of MoNE. In relation to this aspect, T13 reported "*They changed the education system in 2013 and I have not received any training about the changes for English courses. We, as teachers, had to ask each other what changes were brought about. Thanks to this seminar, I could now understand the philosophy behind it.*"

Regarding the English language teachers' perceived needs in terms of professional development, findings show that due to lack of knowledge renewal opportunities, teachers find it difficult to gain and adapt to new developments and changes in the field of language teaching. Based on their answers, it seems obvious that teachers have difficulty in gaining the transformative knowledge to keep them up to date due to the reported reasons. One of the areas they find themselves ineffective is *the new course materials* brought about with improvements with technology. Shedding light on this issue, T72 and T10 stated "*Education materials are changing each year and to keep informed about them we need to gain knowledge about these new materials. For example, most teachers need help from the students to use smart boards especially those above 50* (T10)". Since most classes are equipped with smart boards, online networks and computers, they claim that these technologies were not adequately introduced for educational uses. Also, they explained that the *new methods in language teaching*, which they either forgot by the time or were not given to them as course content, were demanding for the teachers since the new programs required the use of various methods and techniques combined with technological innovations brought into classes. To illustrate, T70 reported that "*I worked at secondary school 2 years ago and now, I am working in high school. Applying the right method with the right age group and school type is quite difficult. I try to watch videos about teaching methods on the net because no one in MoNE dealt with this*."

When the findings for the perceived needs of in-service English language teachers in terms of professional development are reviewed, it is seen that teachers divulge some significant demands which they regard as their needs. Findings indicate that teachers are in need of being pedagogically supported during their professional lives since they report that they feel like diverging from what they learned at university. Following graduation, most of them did not take any comprehensive in-service training except for the ones offered by MoNE. Also, due to knowledge divergence, they state facing difficulties in implementing new education programs effectively. At the same time, they claim to have problems in adapting themselves to changing conditions and renovations in the field of language teaching. Thus, education faculties are regarded by these teachers as creditable in places where available to provide teachers in-service trainings to revive teachers' content pedagogical knowledge to increase teacher quality. Also, they reported that they expect academics of the department to organize seminars or trainings based on their needs such as the introduction of new programs, use of materials effectively.

Findings related to opinions of in-service English language teachers regarding the Third Space joint workshop and seminar between teachers and academics of ELT department.

The participant teachers' opinions regarding the joint workshop and seminar in the context of the partnership agreement between the Education Faculty and DoNE highlighted a number of issues as shown in Table 2.

Table 2. *Teachers' opinions about the joint Third Space partnership activity*

		f	%
Opinions for Joint Third Space Partnership Activity	*Motivation*	70	93
	Satisfaction	68	91
	Feeling of Valued	46	61
	Sense of Belonging	35	46
	Willingness for development	23	30
	Opportunity for sharing problems	17	22

Teacher statements in relation to their opinions for the Third Space activity based on partnership conducted as workshop and seminar showed that being one of the first comprehensive workshops they have ever attended since their graduation from their departments, this organization motivated teachers. Teachers stated that this activity had a motivating effect for them creating desire to learn more about their field and to follow other available academic organizations. One of the teachers stated that s/he wanted to continue his/her uncompleted MA education (T13) by writing "*Now, I feel like that I have to continue my Masters Education which I gave up three years ago"*. Also, a number of teachers reported that they felt satisfied about the content of the workshop and the seminar. In a similar vein, findings showed that the participants found this activity as triggering and relevant to their needs. For example, T52 stated "*I feel very happy to participate in this event because, this is the first time I have enjoyed such a training because the content is just for English language teachers and it addresses all my needs for teaching*." Thus, it can be stated that the joint workshop and seminar offered to the teachers appealed and motivated the practicing teachers to renew their existing knowledge. One another aspect highlighted regarding this Third Space activity was that they felt they were valued by being invited to the workshop. Teachers explained that this was the first activity they participated and since the focus was only on English language teachers, they had the feeling of valued and honoured. Based on their statements, findings show that teachers complained about lack of such activities and this organization contributed them affectively. T38 wrote "*Thanks for this informing event. I am quite happy to be here because this is the first time I have been invited to a training activity like this and this is what we actually expect in our institution. Schools and MoNE should also make teachers feel that they are valuable*."

Regarding the teachers' opinions, this Third Space activity is reported to trigger their desire to pursuit professional development opportunities including masters and doctoral degrees apart from seeking to involve in conferences and seminars available. Yet, they complained that due to time and budget related restrictions, they were not supported by MoNE to participate in such activities for professional development. In this respect, T4 reported "*I personally decided that I want to have Master's degree in my field. Before this workshop, I applied for a conference as a listener, but the school did not support me economically. Thus, if you are a teacher, it is nearly impossible to attend such conferences*". Additionally, teachers stated that they sought to apply what they gained practically from content of the workshop and seminar indicating a possible change in their teaching out of their accustomed styles of teaching for trying innovative initiations. Regarding this, T31 wrote "*I especially benefitted from the sessions of "the Use of Technology in Language Teaching" and "English Language Teaching Programs in Turkey" and I want to apply the things I learned here in my classes.*" They reported that they gained a number of critical implementation issues to apply in class in terms of technology use and suggested methods as required in the new 4+4+4 education program. Thus, findings

show that the teachers were of the opinion that the joint workshop and seminar contributed to their pursuit of professional development opportunities for self-improvement in teaching.

As the last finding based on teachers' opinions in relation to the workshop and seminar they attended within the context of this study, they emphasized the worth of this activity from the perspective of teacher coordination and meeting opportunity for those working across different schools. T68 explained "*I had the chance of meeting other English language teachers working in other schools thanks to this activity*." Regarding this as a chance for networking, a number of teachers (T4,T17,T48,T68 for example) stated that the joint workshop was as an opportunity for information exchange for the problems, their solutions and for sharing their way of conducting classroom activities and implementations of various teaching strategies. Some stated that they had the chance of meeting their friends whom they could not see for a long time as well as gaining new friends as colleagues working at other schools.

In general, findings regarding research question 2 revealed that the workshop and seminar offered by ELT Department, Faculty of Education for English language teachers working in schools of MoNE under the partnership of these two institutions was the first comprehensive one which most teachers participated in for the first time since they actively started to work at MoNE schools. Arousing the feeling of motivation and satisfaction on the part of the participant teachers, the activity was reported to meet their expectations making them feel valued. Findings also showed that participating into the joint activity provoked teachers' desire to pursue professional development opportunities in order to renew their knowledge of teaching. Finally, teachers had the opinion that they could come together with their friends working in other schools in addition to making new friends which enabled them to share their experiences and problems for possible solutions.

Findings related to future expectations of in-service English language teachers from faculty members in terms of their professional development.

Following the joint workshop and seminar held by academics of ELT department for in-service teachers of English, teachers were asked for their future expectations from the faculty members, namely the academics working at ELT, in terms of their professional developments and findings for this research question were shown in Table 3 below.

Under the theme of "*expectations from academics*" or teachers' wants based on Hutchinson and Waters' needs analysis classification, three major categories were identified regarding teachers' expectations from the faculty members. The initial category "*continuous meetings & activities"* revealed that teachers complained about the lack of such activities for professional development stating that each teacher can only join two trainings a year offered by MoNE; however, they also added that the ones offered by other institutions like universities are only held for once. Thus, they demanded such meetings and activities on a continuous basis.

Table 3. *Teachers' Expectations from the Academics*

		f	*%*
Expectations from academics (WANTs)	*Continious meetings & activities*	72	96
	Teacher training	68	91
	Teacher Appraisal	2	3
	Activities based on school types	12	16
	Primary and secondary school	4	5
	Various collaboration types	70	93
	Projects	68	91
	Student visits	2	3

Regarding this, they also have a number of expectations from the academics of ELT Department requesting regular special focus teacher training sessions. Teachers demand academics to analyse their professional needs and organize meetings and teacher training sessions focusing on those needs identified. For example, T6 stated "*I hope this activity will be repeated in regular intervals because we do not often receive this kind of activities."* Another category found with respect to teacher expectations was "teacher evaluation". A number of teachers stated they needed to be evaluated by an outsider expert in the field. In relation to this, for example, one of the teachers (T67) wrote *"I do not exactly know how I am performing in the class, if academics join us in the class, they can give us feedback in terms of applying the methods and techniques appropriately, managing the classroom activities effectively…*"

One another wants of the English teachers from the academics was that they wanted academics to organize meetings and seminars for other school types, too. Since this seminar was only offered to high school English language teachers, primary and secondary school teachers of English could not attend; thus, teachers requested a similar activity for their colleagues working in primary schools and secondary schools. In relation to this, one of the teachers (T19) stated "*I think, this activity should be organized for primary school teachers, too. In fact, not only primary school but also secondary school teachers should join*". Similarly, one another teacher (T47) requested academics to even organize such activities for teacher working in same type high schools by asking "*Here, teachers working at vocational high schools, like me, and science high school come together. Our students and needs are totally different from each other. So, if possible, I think this should be arranged for similar school types*".

As the final finding regarding the teachers' expectations from the academics, apart from seminars and workshops, teachers requested variety of activity types. Almost all teachers stated that they were willing to take part in similar activities in the future, too. Yet, they also demanded project cooperation in addition to regular and needs based teacher trainings. For this, a teacher (T74) stated "*I am sure that we can go beyond this activity. There are several issues on which we can cooperate to prepare abroad projects*." As another demand, two teachers (T34 and T50) offered academics to make pre-service teachers of English to visit their classes and observe them so that the students could bridge the gap between theory and practice

before they were assigned to schools. One other participant also advised the faculty members to visit them accompanied by department students to increase this meeting initiative.

Findings for the last research question posed in this study revealed a number of English language teacher expectations from the academics working in ELT department. Teachers had the opinion that teacher training seminars or workshops were not regularly organized; thus, they demanded such activities or academic member-teacher meetings to be regular and needs based. Additionally, rather than focusing on teachers from various high school types, heterogeneous groups of teachers such as primary or secondary schools were also demanded by the teachers. Finally, teachers who participated in the workshop and seminar asked for extra collaborative academic activities such as projects as well as school visits.

4. Discussion and Conclusions

Due to quite scant research in the literature in relation to English language teachers 'opinions regarding in-service training activities offered by the academic members of education faculties for teachers working in schools affiliated to National Education, this study set out to explore the opinions of English language teachers working in various state high school regarding a Third Space workshop and seminar organized under a partnership agreement between an education faculty and Directorate of National Education.

When the findings of the study are analysed, it is seen that teachers have limited in-service teacher training opportunities and reportedly in need of such trainings in addition to the ones provided by the Ministry. In fact, findings also show that teachers are dissatisfied with the content of the in-service trainings offered by MoNE. In Turkey, several studies indicate that in-service teacher trainings need to be re-organized based on the needs of the practicing teachers to increase the teacher quality (Büyükduman, 2005; Coşkun, Küçüktepe, & Baykın, 2014; Gokmenoglu et al., 2016; Özüdoğru & Adıgüzel, 2015; Topkaya & Küçük, 2010, Yüce, 2019). When these studies are analysed, it is apparent that in-service teacher trainings have recurrently been low in quality although Turkish education system has witnessed three major education reforms since 1997. Thus, it can be stated here that in-service teacher trainings offered by MoNE do not address the needs of the teachers and do not yield the intended outcomes in order to increase the teacher quality, particularly of English language teachers. Findings based on English language teachers' reports in this study also show that the problem of insufficient in-service teacher training opportunities still continues and needs a comprehensive restructuring process.

Another significant aspect found in this study is that language teachers experience becoming less knowledgeable in their field due to lack of knowledge renewal opportunities which is also linked to insufficient in-service training. It is a known fact that teachers need to keep their content and pedagogical knowledge updated and adapt to changes in education. Additionally, one of the most important aspects for achieving the learning outcomes on the part of the students is the teachers' knowledge of content and pedagogy which mandates teacher education institutions and teachers to increase knowledge renewal and improvement (Wilson & Berne, 1999) for quality learning and teaching. As also stated by Holmqvist(2019), enhancing teacher knowledge for increasing the teacher quality as well as encouraging them to pursuit their own professional development opportunities is one of the core needs of countries. Yet, in many cases it is clear that teachers' development is left to teachers themselves (Holmqvist, 2019) and Turkey is not an exception since teachers complain about limited renewal opportunities as one of the significant findings of this research.

Another significant aspect revealed in this study is that teachers stated drawbacks regarding the introduction of language teaching program changes. It seems clear that although teachers

experience education program changes in terms of language teaching, they are not sufficiently informed about the nature of such program changes. In fact, in spite of the education reforms conducted in Turkey which also affected language teaching programs by changing the program components, these changes lack in supporting teachers professionally due to lack of insufficient in-service trainings (Alkan & Arslan, 2014; Özüdoğru & Adıgüzel, 2015; Topkaya & Küçük, 2010). Due to teachers' becoming distant to knowledge renewal opportunities, it seems clear that they have difficulties implementing the program effectively. As discussed by Gokmenoglu et al.(2016), for any education reform or change in the education system together with teaching programs to succeed, teachers' knowledge and needs should be maximized. Yet, when education program changes are considered in the context of Turkey, studies repeatedly showed that education reforms and changes had failures in almost all fields and one of the reasons why these changes did not yield the intended results was linked to teachers need for in-service training to introduce the program components (Erarslan, 2018; Eraslan, 2008; Gokmenoglu et al., 2016) supporting the findings of this study.

Joining to the Third Space joint workshop and seminar by an official invitation, teachers declared they felt satisfied and valued indicating feeling of undervalued in their institutions for teacher development. It is undeniable that teachers' feeling of well-being is of great significance for the professional performance at the workplace namely schools. Regarding this, Daniels and Strauss (2010) argue that various factors contribute to teachers' emotional vulnerability and their teaching quality, how they act upon their students and environment is affected in a negative way due to their feelings of well-being and mental state which are also linked to teacher burnout. Thus, it can be concluded that teachers' feelings of valued and motivated through such academic meetings as workshops, conferences or seminar may be a positive contributor to knowledge renewal, teacher quality and their self-worth. It is true that (Klein, 2005) such meetings are significant contributors for the teachers to exchange new ideas, to increase their demands for deeper cooperation and for the evaluation of their own actions in teaching process.

The teachers' opinions regarding the joint workshop and seminar revealed that they need such activities on a regular basis indicating a desire to keep abreast for continuous improvement as well as dissatisfaction from the in-service trainings of MoNE. At this point, the universities and particular academic members of the Education Faculties, department of ELT in the context of this study, are expected by English language teachers to organize training activities and regular meetings to fill their professional development needs. Regarding this, Klein (2005) asserted that academic meetings enrich teachers' educational efficiency in their teaching since such organizations are among the scarce platforms for their ideas to be shared and taken seriously into consideration. Thus, this study highlights the significance of a close partnership between the universities and educational institutions since they serve the basis for improving the quality of education particularly by creating teacher-oriented activities.

5. Conflict of Interests

The author declares that there is no conflict of interest.

6. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Akbulut Tas, M., & Karabay, A. (2016). Developing teaching skills through the school practicum in Turkey: A metasynthesis study. *Journal of Education and Training Studies*, *4*(11), 87–99. https://doi.org/10.11114/jets.v4i11.1813.

Alkan, M. F., & Arslan, M. (2014). Evaluation of the 2nd grade English language curriculum. *International Journal of Curriculum and Instructional Studies*, *4*(7), 87–99.

Atmaca, Ç. (2017). English teachers' perspectives about teacher competencies in terms of professional identity. *Abant İzzet Baysal University Journal of Faculty of Education*, *17*(4), 1641–1669.

Beck, J. S. (2018). Investigating the Third Space: A new agenda for teacher education research. *Journal of Teacher Education*. https://doi.org/10.1177/0022487118787497

Bhabha, H. K. (1994). *The Location of culture*. London : Routledge.

Büyükduman, F. İ. (2005). The opinions' of elementary schools English teachers on the English curriculum for elementary schools. *Hacettepe University Journal of Education*, 28, 55-64

Çakır, M., Bekiroğlu, F. O., İrez, S., Kahveci, A., & Şeker, H. (2010). Evaluation of Faculty-School Partnership Model: Mentor Teachers' Perspectives. *Marmara University Atatürk Education Faculty Journal of Educational Sciences*, *31*(31), 69–81.

Cohen, L., Manion, L. and Morrison, K. (2000). *Research methods in education*. Routledge: London.

Coşkun, K., Küçüktepe, S. E., & Baykın, Y. (2014). An investigation of teachers' views on the second grade English course and curriculum. *HAYEF: Journal of Education*, *11*(22), 55–78.

Daniels, D., & Strauss, E. (2010). Mostly I'm driven to tears, and feeling totally unappreciated: Exploring the emotional wellness of high school teachers. In *Procedia - Social and Behavioral Sciences* (Vol. 9, pp. 1385–1393). https://doi.org/10.1016/j.sbspro.2010.12.339

Erarslan, A. (2018). Strengths and weaknesses of primary school English language teaching programs in Turkey: Issues regarding program components. *Eurasian Journal of Applied Linguistics*, *4*(2), 325–347. https://doi.org/10.32601/ejal.464194

Eraslan, A. (2008). A faculty – school partnership programme: Prospective mathematics teachers ' reflections on school practice course. *Hacettepe University Journal of Education*, (34), 95–105.

Flessner, R. (2014). Revisiting reflection: Utilizing Third Spaces in teacher education. *Educational Forum*, *78*(3), 231–247. https://doi.org/10.1080/00131725.2014.912711

Gökmenoglu, T. (2013). Preparing teachers : Expectations and existing situation at faculties of education. *Turkish Online Journal of Qualitative Inquiry*, *4*(4), 39–54.

Gokmenoglu, T., Clark, C. M., & Kiraz, E. (2016). Professional development needs of Turkish teachers in an era of national reforms. *Australian Journal of Teacher Education*, *41*(1), 113–125.

Grossman, G. M., & Sands, M. K. (2008). Restructuring reforms in Turkish teacher education: Modernisation and development in a dynamic environment. *International Journal of Educational Development*, *28*(1), 70–80. https://doi.org/10.1016/j.ijedudev.2007.07.005

Holmqvist, M. (2019). Lack of qualified teachers: A global challenge for future knowledge development. *Intech*, 13. https://doi.org/http://dx.doi.org/10.5772/57353

Hutchinson, T. & Waters, A. (1987). *English for Specific Purposes: A learning--centered. Approach*. Cambridge: Cambridge University Press.

Jackson, A., & Burch, J. (2019). New directions for teacher education: investigating school/university partnership in an increasingly school-based context. *Professional Development in Education*, *45*(1), 138–150. https://doi.org/10.1080/19415257.2018.1449002

Kasapoglu, K. (2015). A review of studies on school experience and practice teaching in Turkey. *Hacettepe University Journal of Education*, *30*(1), 147–162.

Klein, E. J., Taylor, M., Onore, C., Strom, K., & Abrams, L. (2013). Finding a third space in teacher education: Creating an urban teacher residency. *Teaching Education*, *24*(1), 27–57. https://doi.org/10.1080/10476210.2012.711305

Klein, J. (2005). Effectiveness of school staff meetings: Implications for teacher-training and conduct of meetings. *International Journal of Research and Method in Education*, *28*(1), 67–81. https://doi.org/10.1080/01406720500036778

Koç, E. M. (2016). A general investigation of the in-service training of English language teachers at elementary schools in Turkey. *International Electronic Journal of Elementary Education*, *8*(3), 455–466.

Lewis, E. (2012). Locating the third space in initial teacher training. *Research in Teacher Education*, *2*(2), 31–36.

Ozer, B. (2004). In-service training of teachers in Turkey at the beginning of the 2000s. *Journal of In-Service Education*, *30*(1), 89–100. https://doi.org/10.1080/13674580400200301

Özüdoğru, F., & Adıgüzel, O. C. (2015). Evaluation of primary school 2nd grade English language teaching curriculum. *Turkish Studies*, *10*(11), 1251–1276.

Sıcak, A., & Parmaksız, R. S. (2016). An evaluation of efficacy of in-service training in primary schools. *İnönü University Journal of the Faculty of Education*, *17*(1), 17–33. https://doi.org/10.17679/iuefd.17144668

Topkaya, E. Z., & Küçük, Ö. (2010). An evaluation of 4th and 5th grade English language teaching program. *Elementary Education Online*, *9*(1), 52–65.

Wilson, S. M., & Berne, J. (1999). Teacher learning and the acquisition of professional knowledge: An examination of research on contemporary professional development. *Review of Research in Education*, *24*(1999), 173–209.

Yilmaz, H. Y., & Esen, D. G. (2015). An Investigation on in-service trainings of the Ministry of National Education (MONE). In *5th World Conference on Learning, Teaching and Educational Leadership, WCLTA 2014* (Vol. 186, pp. 79–86). Elsevier B.V. https://doi.org/10.1016/j.sbspro.2015.04.019.

Zeichner, K., 2010. Rethinking the connections between campus courses and field experiences in college and university based teacher education. *Journal of Teacher Education*, 61 (1–2), 89–99.

Diken, E. H. (2020). A comparative study on the cognitive and metacognitive strategies of 6th grade private and state school students use while reading science texts. *International Online Journal of Education and Teaching (IOJET)*, *7*(3). 1092-1109. https://iojet.org/index.php/IOJET/article/view/874

Received: 22.04.2020
Received in revised form: 14.05.2020
Accepted: 05.06.2020

A COMPARATIVE STUDY ON THE COGNITIVE AND METACOGNITIVE STRATEGIES OF 6th GRADE PRIVATE AND STATE SCHOOL STUDENTS USE WHILE READING SCIENCE TEXTS

Research Article

Emine Hatun Diken

hatundiken06@gmail.com

Kafkas University

Emine Hatun Diken is an assistant professor at the Science Education Department in Kafkas University.

A COMPARATIVE STUDY ON THE COGNITIVE AND METACOGNITIVE STRATEGIES OF 6th GRADE PRIVATE AND STATE SCHOOL STUDENTS USE WHILE READING SCIENCE TEXTS

Emine Hatun Diken

hatundiken06@gmail.com

Abstract

The aim of this qualitative case study was to determine the cognitive and metacognitive strategies used by the Secondary School 6th grade students while reading science texts in a Biology unit titled "Support and Motor System", and to compare these strategies in accordance with the type of their school (private or state school), their grade point averages and their perceptions concerning the difficulty level of the chapter. The number of the participant students was 6; 3 from a private school and 3 from a state school. After the students read the texts in the unit, semi structured interviews were administered in order to determine their strategy types, to compare and contrast these strategies in accordance with the type of their schools, their grade point averages and their perceptions concerning the difficulty level of the chapter. The results of the study revealed that the private school students had “High” and “Very high” grade point averages and assessed the chapter as "Easy” and “Very Easy”, used a higher number and a wider variety of cognitive and metacognitive strategies whereas the state school students had “Low” and "Very Low" grade point averages and assessed the chapter as "Difficult" and "Very Difficult".

Keywords: Cognitive and Metacognitive Strategies, Support and Motor System Chapter, reading strategies, state school and private school students

1. Introduction

Today, individuals need to obtain the information they need, produce new knowledge and have the ability to think scientifically. In order to have this ability, they need to learn and understand science. Students should be made to gain insights, knowledge, skills and values related to science, improve their research, problem solving and decision making skills and acquire the basic skills in this field (Güçlüer & Kesercioğlu, 2010). One of the basic skills in science is to read and understand science texts. Reading has a highly significant and wide influence on human life, and learning to read is a long and difficult way. Reading involves understanding and comprehending the emotions, thoughts and messages in a text (Topuzkanamış & Maltepe, 2010). The reading skill is a factor that students will need both in primary education and in the later stages of the education life and will shape the achievements of students (Calp, 2005; Oz, 2003; Sever, 2004). Science texts are among informative texts and contain concrete and scientific information. The quality of a text has a determining role in reading comprehension (Bayat & Yüce, 2015). As for readability, it refers to the “ease” or “difficulty” with which the reader can understand the text. The readability concept is related to the level of difficulty of a text and its compliance with the reader’s level (Ateşman, 1997). Reading and reading comprehension are cognitive behaviours. It can be argued that studies aiming at determining the cognitive processes of students and identifying their deficiencies in this respect will decrease the difficulty students have in reading and reading comprehension

and increase their levels of success (Çakıroğlu, 2007). The reader must be mentally active during the reading process for comprehension, which is the purpose of reading. For a successful reading, readers need to make sense of and use both cognitive and metacognitive processes (Yore et al., 2003). Since science texts do not contain subjects easy to learn and there are different dimensions of reading the texts, they are often difficult to make sense and read (Yore et al., 1998; Sonleitner, 2005). Therefore, students may have trouble in reading comprehension with science texts. In order to overcome this problem, students can use strategies while reading science texts (Yore, 1986). In the literature, reading strategies have been discussed in two groups as cognitive strategies and metacognitive strategies (Kumlu, 2016). Cognitive strategies are the ones used by the students in order to conduct cognitive processes such as achieving the goals they have determined with respect to the subject, completing a task or accomplishing learning (Boekaerts, 1996). As for metacognitive strategies, they are used by the students to understand the information about the learning processes and to control these processes during learning (Flavell, 1979). Both in Turkey and abroad, studies conducted on cognitive and metacognitive reading strategies generally aim at students who learn Turkish and foreign languages and have reading difficulties. In general, these studies tried to determine the cognitive and metacognitive strategies used by the students use in their reading processes through scales and questionnaires (Anderson, 2003; Ay, 2008; Babacan, 2012; Baydık, 2010; Çakıroğlu, 2007; Çelik, 1997; Güngör, 2005; Hall, Bowman & Myers, 1999; Hamdan, Ghafar, Sihes & Atan, 2010; Kumlu, 2012; Oluk & Başöncül, 2009; Padron, 1992; Sonleitner, 2005). In the literature, studies conducted to determine the cognitive and metacognitive strategies used by students while reading science texts are quite limited. Based on the limited number of studies carried out in Turkey to determine the cognitive and metacognitive strategies used by students in reading science texts; in this study, cognitive and metacognitive strategies used by the 6th grade students while reading the "Support and Motor System" chapter of the 6th Grade Science Textbook as part of the Biology learning domain were determined and these strategies were compared by the type of schools where the students were studying, their grade point averages and their perceptions concerning the level of difficulty-easiness of the chapter. Indeed, Özay Köse (2009) stated that science is a field, which contains a lot of technical terms by its nature and students have difficulty in understanding, and that biology, in particular, is a branch of science where reading difficulties are experienced more due to the definitions of principles, concepts and theories when compared to the physics, chemistry and other branches (Yılmaz, Gündüz, Çimen & Karakaya, 2017; Karakaya, Uzel, Gül, Yılmaz, 2019). It is thought that identifying cognitive and metacognitive strategies and comparing them in terms of some factors might contribute to the use of these strategies by the students more effectively while reading science texts related to the Biology learning domain through the instruction of these strategies in the future studies and in this way, students may overcome the reading difficulties they experience.

1. Method

2. 1. Objective of the Research

The objective of this study was to compare and contrast the cognitive and metacognitive strategies of the 6th grade students in private and state secondary schools while reading the texts in the "Support and Motor System" unit in their Science course book in accordance with the type of their schools (private-state school), their grade point averages as well as their perceptions concerning the level of difficulty-easiness of the unit.

2. 2. Research Design

This qualitative research employing the case study aimed to determine the cognitive and metacognitive strategies used by the students, who were attending a private and a state school

and had different grade point averages, while reading the “Support and Motor System” included as a subject of Biology in the 6th Grade Science Textbook and to compare these strategies by the type of school attended (private or state school), grade point average and perceptions concerning the level of difficulty-easiness of the chapter. Before choosing the unit, the opinions of science teachers and two faculty members, specialized in Biology Education, were received. The study was a holistic multiple case study (Yin, 2003) since each case was addressed in itself as a holistic one and then cases were compared with one another (Yıldırım and Şimşek, 2006). Qualitative data were collected via semi-structured interviews with respect to the cognitive and metacognitive strategies used by the students while reading the chapter with the aim of comparing them by some factors. Then, the patterns among the cases were analysed.

2. 3. Participants

The participants of the study were six 6th grade students; 3 studying at a private school and 3 at a state school in the province of Kars. These students were chosen on the basis of "the principle of maximum diversity" developed by Patton (2002). During the selection of these students, their grade point averages and opinions of the teachers working in their schools were taken into consideration. After the schools were determined, students were chosen by considering the opinions of all teachers working in these schools and the grade points averages of the students in order to ensure that the students who would provide rich data about the use of cognitive and metacognitive strategies while reading the “Support and Motor System” chapter of the 6th Grade Science Textbook could be selected. The students participating in the research were determined on a voluntary basis. In the research, the names of schools and students were not disclosed, and schools were named as “private school or state school” and six students in these schools were named as “S1, S2, S3, S4, S5 and S6”.

The grade point averages of six students participating in the study were assessed in four categories as "Very Good, Good, Low and Very Low” based on the criteria determined in the Ministry of National Education Regulation on the Secondary Education Institutions (MoNE, 2019).

According to the Ministry of National Education Regulation on Secondary Education Institutions (MoNE, 2019), the grade point averages of the students correspond to the levels given in the following Table 1.

Table 1. *Levels of Grade Point Averages of Students according to MoNe*

GPA	Level
85.00-100	Very Good
70.00-84.99	Good
60.00-69.99	Moderate
50.00-59.99	Low
0-49.99	Very Low

As can be seen in Table 1, according to the Ministry of National Education Regulation on Secondary Education Institutions (MoNE, 2019), the grade point averages between “85.00 and 100” are assessed as “Very Good”, between “70.00 and 84.99” as “Good”, between “60.00 and 69.99” as “Moderate”, between 50.00 and 59.99 as “Low” and between “0 and 49.99” as “Very Low”.

In line with the said Regulation (MoNE, 2019), the type of school where the students participating in the study were attending, their grade point averages and their levels by the grade point average are given in Table 2.

Table 2. *Grade Point Averages and Levels of the 6th Grade Students in their School*

	Students	Grade Point Averages	Levels
Private School	S1	96	Very Good
	S2	93	Very Good
	S3	81	Good
State school	S4	57	Low
	S5	53	Low
	S6	43	Very Low

When Table 2 is examined, out of the students studying in the private school, S1 and S2 fall into the category of "Very Good" with their grade point averages of 96 and 93, respectively, while the level of S3 is "Good" with his/her grade point average of 81. As for the students attending the state school, S4 and S5 fall into the category of "Low" with their grade point averages of 57 and 53, respectively, while the level of S6 is "Very Low" with a grade point average of 43. This means that the research was conducted with six students who were attending a public or private school and had varying grade point averages or different levels of success. This selection aimed at determining a maximum number and variety of cognitive and metacognitive strategies while students were reading the "Support and Motor System". Students were selected from two different schools on a voluntary basis based on the opinions of teachers. In this way, the study aimed at determining the cognitive and metacognitive strategies of these students, who were attending different schools and had different levels of success, in depth, and comparing the differences between the strategies used by certain parameters (type of school, grade point average, level of difficulty-easiness of the chapter).

2. 4. Data Collection Tools

Several data collection tools were used in the study so that analyses could be reliable, consistent and thorough (Yin, 2003).

The data collection tools used in the research are as follows:

2.4.1 Think Aloud Session with the "Support and Motor System" Chapter

The first data collection tool used in the research is the think aloud sessions conducted while the students were reading the "Support and Motor System" chapter. "Support and Motor System" chapter is a part of the subject of "Systems in our Body" in the 6th Grade Science Textbook (Çiğdem, Balçık, Minoğlu and Karaca, 2018), which is instructed by the Ministry of National Education (MoNE) as textbook in all schools throughout Turkey. "Support and Motor System" chapter of the 6th Grade Science Textbook was determined with the science teachers since the subject of "Systems in our Body", of which the chapter is a part, has a high number of learning outcomes, the chapter has a rich content (images, figures etc.), the possibility of encountering questions from this chapter in the High School Entrance Exam (LGS) is high, and students are expected to use a higher number and a wider variety of cognitive and metacognitive strategies while reading it. Also, two faculty members specialized in the field of Biology education were asked to control the content of the chapter to see whether there were any incorrect information, and the necessary corrections were made in the chapter based on the

feedbacks of the experts. Students read the "Support and Motor System" chapter in think aloud sessions. Thinking aloud is a technique, which determines the relation between the reading performances of students and the other factors affecting reading (Van Someren, Barnard and Sandberg, 1994). Before students read the chapter, they were informed about the think aloud session by the researcher. In other words, students were asked to read the chapter aloud. In order to ensure that students could get accustomed and adapt to this method, before the actual practice, they were asked to read a small text from a chapter other than the "Support and Motor System" chapter aloud. The students' readings of these different texts were not taped. After that, students were asked to read the "Support and Motor System" chapter aloud, and these sessions were taped. During the exercise, researcher kept the camera in his/her right hand and stood right behind the student on the left. While the students were reading the chapter, when needed, the researcher controlled and adjusted the focus and direction of the camera. The reading processes of students were observed through tape recording while the cognitive and metacognitive strategies used by them in these processes were noted down by the researcher. When students stayed silent for a long time while reading the chapter, they were warned for "thinking aloud". Observations concerning the think aloud sessions held while the students were reading the chapter allowed for determining the strategies used by them and dividing them as cognitive and metacognitive ones.

2.4.2 Semi-Structured Interview Form

Semi-structured interviews were held with the students for once after each student read the chapter with the aim of determining the cognitive and metacognitive strategies used by six 6-grade students of a public and a private school selected within the scope of the research while reading the "Support and Motor System" chapter and comparing these strategies by certain parameters (type of school, grade point average, level of difficulty-easiness of the chapter). The form consisting of the semi-structured interview questions developed by Diken (2014) was applied to the students. In the study, researcher asked questions to the students after they completed reading in order to determine the cognitive and metacognitive strategies used by six 6-grade students of a public and a private school selected within the scope of the research while reading the "Support and Motor System" chapter and to compare these strategies by certain parameters (type of school, grade point average, level of difficulty-easiness of the chapter). All the interviews were semi-structured, and they were videotaped, as well.

Some sample semi-structured questions taken from the form developed by Diken (2014) with the aim of determining the cognitive and metacognitive strategies used by the 6-grade students while reading the "Support and Motor System" chapter and comparing these strategies by certain parameters (type of school, grade point average, level of difficulty-easiness of the chapter) are as follows:

* What appeared in your mind while reading this chapter? Can you explain?

* What did you do while reading the chapter? Which ways did you implement? Can you explain step by step?

* What did you do while reading the chapter (like comparing figures). Why did you do that?

2.4.3 Student Opinion Form about the Level of Difficulty-Easiness of "Support and Motor System" Chapter

After the 6th grade students read the "Support and Motor System" chapter, they were distributed a form to determine their perceptions concerning the degree of difficulty-ease of the chapter. In this form, they were asked to choose and mark the most appropriate category for them out of "Very Difficult", "Difficult", "Moderately Difficult", "Easy" and "Very Easy".

2.5. Research Process

The research process was examined in three stages as the process before the students read the "Support and Motor System" chapter, the process of reading the chapter and the process after reading the chapter.

2.5.1. Before the Students Read the "Support and Motor System" Chapter

a) In the research, first, studies conducted on cognitive and metacognitive strategies at home and abroad were examined. Based on the literature review, a list of cognitive and metacognitive strategies was prepared.

b) The chapter on "Support and Motor System", which is a subject of the Biology domain of science, from the MoNE 6th Grade Science Textbook (Çiğdem, Balçık Minoğlu and Karaca, 2018) was determined for being used in the research in line with the opinions of science teachers, as well.

c) Semi-structured interview questions developed by Diken (2014) were used with the aim of determining the cognitive and metacognitive strategies used by the students while reading the "Support and Motor System" chapter.

d) Students included in the research were selected by consulting the science teachers in the private school and the state school.

e) School administrators, science teachers and students included in the sample were informed about the research process.

f) Students were provided information on the think aloud session before they read the "Support and Motor System" chapter.

2.5.2. While the Students Read the "Support and Motor System" Chapter

a) Students were asked to think aloud while reading the "Support and Motor System" chapter with the aim of determining the cognitive and metacognitive strategies used by them in this process, and these processes were video-taped by the researcher.

b) The researcher controlled and adjusted the focus and direction of the camera when needed while video-taping both the readings and the semi-structured interviews.

c) Since it took a while for the students to read the chapter and complete the semi-structured interviews, short breaks were taken when the students felt tired during the process.

2.5.3. After the Students Read the "Support and Motor System" Chapter

a) After the students read the "Support and Motor System" chapter and the semi-structured interviews were held with them, the researcher controlled whether there were any deficiencies regarding the reading process.

b) Video records of the students' readings of the "Support and Motor System" chapter through think aloud techniques well as the semi-structured interviews held with the students were transcribed.

c) Observations of students thinking aloud while reading the "Support and Motor System" chapter and the transcripts of the semi-structured interviews held with them after the readings were completed were analysed.

2.6. Data Analysis and the Techniques Used

In the research, cognitive and metacognitive strategies used by six 6th grade students attending two different schools, one state school and one private school, in the province of Kars while reading the "Support and Motor System" chapter were determined, and these strategies were compared by certain parameters (type of school, grade point average, degree of difficulty-ease of the chapter). First of all, the data obtained from the observations of students' readings of the chapter and the semi-structured interviews held with the students after the reading sessions were transferred to the computer environment and transcribed to determine the cognitive and metacognitive strategies used by the students.

In this way, the cognitive and metacognitive strategies used by the students while reading the "Support and Motor System" chapter were determined and these strategies were compared by certain parameters (type of school, grade point average, degree of difficulty-ease of the chapter). In order to determine whether the strategies the students used were cognitive or metacognitive, categories were determined for the data related to the observation records of the think aloud sessions and for what purpose they used the strategies and comparisons of the strategies.

The transcripts were coded in a computer program used for the analyses of the qualitative research. To make sure that the data obtained from coding were accurately coded, the researcher met the faculty member, who had frequently studied on the topic and had enough knowledge, and discussed whether the strategies were cognitive or metacognitive, comparisons of these strategies as well as the reliability and consistency of the codes.

After the coding was completed, the data set of a student's reading of the "Support and Motor System" chapter was coded by the faculty member, who was the other coder, as well. At the end, the consistency between the codes given by the coders was calculated as 89%. The coders studied on the inconsistent data sets once more. The researcher and a faculty member having adequate knowledge went over the inconsistent data sets and reached an agreement.

3. Findings

In this part, cognitive and metacognitive strategies used by the students while reading the "Support and Motor System" chapter were determined and compared by the type of school where the students were studying (private school – state school), their grade point averages and their perceptions concerning the degree of difficulty-ease of the chapter. The tables presenting the findings of the research and the relevant explanations are provided below.

The cognitive strategies used by the 6th grade students who were studying in the private school and had different grade point averages while reading the chapter analysed are given in Table 3.

Table 3. *School Cognitive strategies used by the students having different grade point averages while reading the chapter*

SECONDARY SCHOOLS	PRIVATE SCHOOL			STATE SCHOOL		
STUDENTS	S1	S2	S3	S4	S5	S6
GRADE POINT AVERAGE	Very Good	Very Good	Good	Low	Low	Very Low
DEGREE OF DIFFICULTY OF THE CHAPTER	Very Easy	Easy	Easy	Moderate	Moderate	Difficult
COGNITIVE STRATEGIES	√	√	√			
Picturing in the mind	√					
Reading by following the words with coloured pencils	√		√			
Reading by underlining the words with coloured pencils	√		√			
Taking notes with coloured pencils	√		√			
Reading by following the words with highlighters		√				
Reading by underlining the words with highlighters		√				
Taking note with highlighters		√				
Reading by following the words with lead pencils				√	√	
Reading by underlining the words with lead pencils				√		
Taking notes with lead pencils				√		
Examining figures	√	√	√	√	√	√
Comparing figures	√	√	√	√		
Repeating the words					√	√
Rephrasing with his/her own sentences	√	√	√			
Reducing the reading speed			√	√	√	

According to Table 3, S1, who was attending the private school, had a “Very Good” grade point average and assessed the chapter as “Very Easy”, used the cognitive strategies of picturing in the mind, reading by following the words with coloured pencils, reading by underlining the words with coloured pencils, taking notes with coloured pencils, examining figures, comparing figures, rephrasing with his/her own sentences and reducing the reading speed while reading the “Support and Motor System” chapter.

Table 3 shows that S2, who was studying in the private school, had a “Very Good” grade point average and assessed the chapter as “Easy”, used the cognitive strategies of picturing in the mind, reading by following the words with highlighters, reading by underlining the words with highlighters, taking notes with highlighters, examining figures, comparing figures and rephrasing with his/her own sentences while reading the chapter.

As for S3 who was studying in the private school, had a “Good” grade point average and assessed the chapter as “Easy”, it is seen that the student used the cognitive strategies of picturing in the mind, reading by following the words with coloured pencils, reading by underlining the words with coloured pencils, taking notes with coloured pencils, examining figures, comparing figures, rephrasing with his/her own sentences and reducing the reading speed while reading the “Support and Motor System” chapter.

According to Table 3, S4, who was studying in the state school, had “Low” grade point average and assessed the chapter “Moderately Difficult”, used the cognitive strategies of reading by following the words with lead pencil, reading by underlining the words with lead

pencil, taking notes with lead pencil, examining figures, comparing figures and reducing the reading speed while the reading the chapter.

When Table 3 is examined, it is seen that S5, who was studying in the state school, had "Low" grade point average and assessed the chapter "Moderately Difficult, used the strategies of reading by following the words with lead pencil, examining figures, repeating the words and reducing the reading speed while reading the chapter.

Also, according to Table 3, S6, who was studying in the state school, had a "Very Low" grade point average and assessed the chapter as "Difficult", used the cognitive strategies of examining figures and repeating the words while reading the chapter.

Table 3 shows that, differently from the 6th grade students studying in the state school, 6th grade students studying in the private school used the cognitive strategies of picturing in the mind, reading by following the words with coloured pencils, reading by underlining the words with coloured pencils, taking notes with coloured pencils, reading by following the words with highlighters, reading by underlining the words with highlighters, taking notes with highlighters and rephrasing with their own sentences.

Table 3 also shows that S1, who was studying in the private school, had a "Very Good" grade point average and assessed the chapter as "Very Easy" used a higher number and a wider variety of cognitive strategies while reading the chapter when compared to S2, who had a "Very Good" grade point average and assessed the chapter as "Easy", and S3, who had a "Good" grade point average and assessed the chapter as "Easy".

According to Table 3, S4, who was studying in the state school, had a "Low" grade point average and assessed the chapter as "Moderately Difficult" used a lower number of and less diverse cognitive strategies while reading the chapter when compared to S5, who had a "Low" grade point average and assessed the chapter as "Moderately Difficult" and S6, who had a "Very Low" grade point average and assessed the chapter as "Difficult".

As indicated in Table 3, it was determined that the cognitive strategies used by the students, who were studying in the private school, had "Very Good" and "Good" grade point averages and assessed the "Support and Motor System" chapter as "Very Easy" and "Easy", while reading the chapter were higher in number and wider in variety when compared to those used by the students who were studying in the state school, had "Low" and "Very Low" grade point averages and assessed the chapter as "Moderately Difficult" and "Difficult".

The meta-cognitive strategies used by the 6th grade students who were studying in the state school and had different grade point averages while reading the chapter analysed are given in Table 4.

Table 4. *Meta-cognitive strategies used by the students having different grade point averages while reading the chapter*

SECONDARY SCHOOLS	PRIVATE SCHOOL			STATE SCHOOL		
STUDENTS	S1	S2	S3	S4	S5	S6
GRADE POINT AVERAGE	Very Good	Very Good	Good	Low	Very Low	Very Low
DEGREE OF DIFFICULTY OF THE CHAPTER	Very Easy	Easy	Easy	Moderate	Moderate	Difficult
METACOGNITIVE STRATEGIES	√	√	√			
Reading back	√		√			
Underlining the tips with coloured pencils	√		√			
Circling the tips with coloured pencils	√		√			
Taking notes with coloured pencils	√		√			
Taking notes on the figures with coloured pencils	√		√			
Putting marks on the figures with coloured pencils (star, arrow etc.)	√		√			
Underlining the tips with highlighters		√				
Circling the tips with highlighters		√				
Taking notes with highlighters		√				
Taking notes on the figures with highlighters		√				
Putting marks on the figures with highlighters (star, arrow etc.)		√				
Circling the tips with lead pencil				√		
Underlining the tips with lead pencil					√	
Reading by underlining the words with lead pencil				√		
Taking notes with lead pencil				√		
Taking notes on the figures with lead pencil						√
Putting marks on the figures with lead pencil (star, arrow etc.)					√	
Re-examining the figures	√	√	√	√	√	√
Repeating the tips aloud	√	√				
Asking questions to himself/herself	√	√		√		
Accentuation	√	√				
Thinking over the text	√		√	√		
Reviewing	√	√	√			
Visualisation	√	√				

When Table 4 is examined, it is seen that S1, who was studying in the private school, had a "Very Good" grade point average and assessed the chapter as "Very Easy", used metacognitive strategies such as reading back, underlining the tips with coloured pencils, circling the tips with coloured pencils, taking notes with coloured pencils, taking notes on the figures with coloured pencils, putting marks on the figures with coloured pencils (star, arrow etc.), re-examining the figures, repeating the tips aloud, asking questions to himself/herself, accentuation, thinking over the text, reviewing and visualization while reading the "Support and Motor System" chapter.

According to the table, S2, who was studying in the private school, had a "Very Good" grade point average and assessed the chapter as "Easy", used the metacognitive strategies of underlining the tips with highlighters, circling the tips with highlighters, taking notes with highlighters, taking notes on the figures with highlighters, putting marks on the figures with highlighters (star, arrow etc.), re-examining the figures, repeating the tips aloud, asking

questions to himself/herself, accentuation, reviewing and visualization while reading the "Support and Motor System" chapter.

As for S3, who was studying in the private school, had a "Good" grade point average and assessed the chapter as "Easy", used the metacognitive strategies of reading back, underlining the tips with coloured pencils, circling the tips with coloured pencils, taking notes with coloured pencils, taking notes on the figures with coloured pencils, putting marks on the figures with coloured pencils (star, arrow etc.), re-examining the figures, thinking over the text and reviewing while reading the "Support and Motor System" chapter.

Table 4 also shows that S4, who was studying in the state school, had a "Low" grade point average and assessed the chapter as "Moderately Difficult" used the metacognitive strategies of circling the tips with lead pencil, reading by underlining the words with lead pencil, taking notes with lead pencil, re-examining the figures and asking questions to himself/herself while reading the chapter.

As for S5, who was studying in the state school, had a "Low" grade point average and assessed the chapter as "Moderately Difficult", it was determined that the student used the metacognitive strategies of underlining the tips with lead pencil, putting marks on the figures with lead pencil (star, arrow etc.) and re-examining the figures while reading the chapter.

Finally, according to the table, S6, who was studying in the state school, had a "Very Low" grade point average and assessed the chapter as "Difficult", used the metacognitive strategies of taking notes on the figures with lead pencil and re-examining the figures while reading the "Support and Motor System" chapter.

Table 4 shows that, differently from the 6th grade students studying in the state school, 6th grade students studying in the private school used the metacognitive strategies of reading back, underlining the tips with coloured pencils, circling the tips with coloured pencils, taking notes with coloured pencils, taking notes on the figures with coloured pencils, putting marks on the figures with coloured pencils (star, arrow etc.), underlining the tips with highlighters, circling the tips with coloured highlighters, taking notes with highlighters, putting marks on the figures with highlighters (star, arrow etc.), repeating the tips aloud, accentuation, reviewing and visualization while reading the "Support and Motor System" chapter.

According to Table 4, S1, who was studying in the private school, had a "Very Good" grade point average and assessed the chapter as "Very Easy", used a higher number and a wider variety of metacognitive strategies when compared to S2, who had a "Very Good" grade point average and assessed the chapter as "Easy", and S3, who had a "Good" grade point average and assessed the chapter as "Easy" when reading the "Support and Motor System" chapter.

When Table 4 is examined again, it is seen that S4, who was studying in the state school, had a "Low" grade point average and assessed the chapter as "Moderately Difficult"; S5, who had a "Low" grade point average and assessed the chapter as "Moderately Difficult"; and S6, who had a "Very Low" grade point average and assessed the chapter as "Difficult" used a small number of and less diverse metacognitive strategies while reading the "Support and Motor System" chapter.

Table 4 also shows that the metacognitive strategies used by the students who were studying in the private school, had "Very Good" and "Good" grade point averages and assessed the "Support and Motor System" chapter as "Very Easy" and "Easy" were higher in number and wider in variety when compared to those used by the students who were studying in the state school, had "Low" and "Very Low" grade point averages and assessed the chapter as "Moderately Difficult" and "Very Difficult".

When Table 3 and Table 4 are compared, it is seen that the metacognitive strategies used by the 6th grade students studying in the private school while reading the "Support and Motor System" chapter are higher in number and wider in variety than cognitive strategies. On the other hand, there is no significant difference between the cognitive and metacognitive strategies used by the 6th grade students studying in the state school while reading the chapter in terms of number and variety.

4. Conclusion and discussion

In this study, it can safely be concluded that the participant students from the private school showed better performance in contrast to those from the state school. The following discussions with references to findings and the related literature are helpful enough to conclude the research.

It was determined that S1, who was attending the private school, had a "Very Good" grade point average and assessed the chapter as "Very Easy", used the cognitive strategies of picturing in the mind, reading by following the words with coloured pencils, reading by underlining the words with coloured pencils, taking notes with coloured pencils, examining figures, comparing figures, rephrasing with his/her own sentences and reducing the reading speed while reading the "Support and Motor System" chapter; S2, who was studying in the private school, had a "Very Good" grade point average and assessed the chapter as "Easy", used the cognitive strategies of picturing in the mind, reading by following the words with highlighters, reading by underlining the words with highlighters, taking notes with highlighters, examining figures, comparing figures and rephrasing with his/her own sentences; and S3, who was studying in the private school, had a "Good" grade point average and assessed the chapter as "Easy", used the cognitive strategies of picturing in the mind, reading by following the words with coloured pencils, reading by underlining the words with coloured pencils, taking notes with coloured pencils, examining figures, comparing figures, rephrasing with his/her own sentences and reducing the reading speed. It was also found out that S5, who was studying in the state school, had "Low" grade point average and assessed the chapter "Moderately Difficult, used the strategies of reading by following the words with lead pencil, examining figures, repeating the words and reducing the reading speed while reading the chapter while S6, who was studying in the state school, had a "Very Low" grade point average and assessed the chapter as "Difficult", used the cognitive strategies of examining figures and repeating the words while reading the chapter.

O'Malley et al. (1985) reported that students used cognitive strategies such as repeating, examining sources, grouping, note-taking, drawing conclusions, combining, visualization, paraphrasing, association and inference while reading plain texts. Güral (2000) stated that foreign language students used the cognitive strategies of reading back, reading aloud, associating sentences, research, note-taking, stressing, underlining, review, finding the main idea, finding idioms, translation, finding tips, detailing, skipping, presentation, picturing in the mind, tracing reading and expressing differently while reading plain texts. Karaçam (2009) determined that students used the cognitive strategies of repeating the answer aloud, picturing in the mind, repeating the tips aloud, paraphrasing, defining piece by piece, note-taking, following the figure by reading and examining the figure after reading while solving open-ended and multiple-choice questions. Kumlu (2012) reported that the preservice teachers used the cognitive strategies of repeating the procedures within the text, examining the figure, visualization, paraphrasing, reading back and reviewing while reading the plain texts on photosynthesis and respiration. Finally, Diken and Yürük (2019) determined that the 9th grade students used the cognitive strategies of picturing in the mind, reading by following the words with a pencil, examining the figure, note-taking, paraphrasing, examining the figure and

reading by underlining the word while they were solving the multiple-choice questions in the field of science.

It was determined that S1, who was studying in the private school, had a "Very Good" grade point average and assessed the chapter as "Very Easy", used metacognitive strategies such as reading back, underlining the tips with coloured pencils, circling the tips with coloured pencils, taking notes with coloured pencils, taking notes on the figures with coloured pencils, putting marks on the figures with coloured pencils (star, arrow etc.), re-examining the figures, repeating the tips aloud, asking questions to himself/herself, accentuation, thinking over the text, reviewing and visualization while reading the "Support and Motor System" chapter; S2, who was studying in the private school, had a "Very Good" grade point average and assessed the chapter as "Easy", used the metacognitive strategies of underlining the tips with highlighters, circling the tips with highlighters, taking notes with highlighters, taking notes on the figures with highlighters, putting marks on the figures with highlighters (star, arrow etc.), re-examining the figures, repeating the tips aloud, asking questions to himself/herself, accentuation, reviewing and visualization while reading the chapter; and S3, who was studying in the private school, had a "Good" grade point average and assessed the chapter as "Easy", used the metacognitive strategies of reading back, underlining the tips with coloured pencils, circling the tips with coloured pencils, taking notes with coloured pencils, taking notes on the figures with coloured pencils, putting marks on the figures with coloured pencils (star, arrow etc.), re-examining the figures, thinking over the text and reviewing while reading the chapter.

It was also found out that S4, who was studying in the state school, had a "Low" grade point average and assessed the chapter as "Moderately Difficult" used the metacognitive strategies of circling the tips with lead pencil, reading by underlining the words with lead pencil, taking notes with lead pencil, re-examining the figures and asking questions to himself/herself while reading the chapter; S5, who was studying in the state school, had a "Low" grade point average and assessed the chapter as "Moderately Difficult", used the metacognitive strategies of underlining the tips with lead pencil, putting marks on the figures with lead pencil (star, arrow etc.) and re-examining the figures; and S6, who was studying in the state school, had a "Very Low" grade point average and assessed the chapter as "Difficult", used the metacognitive strategies of taking notes on the figures with lead pencil and re-examining the figures while reading the chapter.

O'Malley et al. (1985) reported that students used the metacognitive strategies of diverting one's attention, selective attention, self-management, planning and self-assessment while reading the plain texts. Güral (2000) stated that foreign language students used the metacognitive strategies of determining the level of knowledge, planning, implementation, monitoring whether the subject was understood, finding the problem and self-assessment while reading the plain texts. Karaçam (2009) reported that the students used the metacognitive strategies of reading back, asking questions, questioning the expectation of the question, reducing the reading speed, paraphrasing and establishing causal relations while solving open-ended and multiple-choice questions. Kumlu (2012) determined that the preservice teachers used the metacognitive strategies of underlining with highlighters, circling, underlining with lead pencil, thinking over the text, putting an arrow mark, putting a star mark, accentuation and circling while reading plain texts about photosynthesis and respiration. Finally, Diken and Yürük (2019) determined that the 9th grade students used the metacognitive strategies of reading back, underlining the tips, circling the tips, re-examining the figure, repeating the important points, asking questions to himself/herself, putting marks on the explanations in the question text and paraphrasing while solving multiple-choice questions in the field of science.

According to the results of the study, differently from the 6th grade students studying in the state school, 6th grade students attending the private school used the cognitive strategies of picturing in the mind, reading by following the words with coloured pencils, reading by underlining the words with coloured pencils, taking notes with coloured pencils, reading by following the words with highlighters, reading by underlining the words with highlighters, taking notes with highlighters and rephrasing with their own sentences. Furthermore, it was determined that, differently from the 6th grade students studying in the state school, 6th grade students attending the private school used the metacognitive strategies of reading back, underlining the tips with coloured pencils, circling the tips with coloured pencils, taking notes with coloured pencils, taking notes on the figures with coloured pencils, putting marks on the figures with coloured pencils (star, arrow etc.), underlining the tips with highlighters, circling the tips with coloured highlighters, taking notes with highlighters, putting marks on the figures with highlighters (star, arrow etc.), repeating the tips aloud, accentuation, reviewing and visualization.

In the present study, it was determined that the 6th grade students, who were studying in the private school, had "Very Good" and "Good" grade point averages and assessed the "Support and Motor System" chapter as "Easy" and "Very Easy", used a higher number and wider variety of cognitive and metacognitive strategies when compared to the 6th grade students, who were studying in the state school, had "Low" and "Very Low" grade point averages and assessed the chapter as "Moderately Difficult" and "Difficult". Grabe (1991) reported that good readers are more active in using metacognitive skills than those having reading problems. O'Malley and Chamot (1990) determined that the students having higher levels of learning motivation used a higher number and wider variety of strategies when compared to those with lower levels of motivation.

In this study, it was determined that the metacognitive strategies used by the 6th grade students, who were studying in the private school, had "Very Good" and "Good" grade point averages and assessed the "Support and Motor System" chapter as "Easy" and "Very Easy" were higher in number and wider in variety when compared to the cognitive strategies. Kumlu (2012) reported that the students used metacognitive strategies much more than the cognitive strategies while they were reading plain texts. On the other hand, in the present study, no significant different was found between the cognitive and metacognitive strategies used by the students, who were studying in the state school and had "Low" and "Very Low" grade point averages, in terms of number and variety. Gelen (2003) reported that individual factors (previous knowledge, cognitive skills of the student etc.), tactics and techniques (learning cognitive awareness techniques and factors developed by the student on an individual basis) and situational (or environmental) factors (family, cultural and social factors, course content etc.) affected the acquisition of metacognitive skills.

In line with the results of this study, cognitive and metacognitive strategies used by the students while reading different chapters can be examined. Also, cognitive and metacognitive strategies used by the 6th grade students can be taught to all students of this grade. In particular, secondary school students, for whom reading and reading comprehension are of paramount importance, can be informed about the use of cognitive and metacognitive strategies for reading science texts through reading activities with science texts. In this way, comprehension and awareness of students regarding the texts can be ensured and increased.

5. Conflict of Interest

The author declares that there is no conflict of interest.

6. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Anderson N (2003). Scrolling, clicking, and reading English: Online reading strategies in a second/foreign language. *The Reading Matrix, 3*(3), 1-33.

Ateşman, E. (1997). Measuring readability in Turkish. *TÖMER Language Journal, 58*, 171-174.

Ay, S. (2008). Reading strategies in foreign language: A case study with students having different dominant types of intelligence. *Language Journal, 141*, 7-88.

Babacan, T. (2012). *Examination of the relationship between the metacognitive reading strategies and multiple intelligence domains of preservice classroom teachers.* Unpublished Master's Thesis. Cumhuriyet University Institute of Education Sciences, Sivas.

Bayat, N., & Yüce, S. (2015). Impact of metaphoric paraphrasing in understanding science texts. *Journal of Language Education and Research, 1*(3), 1-14.

Baydık, B. (2011). A study on the use of metacognitive reading strategies by dyslexic students and reading comprehension teaching practices of their teachers. *Education and Science, 36*(162), 301-319.

Boekaerts, M. (1996). Self-regulated learning at the junction of cognition and motivation. *European Psychologist, 1*(2), 100-112.

Calp, M. (2005). *Turkish education as a domain of special teaching*, Konya.

Çakıroğlu, A. (2007). *Effect of the use of metacognitive strategies in increasing gain in the students with low level of success in reading comprehension.* Unpublished PhD Dissertation, Gazi University Institute of Education Sciences, Ankara.

Çelik, J. (1997). *Metacognitive knowledge and control in the use of reading comprehension strategies by freshman EFL students at Ankara University.* Master's Thesis, Bilkent University, Ankara.

Çiğdem, C., Balçık Minoğlu, G., & Karaca, Ö. (2018). *Support and Motor System.* (Kibar, S.F.) (Ed.). *MoNE 6th Grade Textbook* (s. 38-44). Sevgi Publishing, Ankara.

Diken, E. H. (2014). *Identification of cognitive and metacognitive strategies used by 9th grade high school students while solving multiple choice science questions*. Unpublished PhD Dissertation, Gazi University, Ankara.

Diken, E. H., & Yürük, N. (2019). Determination of the cognitive and metacognitive strategies used by the 9th grade students before, during and after the solution of multiple-choice questions in the field of science. *Journal of Human and Social Science Research, 8*(2), 1071-1099.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive developmental inquiry. *American Psychologist, 34*(10), 906-911.

Gelen, G. (2003). *Effect of cognitive awareness strategies on the attitudes, reading comprehension and permanence in the Turkish course.* Unpublished PhD Dissertation, Çukurova University Institute of Social Sciences, Adana.

Grabe, W. (1991). Current developments in second language reading research. *TESOL Quarterly,* 25(3), 375-406.

Güçlüer, E., & Kesercioğlu, T. (2010). Effect of the use of activities for science literacy in the science and technology course on the student success. *Journal of New World Sciences Academy, 5*(2). 446-455.

Güngör, A. (2005). The levels of sixth, seventh and eighth grade students for using reading comprehension strategies. *Hacettepe University Journal of Education Faculty, 28,* 101-108.

Hall, K., Bowman, H., & Myers, J. (1999). Tasks, texts and contexts: A study of reading and metacognition in English and Irish primary classrooms. *Educational Studies, 25*(3), 311-325.

Hamdan, A. R., Ghafar, M. N., Sihes, A. J., & Atan, S. B. (2010). The cognitive and metacognition reading strategies of foundation course students in Teacher Education Institute in Malaysia. *European Journal of Social Sciences, 13*(1), 133–144.

Karaçam, S. (2009). *Examination of students' conceptual comprehension and use of cognitive and metacognitive strategies in the solution of questions on the subjects of force and motion by considering the question types.* Unpublished PhD Dissertation, Gazi University Institute of Education Sciences, Ankara.

Karakaya, F., Uzel, N., Gül, A., & Yılmaz, M. (2019). Pre-service teachers' levels of preparedness to teach. *Gazi University Journal of Gazi Educational Faculty, 39*(1), 373-396.

Köse Özay, E. (2009). Readibility levels of the texts related to cell in the 9th grade biology textbook. *Çankaya University, Faculty of Arts and Science, Journal of Arts and Sciences, 12,* 141-150.

Kumlu, G. D. (2016). *Examination of the effect of direct or peer education on the conceptual comprehension of preservice science teachers on the subject of heat-temperature in terms of reading strategies.* Unpublished PhD Dissertation, Gazi University Institute of Education Sciences, Ankara.

MoNE (2018). *Ministry of National Education Science Course Curriculum,* Ankara. Retrieved from http://mufredat.meb.gov.tr/dosyalar/201812312311937-fen%20programı2018.pdf on 24.02.2020.

MoNe (2019). *Ministry of National Education Regulation on Secondary Education Institutions.* Retrieved from http://mevzuat.gov.tr/Dosyalar/7.5.19912.pdf on 24.02.2020.

Oluk, S., & Başöncül, N. (2009). Levels of the 8th grade students in using metacognitive reading strategies and its impact on the success levels in science-technology and Turkish courses. *Kastamonu Education Journal, 17*(1), 183-194.

O'Malley, J. M., Chamot, A. U., Stewner-Manzanares, G., Russo, R. P., & Küpper L. (1985). Learning strategy applications with students of English as a second language. *TESOL Quarterly, 19*(3), 557-584.

O'Malley, J.M., & Chamot, A. U. (1990). *Learning strategies in second language acquisition.* Cambridge: Cambridge University Press.

Öz, F. (2003). *Turkish Education in Practice,* Anı Publishing, Ankara.

Padron, Y. N. (1992). The effect of strategy instruction on bilingual students' cognitive strategy use in reading. *Bilingual Research Journal, 16*(3-4), 35–51.

Sever, S. (2004). *Turkish education and full learning*, Ankara.

Sonleitner, C. L. (2005). *Metacognitive strategy use and its effect on college biology students' attitude toward reading in the content area.* Master's Thesis, Oklahoma State University, Stillwater, Oklahoma.

Topuzkanamış, E., & Maltepe, S. (2010). Preservice teachers' use of reading comprehension and reading strategies. *Turkish Science Research, 46*(27), 655-677.

Patton, M.Q. (2002). *Qualitative research and evaluation methods* (3nd Ed.). Thousand Oaks, CA: Sage Publications.

Yilmaz, M., Gündüz, E., Çimen, O., & Karakaya, F. (2017). Examining of biology subjects in the science textbook for grade 7 regarding scientific content. *Turkish Journal of Education, 6*(3), 128-142.

Yin, R. K. (2003). *Case study research: design and methods* (3nd Ed.). Thousand Oaks, CA: Sage.

Yore, L. D. (1986, Mart-Nisan). *What research says about science textbooks, science reading and science reading instruction: A research agenda.* Paper presented at the NARST Annual Conference, San Francisco, CA.

Yore, L. D., Craig, M. T., & Maguire, T. O. (1998). Index of science reading awareness: An interactive-constructive model, test verification, and grades 4-8 results. *Journal of Research in Science Teaching, 35*(1), 27-51.

Yore, L. D., Bisanz, G. L., & Hand, B. M. (2003). Examining the literacy component of science literacy: 25 years of language arts and science research. *International Journal of Science Education, 25*(6), 689-725.

Şimşek, İ., Uygun, T. & Güner, P. (2020). Problem-solving performance and mathematics achievement: The mediating role of eye tracking measurements. *International Online Journal of Education and Teaching (IOJET)*, *7*(3). 1111-1124. https://iojet.org/index.php/IOJET/article/view/828

Received: 10.02.2020
Received in revised form: 19.05.2020
Accepted: 21.05.2020

PROBLEM-SOLVING PERFORMANCE AND MATHEMATICS ACHIEVEMENT: THE MEDIATING ROLE OF EYE TRACKING MEASUREMENTS

Research article

İrfan Şimşek
irfan@istanbul.edu.tr

Tuğba Uygun,
Alanya Alaattin Keykubat University
tugba.uygun@alanya.edu.tr

Pınar Güner
Istanbul University - Cerrahpasa
pinar.guner@istanbul.edu.tr

İrfan Şimşek is an associate professor at Istanbul Univeristy – Cerrahpasa, Hasan Ali Yucel Faculty of Education, Computer Education & Intstructional Technologies Department.

Tuğba Uygun is an assistant professor at Alanya Alaattin Keykubat Univeristy, Faculty of Education, Mathematics and Science Education Department, Teaching Mathematics.

Pınar Güner is an associate professor at Istanbul Univeristy – Cerrahpasa, Hasan Ali Yucel Faculty of Education, Mathematics and Science Education Department, Teaching Mathematics.

PROBLEM SOLVING PERFORMANCE AND MATHEMATICS ACHIEVEMENT: THE MEDIATING ROLE OF EYE TRACKING MEASUREMENTS

İrfan Şimşek

irfan@istanbul.edu.tr

Tuğba Uygun,

tugba.uygun@alanya.edu.tr

Pınar Güner

pinar.guner@istanbul.edu.tr

Abstract

The purpose of the present study was to propose a model for mathematics achievement considering the mediating role of eye tracking measurements in the relationship between problem solving performance and mathematics achievement. In this sequential explanatory mixed method research design, a geometry test was conducted to 381 7th grade students. Their problem-solving process was recorded using eye tracking technology. Also, their mathematics achievement scores were acquired from their schools. Afterwards, semi-structured interviews were conducted to 15 students. Based on the results, it was observed that there was a positive relationship among problem-solving performance and mathematics achievement while eye tracking measurements were negatively correlated to problem solving performance and mathematics achievement. Qualitative findings also confirmed these results. Moreover, the hypothesized model could approximately express 22% of the variance on mathematics achievement.

Keywords: eye tracking, mathematics achievement, problem solving, students

1. Introduction

Problem solving is composed of actions performed through exploration of a path beginning at a problem statement to reach the anticipated goal (Dhillon, 1998; Jackson, 1975). In this respect, problem solving taking place in mathematics lessons as in many disciplines have effects and reflections on individuals' real life. The more equipped with problem solving the students become through the lessons, the more successful they are to face with and remove complex problems in their real life outside the school (Irwanto, Saputro, Rohaetti, & Prodjosantoso, 2018).

Problem solving is critical in mathematics education taking place at the core of the teaching process (NCTM, 2000). Moreover, previous researches show that students' problem-solving performance is in connection with their academic achievement in the lessons (Aka, Guven & Aydogdu, 2010; Cheng, She & Huang, 2018; Gok, 2014; Hu, Xiaohui & Shieh, 2017; Saputro, Irwanto, Atun & Wilujeng, 2019). This connection can be emphasized by the quote "You do not know anything until you have practiced" by R. P. Feynman because problem solving provides the opportunity of testing the knowledge that the students acquire. Also, in problem solving, the students make searching to create new strategies and paths to reach a solution using

previously learned knowledge rather than applying the learned rules simply (Woolfolk, 1993). In this respect, it can be stated that problem solving performance can be an indicator to estimate the students' achievement. Furthermore, it is stated that the performances that the students represent through problem solving can provide information about their conceptual understanding of the content and achievement in the lessons (Gok, 2014). Moreover, Serway and Beichner (2000) strongly insist on the usage of problem solving to test the students' knowledge in order to make them acquire the necessary knowledge about the concept and represent academic achievement.

In the process of examination of individuals' problem-solving processes, the solution paths and the results are examined simultaneously in order to extract their problem solving performance, and their views about the process may provide more information about the context. In this process, the individuals may be blocked in some parts of the problem or the solution. Sometimes, they could not explicitly explain this case and the reasons for their difficulty that can prevent to perform effective feedback and hint and to represent their coping behaviors explicitly. The researchers suggest benefiting from eye tracking measures in the cases including these opaque problem-solving processes by collecting data about the individuals' visual attention using temporal and spatial resolutions while they engage in solving problems (Rayner, 1998). In this respect, the problem-solving performance can be examined in detail in a different perspective with the help of eye tracking proposing attention-related evidences for the problem solving processes (Johnson & Mayer, 2012). Moreover, the mathematical achievement that the students represent their mathematical conceptualization can be referred to their cognitive processes. In this respect, eye tracking can be beneficial since by enhancing the exploration of cognitive structures and processes because the related literature have showed that how individuals behave can be explained by considering what they think (Hyöna, 2010; Jang et al., 2014; Jarodzka, Scheiter, Gerjets, & Van Gog, 2010; Mayer, 2010). To line with this view, eye tracking methods can suggest detail and holistic view to represent the mental operations, the cognitive processes and the actions occurring in individuals' mind focusing on their visual attention (Andrá et al, 2015; Johnson & Mayer, 2012; Obersteiner & Tumpek, 2016).

1.1. Problem Solving Performance, Mathematics Achievement and Eye Tracking

Problem solving is an important indicator of achievement in the lessons performs through cognitive processes and goal-directed actions necessitating mental representations and decision making (Metallidou, 2009; Simon & Simon, 1978). Polya (1945) describes problem solving process as linear and hierarchical. In this process, the individuals are expected to keep previously acquired information in working memory, take back schema from long-term memory and glide their visual attention on important parts (Kester, Kirschner, & van Merrienboer, 2005). To line with this view, it can be stated that cognitive and mental operations are necessitated in solving problems. At that point, eye tracking can provide beneficial information about this process (Andrá et al, 2015; Jacob & Karn, 2003; Obersteiner & Tumpek, 2016; Rayner, 1998). Measurements acquired through eye tracking can provide information about the actions and individuals' thinking in solving problems. For example, fixation as a kind of eye tracking measurement can inform researchers about the problem solvers' cognitive attention and difficulty and the increase in fixation measurements can be interpreted as having difficulty in solving the problem at particular stages (Andra et al., 2015; Epelboim & Suppes, 2001; Jacob & Karn, 2003; Liversedge & Findlay, 2000). In this respect, eye tracking can provide information in direct connection with problem solving performance.

In solving problems by going through the stages, the students may have difficulty. The previous researches explain that the students' difficulty in solving problems may reason from

insufficient previous knowledge such as not knowing the hierarchical relationship among quadrilaterals, perceptual issues such as not recognizing the geometrical shapes appropriately and inability to make reasoning about the content and process accurately and sufficiently (Bransford, Sherwood, Vye, & Rieser, 1986; Cooper & Sweller, 1987; Lin & Lin, 2014). Based on this given explanation, two implications can be made. Firstly, the problem-solving performance and process is directly related to their understanding of the content and also mathematics achievement. Secondly, problem solving process includes the actions affected by perceptual actions and visual attention. To line with this view, the students can focus on important parts of the problem and perform a cognitive process including decision making and reasoning by visual attention. Hence, it can be stated that problem solving process giving information about the students' achievement can be explored through eye tracking. By this view, there exist research exploring the individuals' actions through the problem-solving stages (Knoblich, Ohlsson & Raney, 2001; Thomas & Lleras, 2007). Previous research show that eye tracking provides information about the individuals' relational schemata and thinking, reasoning and difficulty in understanding and engaging in achievement tests (Muldner & Burleston, 2015; Schindler et al., 2016; Tsai, Hou, Lai, Liu & Yang, 2012; Thomas & Lleras, 2007).

Based on the given explanations and the research showing that there is direct relationship between problem solving performance and achievement regarding visual attention and cognitive operations, it can be stated that eye tracking can take a role in the relationship between problem solving performance and mathematics achievement. Moreover, there exist previous research in the related literature providing information about the relationship between problem solving and mathematics achievement. The current study differentiates from these researches by focusing on the mediating role of eye tracking on the direct relationship between problem solving performance and mathematics achievement. In other words, the purpose of the current study is to explore whether eye tracking has a mediating role on problem solving performance and mathematics achievement by providing the theoretical model of these explained variables represented in Figure 1.

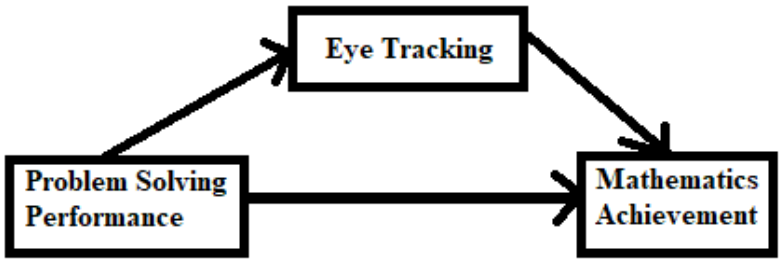


Figure 1. The theoretical model for the relationship between problem solving performance, mathematics achievement

In order to examine the theoretical model explained in Figure 1, the mediating role of the construct of eye tracking is focused on. In the literature, eye tracking has been explored by various measurements proposed by eye tracking technology and used for the implementation of visual attention and cognitive actions based on eye-mind assumption (Just & Carpenter, 1980). For example, fixation duration which refers to the period of time that the eyes focus on zone and provides information about visual attention and difficulty in cognitive processes (Andra et al., 2015; Epelboim & Suppes, 2001; Jacob & Karn, 2003; Lin & Lin, 2014). This issue is emphasized by the statement "what a person looks at is assumed to indicate the thought 'on top of the stack' of cognitive processes" (Jang et al., 2014, p. 318). In this respect, longer

fixation duration can be interpreted as the existence of complex context, difficulty in conceptualizing and deeper reasoning. Another measurement is glance duration provides information about visual distraction and perception load. The increase on glance duration while engaging in a problem or task can be interpreted as the existence of visual distraction (Bao, Kiss, & Wittmann, 2002; De Waard, 1996; Noy, Lemoine, Klachan, & Burns, 2004). Based on these explanations, it is necessitated to determine the variables included in the construct of the eye tracking. Hence, in the current study, this construct was analyzed by considering the variables of fixation time, dwell time, glance duration and diversion duration by confirmatory factor analysis.

1.2. Theoretical foundations and theoretical framework of research

In information processing theory, the knowledge is acquired through the processes including paying attention to, perceiving, storing in mind, remembering. The individuals receiveexternal stimuli with their hands, eyes or ears and records these stimulants but a few of them switch into short-term memory with the help of selective perception. The new information obtained in this way is compared with the information acquired previously and stored in long-term memory and then stored by being organized (Simon & Simon, 1978). Previous research show encouragement and description of the processes and actions about decision making, learning and problem solving by information processing theory (Peterson, Sampson, Reardon, &Lenz, 1996; Sampson, Peterson, Lenz &Reardon, 1992). Given these explanations show that visual attention can have important role in learning, problem solving and performing the tasks (McGivney & DeFranco, 1995; Simon & Simon, 1978). In this respect, eye tracking can provide a contribution to information processing theory by examining cognitive processes focusing on visual attention and behaviors of the eyes. Hence, the current study has been organized with the purpose that eye tracking related to visual attention can provide useful information about detailing and explaining the students' problem solving and mathematics achievement.

2. Method

In order to examine the connections of the variables of problem-solving performance, eye tracking measurements and mathematics achievement and provide a mediational model explaining the mediating role of eye tracking measurements in the relationship between problem solving performance and mathematics achievement in detail, the present study was carried out based on sequential explanatory mixed method research design. In this research design, the quantitative data dominates on the qualitative data and qualitative data is used in order to comprehend and implement the quantitative data more clearly in detail (Creswell, 2013). In this respect, the quantitative data was used in order to establish the relationships among problem solving performance, eye tracking measurements and mathematics achievement and provide a mediational model. Afterward, the qualitative data were used in order to detail and look at the relationships among variables with respect to holistic perspective.

2.1. Participants

In the quantitative part of the study, the multiple-choice and matching geometry test was conducted to 381 seventh grade students who were selected by the typical sampling strategy. In this respect, 5 schools from low, middle and high socioeconomic level districts of İstanbul were selected. These students participated in the process of solving problems on the test. Afterwards, in the qualitative part of the study, 15 students different from these 381 students were selected based on cluster sampling strategy. With respect to this sampling strategy, three students were identified from each school. These students' problem-solving processes were not

recorded via eye tracking technology. Hence, quantitative data belonged to these students were not collected. They were conducted to semi-structured interviews.

2.2. Data Collection

In the data collection process, in order to collect quantitative data about the students' problem solving performance, a test was prepared based on the common geometrical subjects that the students had misconception and difficulty by a group of researchers having Ph.D.degree in mathematics education and teaching technology. The questions were prepared about the angle and angle measure (Devichi ve Munier, 2013; Doyuran, 2014), the concept and definition of polygon (Akuysal, 2007), triangle (Clements et al., 1999; Tsamir, Tirosh & Levenson, 2008; Tsamir, Tirosh, Levenson, Barkai & Tabach, 2014), triangle and altitude of triangles (Alatorre & Saiz, 2010; Uygun & Akyuz, 2019; Hershkowitz, 1990), quadrilaterals and their hierarchical relationship (Monaghan, 2000; Pickreign, 2007; Erez & Yerushalmy, 2006; Fujita & Jones, 2008), and prism and opening form of geometric solids (Gökkurt, Şahin, Soylu & Doğan, 2015; Tsamir et al., 2014). Mathematics middle school curriculum, geometry textbooks and studies about geometrical misconceptions in the literature were examined before the construction of the test. Eight multiple-choice questions and one matching question in the test (see Appendix for sample questions) were represented to the students using web 2.0 tools on a computer screen. The maximum score that the students could acquire for each question was 1 and the minimum score was 0. They answered the questions on the test one by one. They identified the correct answers by distinguishing them from irrelevant items. After completing the selection of relevant items of the question, they moved to the next question. The students' scores for each question was determined and analyzed separately.

During the process of answering, eye tracking data was recorded by SMI Experiment 2 to represent visual stimuli. The scores of eye tracking measurements were collected for each question for each student separately. Hence, 3081 scores for problem solving performance and eye tracking measurements could be acquired. The process of students' problem solutions through eye tracking technology was illustrated in Figure 2. The data collected through eye tracking technology were analyzed and reported using BeGaze program. By this vehicle and program, the measurements of fixation duration, fixation dispersion, saccade duration and blink duration were collected. Then, in order to acquire the quantitative data belonged to each question provided by each student, an eye tracking measurement was calculated by getting the mean value using the measurements of fixation duration, fixation dispersion, saccade duration and blink duration. Afterward, in order to collect data about students' mathematics achievement, their mathematics grades that they acquired in the previous semester for their mathematics lessons were taken from their schools.

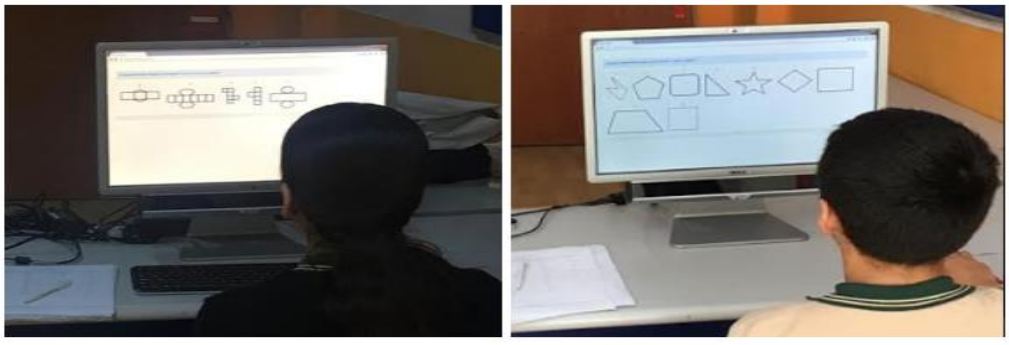


Figure 2. An illustration for data collection process by eye tracking

2.3. Data Analysis

In the quantitative data analysis, descriptive statistics, Pearson's correlation method, an approach based on Ordinary Least Squares Regression, and Bootstrapping were used. Mahalanobis distance values were calculated and no extreme outliers were found. To check normal univariate distribution, the values of kurtosis and skewness were calculated. The results showed acceptable ranges in the region of -1.5 to +1.5 (as shown in Table 1), it was implemented that the students' scores for the variables tended to show the normal distribution (Tabachnick & Fidell, 2013).

In the present study, a mediation model (Preacher & Hayes, 2008, p. 880), was performed with the help of mediating analysis. Hayes (2009) explains "if zero is not between the lower and upper bound, then the analyst can claim that the indirect effect is not zero with ci% confidence" (p. 412). In order to find stronger mediators and specific indirect of the variables, a contrast test was used. The Bootstrapping analyses were performed based on "Mediation Model 4" using PROCESS Macro 3 through IBM SPSS 24.0 (Hayes, 2012/2013) with the statistical significance p-value of .05.

In the qualitative part of the present study, 15 students were conducted to semi-structured interviews. The questions such as "Why and how did they select or eliminate the particular options?, How did they spend their time in solving problems?" were asked to the students. Each interview lasted approximately 30 minutes and were recorded by audio recordings. After completing the interviews, the audio recordings were transcribed verbatim and related quotations were given in the results.

3. Results

3.1. Descriptive Statistics and Correlations

In order to examine the relationship among the variables of problem-solving performance, mathematics achievement and eye tracking measurement, Pearson's correlation coefficients were calculated and represented in Table 1. The values of mean, standard deviation, skewness and kurtosis belonged to these variables, and correlation values for the relationships among these variables were illustrated in Table 1.

Table 1. *Descriptive statistics and bivariate correlations among variables*

Variables	Mean	Sd.	Skewness	Kurtosis	1	2	3
1. Problem Solving Performance	.46	.36	.22	.44	--		
2. Eye Tracking	977.28	313.61	1.21	1.41	-.35**	--	
3. Mathematics Achievement	67.60	22.47	-1.28	-1.19	.63**	-.45*	--

N=3081, *p<.05, **p<.01.

In Table 1, it is observed that there exist statistically significant relationships among the variables based on Bivariate correlations (Table 1). In other words, Table 1 illustrates that eye tracking is negatively correlated to mathematics achievement and problem solving performance while problem solving performance and mathematics achievement are positively correlated.

3.2. Mediation Model Analyses

When the mediating effect of eye tracking measurements was tested in the relationship between problem solving performance and mathematics achievement, the mediational model could be proposed. The findings of this mediational model explaining the mediating role of eye tracking measurements in the relationship between problem solving performance and mathematics achievement are presented in Figure 3.

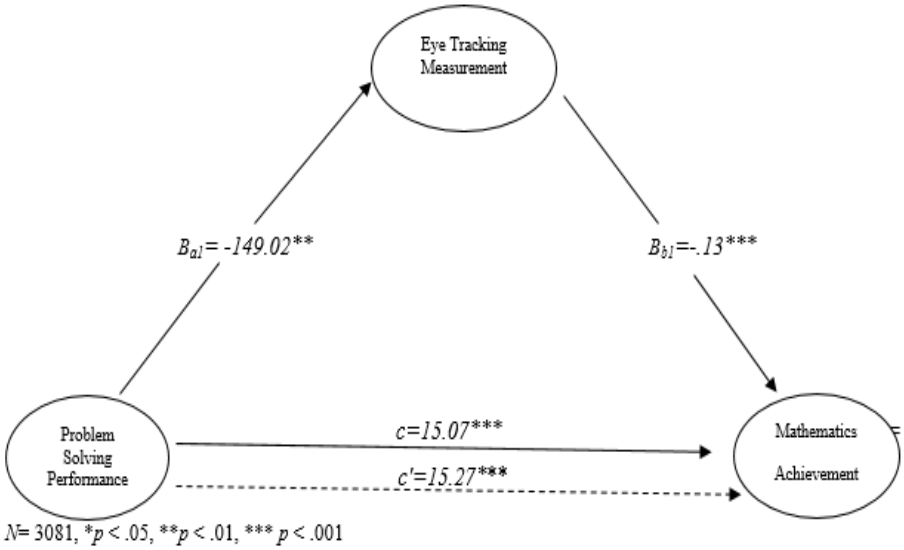


Figure 3. The Mediating Role of Eye Tracking Measurements in the Relationship between Problem Solving Performance and Mathematics Achievement

The mediational model proposed in the present study is illustrated in Figure 3. The total effect of problem solving performance on mathematics achievement is statistically significant (c = 15.07, SE = 1.08, t = 13.92, p < .001) (step 1). The direct effect of problem-solving performance on eye tracking measurements is statistically significant (B = -149.02, SE= 48.46, t= -3.07, p < .01) (step 2). The direct effect of eye tracking on mathematics achievement is statistically significant (B = -.13, SE= .04, t= -3.29, p < .01) (step 3). When problem solving performance and mediating variable eye tracking measurements have been taken simultaneously (Step 4), the relationship between problem solving performance and mathematics achievement has increased and the significance value has remained at the same level (c'= 15.27, SE= 1.08, t = 14.11, p < .001). This coefficient is also statistically significant. According to this result, eye tracking measurement is partially mediated in the relationship between problem solving performance and mathematics achievement. These results provide the mediational hypothesis and the model is significant (F(2-3079), p < .001) by explaining approximately 22% of the variance on mathematics achievement.

3.3. Problem Solving Performance and Mathematics Achievement: The Mediating Role of Eye Tracking Measurement

The findings belonged to the comparisons of the total, direct and specific indirect effects of problem-solving performance on mathematics achievement through eye tracking measurements are illustrated in Table 2.

Table 2. *The findings on the mediating role of eye tracking measurements in the relationship between problem solving performance and mathematics achievement*

			Product of Coefficients		**Bootstrapping 95% BCa Confidence Interval**	
Effects	**Point Estimate**	**SE**	***t***	***p***	**Lower**	**Upper**
Indirect	-.20	.10	-	-	-.4142	-.0401
Total	15.0738	1.0725	13.9244	.0000	12.9512	16.1964
Direct	15.2708	1.0825	14.1072	.0000	13.1483	13.7533

Note: *N*= 3081, *k* = 5000, *p < .05, ** p < .01, ***p < .001, *BCa*: Bias corrected and accelerated 5000 bootstrap samples

The indirect effect was explored with the help of bootstrapping with 5000 bootstrap samples. The estimates were considered within 95% confidence interval and bias corrected and accelerated results are illustrated in Table 2. The results illustrated in Table 2 emphasize that the indirect effect (the difference between the total and direct effects /c-c') of problem solving performance through eye tracking measurements on mathematics achievement is statistically significant (point estimate= -.20 and 95% BCa CI [-.4142, -.0401].

3.4. Qualitative Findings

Based on the findings of the qualitative data analysis, students' explanations provided evidence and strength for the quantitative findings representing the relationship among the variables of mathematics achievement, problem solving performance and eye tracking measurement and proposed mediation model. For example, a student not liking mathematics made an explanation as follows:

"Mathematics is so difficult for me. My mathematics grades are low. In solving mathematical problems, I had difficulty. Even if I can understand the concepts, I cannot solve problems. I usually look at the problems, focus on it and think about it. Still, I cannot solve it."

Another student liking mathematics made explanation as follows:

"I like mathematics and solving problems, especially about geometric solids. When I face with geometry problems, I spend short time in solving problems that I can understand and solve easily. When I have difficulty in solving problems, these problems are usually about the concepts that I cannot comprehend effectively. Generally, this case can decrease my grade when the exam includes problems with these concepts."

Moreover, it was observed that the students having low scores of problem solving performance were likely to have low scores of mathematics achievement. Hence, a student having low scores of mathematics problem solving performance and mathematics achievement had difficulty in answering the question about the altitude of a triangle. This student answered this question incorrectly. She made her choices based on the idea that the altitude had to be perpendicular to the side. She could not identify the altitudes of obtuse angled triangles. Moreover, she spent much time while answering this question. Hence, it can be stated that this student got higher scores of eye tracking measurements.

4. Discussion and Conclusion

Based on the quantitative findings of the current study, it was observed that problem solving performance and mathematics achievement were positively correlated. Moreover, the qualitative findings acquired through the analysis of semi-structured interviews supported evidence and strength for this relationship. This finding can be provided by previous research emphasizing the connection of problem-solving performance to academic achievement in their lessons in the literature (Aka, Guven & Aydogdu, 2010; Cheng, She & Huang, 2018; Gok, 2014; Hu, Xiaohui & Shieh, 2017; Saputro, Irwanto, Atun & Wilujeng, 2019). In the literature, there have been many researches exploring the effects of problem solving performance. These research state that problem solving performance is an important factor related to students' achievement and conceptual understanding (Gok, 2014; Serway & Beichner, 2000). Hence, it can be claimed that problem solving performance can serve as an important predictor for mathematics achievement with respect to the findings of the present study.

Based on the findings, it was observed that eye tracking measurements were negatively correlated with these variables. Moreover, qualitative findings acquired through semi-structured interviews encouraged the expressed the connection of eye tracking measurements to the variables of problem-solving performance and mathematics achievement. The finding of the relationship between problem solving performance and eye tracking measurements can be confirmed by previous research (Johnson & Mayer, 2012; Rayner, 1998) providing attention-related evidences for the problem-solving processes with the help of eye tracking measurements. The eye measurements can provide information and serve as an indicator to interpret the difficulty of the students experiencing in solving problems. For example, the more score of eye fixation duration a student gets, the more difficulty the student has in solving problem (Andra et al., 2015; Epelboim & Suppes, 2001; Jacob & Karn, 2003; Liversedge & Findlay, 2000). Hence, it can be claimed that eye tracking measurements can provide information about the students' problem-solving process and difficulty. In addition, it was observed that there was a statistically significant negative relationship between eye tracking measurements and achievement in the context of mathematics. This finding can be confirmed by the results of the previous research (Muldner & Burleston, 2015; Schindler et al., 2016; Tsai, Hou, Lai, Liu & Yang, 2012; Thomas & Lleras, 2007) stating the connection of eye tracking measurements and academic achievement. Hence, it can be stated eye tracking measurements can serve as an important predictor for academic achievement in the context of mathematics.

It was also shown that eye tracking measurements has mediating role in the relationship between problem solving performance and mathematics achievement and this hypothesized mediation model could approximately express 22% of the variance on mathematics achievement. This model can be confirmed by the studies of Andrá and colleagues (2015), Johnson and Mayer (2012), Just and Carpenter (1980), Obersteiner and Tumpek (2016) emphasizing the beneficial role of eye tracking to represent the students' mental operations, cognitive processes and actions occurring in their minds focusing on their visual attention through solving problems and engaging in achievement tests. Hence, this study can provide beneficial contribution to the literature. The present study differentiates from previous research since it reported the direct relationship of eye tracking measurements with the variables of problem solving performance and mathematics achievement, and their mediating role on these variables. It also differentiates by detailing these relationships with the help of qualitative findings.

5. Limitations and Implications

There exist some limitations in the present study. The participants of the present study were composed of 7th grade students. Moreover, the relationships among the variables were examined in the study. Further research can be conducted to the students from different grade levels and the causality considering the variables of the study can be explored by designing experimental and longitudinal research. Moreover, further research can be performed by using different comprehensive and detailed mathematics tests appropriate for all middle level grade students. The context of further research can also be narrowed down considering the learning areas of mathematics such as algebra, data analysis. Moreover, the present study can contribute to the teachers by representing the connection of visual attention and cognitive process to problem solving performance and academic achievement with the help of eye tracking technology. Therefore, they can analyze their students' visual attention in problem solving processes in order to make a prediction about and help their students increase their problem solving performance and academic achievement. Moreover, by emphasizing the relationship between problem solving performance and mathematic achievement, the teachers can help their students increase their problem-solving performance by providing them with opportunities to solve problems. Hence, students can improve their mathematics achievement. Moreover, the findings can make beneficial contribution to the literature about problem solving and academic achievement using eye tracking by proposing the mediation model. Moreover, teacher educators can educate preservice teachers to consider their students' visual attention to predict and increase the students' problem-solving performance and academic achievement.

6. Conflict of interests

The authors declare that there is no conflict of interest.

7. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Aka, E. İ., Güven, E. & Aydoğdu, M. (2010). Effect of problem solving method on science process skills and academic achievement. Journal of Turkish Science Education, 7(4), 13–25.

Akuysal, N. (2007). İlköğretim 7. sınıf öğrencilerinin 7. sınıf ünitelerindeki geometrik kavramlardaki yanılgıları. Yayınlanmamış yüksek lisans tezi, Selçuk Üniversitesi, Konya.

Alatorre, S., & Saiz, M. (2009). Teachers and triangles. Proceedings of Congress of Educational Research in Mathematics Education. 28 January- 1 February, Lyon; France.

Andrá, C., Lindström, P., Arzarello, F., Holmqvist, K., Robutti, O., & Sabena, C. (2015). Reading mathematics representations: an eye-tracking study. International Journal of Science and Mathematics Education, 13(2), 237–259.

Bao, Y., Kiss, M., & Wittmann M. (2002). Effects of age and memory grouping on simulated car driving. In Proceedings of the Human Factors and Ergonomics Society 46th Annual Meeting (pp. 1853-1857). Santa Monica, CA: Human Factors and Ergonomics Society.

Bransford, J., Sherwood, R., Vye, N., & Rieser, J. (1986). Teaching thinking and problem solving: Research foundations. American Psychologist, 41(10), 1078–1089.

Cheng, S. C., She, H. C., & Huang, L. U. (2018). The Impact of Problem-Solving Instruction on Middle School Students' Physical Science Learning: Interplays of Knowledge, Reasoning, and Problem Solving. *EURASIA Journal of Mathematics, Science and Technology Education*, *14*(3), 731-743.

Clements, D., Swaminathan, S., Hannibal, M., & Sarama, J. (1999). Young children's concepts of shape. *Journal for Research in Mathematics Education, 30*(2), 192–212.

Cooper, G., & Sweller, J. (1987). Effects of schema acquisition and rule automation on mathematical problem solving transfer. Journal of Educational Psychology, Vol 79(4), 347-362.

Creswell, J. W. (2013). Qualitative inquire and research design: Choosing among five approaches. Los Angeles, CA: Sage.

Devichi, C., & Munier, V. (2013). About the concept of angle in elementary school: misconceptions and teaching sequences. *Journal of Mathematical Behavior, 32,* 1–19.

De Waard, D. (1996). The measurement of drivers' mental workload. Groningen, the Netherlands: Traffic Research Center Groningen University.

Dhillon, A. S. (1998). Individual differences with problem-solving strategies used in physics. Science Education, 82(3), 379–405.

Doyuran, G. (2014). *Ortaokul öğrencilerinin temel geometri konularinda sahip olduklari kavram yanilgilari.* Yayımlanmamış yüksek lisans tezi, Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü, İzmir.

Epelboim, J., & Suppes, P. (2001). A model of eye movements and visual working memory during problem solving in geometry. Vision Research, 41(12), 1561-1574.

Erez, M. & Yerushalmy, M. (2006). If you can turn a rectangle into a square, you can turn a square into a rectangle: young students' experience the dragging tool. *International Journal of Computers for Mathematical Learning, 11*(3), 271-299.

Fujita, T. & Jones, K. (2008). Learners' understanding of the definitions and hierarchical classification of quadrilaterals: Towards a theoretical framing. *Research in Mathematics Education, 9*(1), 3–20.

Gok, T. (2014). Students' Achievement, Skill and Confidence in Using Stepwise Problem Solving Strategies. *Eurasia Journal of Mathematics, Science & Technology Education, 10*(6), 617-624.

Gokkurt, B., Şahin, Ö., Soylu, Y. & Doğan, Y. (2015). Pre-service teachers' pedagogical content knowledge regarding student mistakes on the subject of geometric shapes. *Elementary Education Online, 14*(1), 55-71.

Hayes, A. F. (2009): Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. Communication Monographs, 76(4), 408-420. doi:10.1080/03637750903310360

Hayes, A. F. (2012). Process: A versatile computational tool for observed variable mediation, moderation, and conditional process modelling. Retrieved from http://www.processmacro.org/download.html

Hayes, A. F. (2013). Introduction to mediation, moderation, and conditional process analysis A regression based approach. USA: The Guilford Press.

Hershkowitz, R. (1990). Psychological aspects of learning geometry. In P. Nesher & J. Kilpatrick (Eds.), *Mathematics and cognition* (pp. 70–95). Cambridge, UK: Cambridge University Press.

Hu, R., Xiaohui, S., & Shieh, C. J. (2017). A study on the application of creative problem solving teaching to statistics teaching. Eurasia Journal of Mathematics, Science and Technology Education, 13(7), 3139–3149.

Hyönä, J. (2010). The use of eye movements in the study of multimedia learning. Learning and Instruction, 20, 172–176.

Jackson, K. L. (1975). The art of problem solving. London: Heinamann, Bk. Ltd.

Jacob, R. J. K. & Karn, K. S. (2003). Eye Tracking in Human—Computer Interaction and Usability Research: Ready to Deliver the Promises. In R. Radach, J. Hyona, & H. Deubel (Eds.). The mind's eye: Cognitive and applied aspects of eye movement research. Elsevier.

Jang, Y.-M., Mallipeddi, R., & Lee, M. (2014). Identification of human implicit visual search intention based on eye movement and pupillary analysis. User Modeling and User-Adapted Interaction, 24(4), 315–344.

Jarodzka, H., Scheiter, K., Gerjets, P., & van Gog, T. (2010). In the eyes of the beholder: How experts and novices interpret dynamic stimuli. Learning and Instruction, 20(2), 146-154.

Johnson, C. I., & Mayer, R. E. (2012). An eye movement analysis of the spatial contiguity effect in multimedia learning. Journal of Experimental Psychology-Applied, 18, 178–191.

Irwanto, Saputro, A. D., Rohaetti, E. & Prodjo Santoso, A. K. (2018). Promoting critical thinking and problem solving skills of preservice elementary teachers through process-oriented guided-ınquiry learning (POGIL). International Journal of Instruction, 11(4), 777-794.

Kester, L., Kirschner, P. A., and van Merriënboer, J. J. G. (2005). The management of cognitive load during complex cognitive skill acquisition by means of computer simulated problem solving. Br. J. Educ. Psychol. 75: 71–86.

Knoblich, G., Ohlsson, S. & Raney, E. G. (2001). An eye movement study of insight problem solving. Memory & Cognition, 29, 1000–1009.

Lin, J. J. H., & Lin, S. S. J. (2014a). Cognitive load for configuration comprehension in computer-supported geometry problem solving: An eye movement perspective. International Journal of Science and Mathematics Education, 12, 605–627.

Liversedge, S. P., & Findlay, J. M. (2000). Saccadic eye movements and cognition. Trends in Cognitive Sciences, 4(1), 6–14.

Mayer, R. E. (2010). Unique contributions of eyetracking research to the study of learning with graphics. Learning and Instruction, 20(2), 167-171.

McGivney, J. M., & DeFranco T. C. (1995). Geometry proof writing: A problem solving approach a la Polya. Mathematics Teacher, 89, 552-555, Reston, Virginia: National Council of Teachers of Mathematics.

Metallidou, P. (2009). Pre-service and in-service teachers' metacognitive knowledge about problem-solving strategies. Teaching and Teacher Education, 25, 76-82.

Monaghan, F. (2000). What difference does it make? Children's views of the differences between some quadrilaterals. Educational Studies in Mathematics, 42 (2),179-196.

Muldner, K., & Burleston, W. (2015). Utilizing sensor data to model students' creativity in a digital environment. Computers in Human Behavior, 42, 127–137.

National Council of Teachers of Mathematics (NCTM). (2000). *Principles and standards for school mathematics*. Reston, VA: Author.

Noy, Y.I., Lemoine, T.L., Klachan, C. & Burns, P.C. (2005). Task interruptability and duration as a measure of visual distraction. Applied Ergonomics, 35, 207-213.

Obersteiner, A. & Tumpek, C. (2016). Measuring fraction comparison strategies with eye-tracking. ZDM—Mathematics Education, 48(3), 255-266.

Peterson, G. W., Sampson, Jr., J. P., Reardon, R. C., & Lenz, J. G. (1996). Acognitive information processing approach to career problem solving anddecision making. In D. Brown, L. Brooks, & Associates (Eds.), Career choiceand development (3rd ed., pp. 423–476). San Francisco: Jossey-Bass.

Pickreign, J. (2007). Rectangle and rhombi: How well do pre-service teachers know them? *Issues in the Undergraduate Mathematics Preparation of School Teachers, 1,* 1-7.

Polya, G. (1945). How to solve it. New Jersey: Princeton University Press.

Rayner, K. (1998). Eye movements in reading and information processing: 20 years of research. Psychological Bulletin, 124, 372–422.

Sampson, J. P., Jr., Peterson, G. W., Lenz, J. G., & Reardon, R. C. (1992). A cognitive approach to career services: Translating concepts into practice. The Career Development Quarterly, 41, 67-74.

Saputro, A. D., Irwanto, I., Atun, S. & Wilujeng, I. (2019). The impact of problem solving instruction on academic achievement and science process skills among prospective elementary teachers. Elementary Education Online, 18(2), 496-507.

Schindler, M., Lilienthal, A.J., Chadalavada, R., & Ögren, M. (2016). Creativity in the eye of the student. Refining investigations of mathematical creativity using eye-tracking goggles. In Csíkos, C., Rausch, A., & Szitányi, J. (Eds.). Proceedings of the 40th Conference of the International Group for the Psychology of Mathematics Education, Vol. 4, pp. 163–170. Szeged, Hungary: PME.

Serway, R. A., & R.J. Beichner. 2000. Physics for Scientists and Engineers, with Modern Physics. Fort Worth, Tex.: Saunders College Publishing.

Simon, D. P. & Simon, H. A. (1978). Individual differences in solving physics problems. In R. S. Siegler (Eds.), Children thinking: What develop? (pp.325-348). New Jersey: Lawrence Erlbaum Associates.

Tabachnick, B. G., & Fidell, L. S. (2013). Using multivariate statistics. Boston: Pearson.

Thomas, L. E. & Lleras, A. (2007). Moving eyes and moving thought: On the spatial compatibility between eye movements and cognition. Psychonomic Bulletin & Review, 14, 663–668.

Tsai, M.-J., Hou, H.-T., Lai, M.-L., Liu, W.-Y., & Yang, F.-Y. (2012). Visual attention for solving multiple-choice science problem: An eye-tracking analysis. Computers & Education, 58, 375-385.

Tsamir, P., Tirosh, D., Levenson, E., Barkai, R., & Tabach, M. (2014). Early-years teachers' concept images and concept definitions: triangles, circles, and cylinders. *ZDM-Mathematics Education*, DOI 10.1007/s11858-014-0641-8.

Uygun, T. & Akyuz, D. (2019). Developing subject matter knowledge through argumentation. *International Journal of Research in Education and Science (IJRES)*, *5*(2), 532-547.
Woolfolk A. (1993). Educational psychology. Fifth Ed. Allyn and Bacon.

Polat, M. (2020). A rasch analysis of rater behaviour in speaking assessment. *International Online Journal of Education and Teaching (IOJET)*, *7*(3). 1126-1141.
https://iojet.org/index.php/IOJET/article/view/902

Received: 14.05.2020
Received in revised form: 11.06.2020
Accepted: 20.06.2020

A RASCH ANALYSIS OF RATER BEHAVIOUR IN SPEAKING ASSESSMENT

Research Article

Murat Polat

Anadolu University

mpolat@anadolu.edu.tr

Biodata(s): Murat Polat holds a Ph.D. at Osmangazi University, Educational Sciences, Research Methods and Statistics Program. Currently he is working as a language instructor at Anadolu University, Foreign Languages School. His research interests include language assessment, alternative testing and educational statistics.

A RASCH ANALYSIS OF RATER BEHAVIOUR IN SPEAKING ASSESSMENT

Murat Polat

mpolat@anadolu.edu.tr

Abstract

The assessment of speaking skills in foreign language testing has always had some pros (testing learners' speaking skills doubles the validity of any language test) and cons (many test-relevant/irrelevant variables interfere) since it is a multi-dimensional process. In the meantime, exploring grader behaviours while scoring learners' speaking skills is necessary not only for inter/intra-rater reliability estimations but also for identifying the potential stringent and lenient graders in the rater-group to act accordingly to settle the best matches for graders when paired-rater-scorings or cross-marking-gradings are preferred for increasing the objectivity. In this exploratory study, which was implemented in 2019, 6 expert speaking graders scored 24 English language learners' speaking interviews from their video recordings including an individual and a pair discussion task for each student. A Rasch model in which MFRM (Many Faceted Rasch Measurement) was utilised to explore the scoring behaviours of the expert graders in terms of stringency and find out if their grading habits significantly affect language learners' overall speaking performances. The results of the present research showed that graders had significant score differences among each other and some of them scored too leniently or too stringently that might affect learners' speaking grades significantly.

Keywords: assessment, reliability, foreign language testing, rater bias, Rasch analysis

1. Introduction

In foreign language assessment, it is common to carry out performance assessment tasks through writing and speaking tests in which generally human-raters are involved in the procedure to mark the spoken or written responses that learners create in the target language so that we can increase the validity of testing. In the end of this process, the scores raters assign through those language tests are used not only to identify students' foreign language levels, but also to make educational inferences about the quality of the performance tests, flow of the language curriculum, sustainability of the language outcomes and finally the benefits of the language materials. Therefore, language test scores have a number of important predictive functions on which language program designers and school administrations base their substantive educational decisions. That is why these scores (particularly the subjective ones which are given through speaking and writing exams) have to be reliable and reflect the actual language performance of the testees.

However, the concept of language testing is a multi-dimensional task and draws on a wide and diverse set of personal, cognitive, and linguistic qualities which are inter-related and have unique functions in demonstrating a person's foreign language proficiency (Taylor & Wigglesworth, 2009). To illustrate, in a foreign language reading test, students may be asked to read an English text and answer some comprehension questions which were prepared to identify the main idea of the text or some other questions to be able to check if the student could make some inferences based on the information s/he gets from the reading text. The main objective is to measure the language proficiency of the learner, and the tool is the reading test here, but what if the student had an outstanding reading mastery in his/her native language or

vice versa, what if the learner already had many problems in reading even in his native tongue? Would they have an impact on this student's reading test score in a foreign language test? Which feature in such a test do you think would be more prominent: the test-taker's overall reading ability or his/her reading ability in the target language?

In another example of testing, students could be asked to demonstrate their foreign language skills through writing an opinion paragraph or an argumentative essay in which they were supposed to write about their favourite free-time activity with a number supporting reasons and examples. Normally, these essays are mostly scored by human-raters using either a holistic or an analytic rubric to set a standard within him/her scorings and with the other raters as well if multiple scoring sessions are held. In this case, a testee's receiving a high grade from this essay might depend not only on her/his foreign language mastery and the quality of writing, but also on the personal traits of one of the juries who grade the exam paper, such as the rater's habit of scale-shrinking (using a particular part of the scale and assigning similar scores regardless of the superiority of the written performance), lenient or harsh scoring (Fulcher, 2003). For example, think of a female rater who hates football and would never bother seeing or reading something about it or a male rater who loves watching football and reading comments about important matches They both grade the same student's essay on how amusing it is to watch a derby football match and share this joy with some friends. Do you think that these two graders would never be affected from their personal feelings while scoring this paper although they are both experienced, trained and were given the same grading criteria? Or what if one of them was a lenient, the other was a stringent rater? Would it somehow cause a scoring difference if they score this paper as a pair?

The third example could be about a speaking interview where two raters grade a paired speaking test in English. Let's assume that each grader was given a different task (welcoming the students and ensuing the identity check, employing the first or the second part of the test, delivering or presenting the exam questions etc.). In this case, the number of variables that could influence the students' scores might be more than the variables that might have an effect in a writing test. The tone and the body language of the graders, their way of asking the questions (stress, pauses, intonation etc.), students' familiarity, their reactions when the speaker does not understand a part or the whole question, how they listen to the students' responses (and the things they do meanwhile), their psychological moods at the time, expected test duration, the number of the testees (it is sometimes more advantageous to be in the first or in the last group of examinees in terms of receiving higher grades) may all have impacts on the overall speaking scores (Wang Haizhen, 2008). Even the difficulty of the exam questions might differ a lot, sometimes a jury's interview questions could be much more difficult than the other, and this can be quite occasional in exams where hundreds of students are interviewed at a time. Moreover, in paired grading sessions, where two different graders are assigned to grade students' speaking performances and compare their scores in the end of each grading session where rater negotiation is required, could it be possible that the experience, rank difference or the dominance of a rater would affect the other rater's scores when there are significant score discrepancies between raters?

All those examples might prove the fact that foreign language assessment (either in writing or speaking) have various dimensions (which are known as facets in testing terminology) which require further planning, research and extensive discussions to be able to design more bias-free and objective measurement tools and techniques. This study aims to explore rater behaviours in speaking assessment according to various independent variables; therefore, the findings of this study could be valuable for foreign language test designers since it aims to reflect the comparisons of rater judgements and score means according to various facets including the most debated topics such as students' language competence levels, students' individual

performance differences, grader differences and the differences which stem from the rubric's components. Moreover, the results of this research could also help raters re-check their individual scoring habits and rituals since those individual differences might affect not only a student's foreign language competency score but also his/her academic carrier in a bigger picture.

1.1. Theoretical background

1.1.1. Speaking Tests' Facets

In speaking interviews where the number of independent variables that might affect the flow of the exam, test-takers' moods and graders' judgements are so many, it is the duty of test designers to foresee such distractors and take necessary measures to minimise the test irrelevant factors (Brown, 1995). The first example in the introduction part, the one related to the reading comprehension test, illustrates a commonly encountered case in foreign language tests related to two relevant facets in measurement: testing the language skills and cognitive skills (directly or indirectly) at the same time. From one perspective, each student is a single facet, and each response of this student is an element of the item facet which is valuable and should not be considered separately from the student (Pollitt & Murray, 1996). Therefore, it could be impossible to distinguish cognitive skills of a learner from his/her foreign language skills while answering questions because each answer is unique and specific to its owner (Eckes, 2009). From another perspective, Wigglesworth (1993) reminded that the duty of test-designers is to focus on the target language outcomes and maximize the assessment of skills which are directly related to language production skills. Thus, the consideration of the language proficiency level of the students while preparing test items and designing the rubric according to such levels are critical in order to make fair judgements (Cohen, 1994). Considering this fact, the examinee and his/her language proficiency level constitute the first facet of the speaking tests.

Next, comes the role of the interviewer or the grader among the considerable facets of speaking tests. The second example in the introduction part, the one related to two different raters (the female rater who hates and the male rater who loves football and had to score a student's essay about his love for watching football), illustrates a commonly encountered case: rater-factor in assessment (Engelhard, 2002; McNamara, 2000). Research on rater judgements in foreign language assessment has revealed the fact that subjectivity of a rater is sometimes inevitable and judgements of even the most experienced raters may even vary significantly from the others' (Shohamy, 1983; Fulcher, 2003). Lumley (2002) stated that even the interpretation and application of a standardized scoring rubric may vary significantly and might cause significant scoring differences. The use of adjectives in descriptors may cause interpretation differences; for example, "extensive use of vocabulary items" or "a good control of cohesive devices", in this case, it might not be clear to identify "*extensive*" or come to an agreement on "*good control*". Another study carried out by Lumley and McNamara (1995) revealed that even extensive rater-training may not help to eliminate the grader differences in writing and speaking assessment in foreign language testing since raters reflect their prior-experience, prejudices, habits and beliefs to their judgements. What is more, in most of the cases where raters use their own judgements rather than using the grading rubric's descriptors, they are not aware of doing this and not accepting the fact that they score subjectively regardless of what he/she is supposed to do in the exam (Milanovic et al., 1996; Orr, 2002). That is why the rater behaviour in using the scoring rubric and its components is another facet in speaking tests.

Another issue which is worth mentioning is the complexity of a face-to-face interview, which is hard to handle both for the graders and the students for various reasons under normal circumstances. As illustrated in the third example in the introduction part, there are various factors that must be controlled simultaneously. These variables such as the tone and the body language of the graders, their way of asking the questions (stress, pauses, intonation etc.), test-takers' familiarity, grader reactions when the testee does not understand question, graders' way of listening the students' responses (and the things they do meanwhile), their psychological moods at the time which might have invisible and easily unrecognisable links in the background (Lane & Sone, 2006). These variables including students, test-tasks, graders, scoring rubric, and the atmosphere all together have effects on determining the speaking scores of the language learners' (Bachman, 2004). As all these cases illustrate, when subjective measurement is involved in foreign language assessment, it is inevitable that some human features will come out either willingly or unwillingly (Linacre, 2002; Wolfe & Dobria, 2008), and the speaking exam raters' leniency and stringency in scoring is one of these features.

Wolfe (2004) claimed that in some cases raters are, just because of their characteristic features, too lenient or too harsh in grading. The former could be considered as a positive attitude by the test-takers; however, regarding the consequences of scoring exaggeratedly high, lenient scoring would even harm the validity of the testing process deeply. Also, Myford and Wolfe (2004) underlined the same fact and warned that leniency in grading could be a serious measurement error when students are ranked according to those grades. Congdon and McQueen (2000) asserted that "rater stringency or severity" is the likelihood of giving low marks by a rater whose expectations are above other raters and tend to assign lower grades, which has been a phenomenon in testing for many years. Some teachers are known to be stringent graders whereas other raters are very comfortable in assigning high grades which might turn the assessment process into heads or tails, and if the rater is lenient you hit the jackpot, you lose if it is a stringent grader regardless of the quality of your performance (Lunz et al., 1990). In other words, the testee fails or passes no matter if he/she deserves or not). Al in all, defining the severe and lenient graders in the rater-pool is essentially important in quality and reliable scoring where cross marking assessment practices are held. Finally, the raters' leniency or stringency while grading students' spoken performances constitute the third facet in speaking assessment.

1.1.2. Many Faceted Measurement in the Assessment of Speaking

It is possible to categorize the theories used to analyse test results under two specific categories as Classical Test Theory (CTT) and Latent Trait Models (LTM). Within LTM, which was developed as an alternative to CTT, there are two separate models called as "Item Response Theory" and "Rasch model". Linacre (1993) developed the Many-Faceted Rasch Measurement Model by adding the scorer's stringency/leniency facet to the model developed by Rasch (1980) (Talent Levels of Individuals - Difficulty Levels of Questions). Many-faceted Rasch estimation alludes to the utilization of a class of estimation models that target giving a detailed investigation of different factors conceivably affecting the language test or its evaluation results (Kubinger, 2009). What is more, Di Nisio (2010) stated that MFRM has a number of superior properties compared to conventional measuring methods. To exemplify, the Rasch model uses measurement values of individuals (free from measurement errors) instead of raw scores.

In this model, each grader is assumed as a distinct facet which allows the researcher to explore probable scoring variety by investigating interactions of other graders with the other facets in the same grading process. To illustrate, Schaefer (2008) noted that the Rasch Model could be used to facilitate a considerable degree of rater objectivity in speaking or writing assessments by investigating the level of rater-bias. In addition, it was stated that Many Faceted Rasch Measurement (MFRM) could function as a powerful and substantial analysis in speaking tests since it can be helpful in detecting the measurement errors or sources of variance on students' test scores besides other variables such as item difficulty or test-taker's actual performance (Engelhard, 1992). In speaking assessment settings where graders use analytic rubrics, Weigle (1998) proposed the use of Rasch analysis to investigate rater bias since this model analyses rater behaviours and pinpoints the cases when significantly severe or lenient scores are assigned.

While grading students' written or oral performances, McMillan (2000) recommended the application of correct Rasch Models to investigate the rater impact on scores to sustain concurrent validity of the language test. Therefore, detecting which graders score more leniently or harshly than the others in the rater-pool MFRM is an effective method. Likewise, Park (2004) and Di Nisio (2010) suggested the use of MFRM to analyse the scoring differences of the raters according to different components of the analytical rubrics since the Many-Faceted Rasch model also determines and establishes the rules of a linear connection between each surface in a research (for example, in this research, students' language levels, the quality of speaking performances, the components of the criterion used to evaluate students' performance, and the scoring behaviours of the raters were investigated). In short, the Many-Faceted Rasch model standardizes the surfaces by combining the surfaces in a common plane to achieve an unbiased and effective measurement, and offers the ability to compare individuals' ability to perform the task, the difficulty/ease of questions, and scoring leniency or stringency of the raters at the same time (Hubbard et al.,2006).

In his research, McNamara (2000) found statistically significant variations in rater behaviours while grading test takers' language performances by MFRM including the score variance between what graders thought they were performing and what they actually performed. In another research related to language assessment, Koizumi et al. (2019) studied grader-behaviour impact on language learners' scores using the Rasch model which emphasizes inter-rater reliability in foreign language assessment including the effect of various components in the rating criteria. However, in Turkish context, MFRM has been used mostly in program evaluation studies rather than defining grader behaviours in performance assessment (Semerci, 2011; Uyanık et al., 2018). Thus, this study aims to analyse rater behaviours in language assessment according to a number of independent variables including rater differences, students' language level differences and scoring rubric's components. Thus, this study aimed to answer the research questions below to probe this underexplored but critical matter in Turkish context:

1. Do experienced graders' scores differ significantly although they use the same scoring rubric?
2. Do experienced graders' scores differ from the others' in terms of grader-leniency or stringency?
3. Do experienced graders' scores differ significantly according to different components of the scoring rubric?

2. Methodology

This exploratory study was carried out in 2019 in a foreign language preparatory school of a state university in Eskişehir. The official permission necessary for the study was taken from the language school's administration after reporting them the aim and the scope of the study.

2.1. Participants

Including the grader group and the testees, there were two separate groups of participants in this research. 6 English language instructors (4 female, 2 male graders) who were working in that language school voluntarily participated in the study. All the raters held MA degrees in ELT and had been grading students' oral performances for at least 10 years. As for the students, 24 students (15 female and 9 male students aged between 18-21) from 4 different language levels (from A level to D level, in this language school A level is considered the highest language level whereas D is the lowest, 6 students from each level) agreed to give permission for the use of their speaking exam video recordings to be used in this study. Speaking interviews are held in the school as paired interviews and each pair of students' oral performance is scored by two raters.

2.2. Instruments

There were two main instruments in this study; the videos of the speaking exam and the analytic rubric which was used to score students' interviews. All the video recordings belonged to the same proficiency exam's speaking interview section. The speaking exam in this school has two parts. In the first section, students are asked individual questions and in the second part, they are supposed to have discussions on specific topics with their exam partners. The scorings were done by an analytic scoring rubric which has five components (content, grammatical competence, lexical competence, fluency and interaction). The analytic criterion was developed by the school's testing office and all the raters were quite familiar with the analytic scale since in all speaking exams, the same scale is used in the school for language assessment. The rubric's components range from 0-4 (0 and 1 stand for the poor and weak performances, 2 for average, 3 stands for good and 4 stands for the excellence in the related criterion in a single component. The maximum score is 20 (5 components x 4 pts.= 20 pts.) in this speaking interview.

2.3. Data Collection & Analysis

As it was mentioned before, this study was carried out in 2019 and all the participants contributed to the study voluntarily after they were provided the necessary information about the aim the study. To be able to control the interviewer effect, 2 raters from the voluntary rater group made all the speaking interviews of the 24 students. As mentioned before, paired speaking interviews are carried out in the assessment and each pair of students' oral performance is scored by two those two raters. The raters were not the sample group's teachers at school and they did not know that the students were from 4 different language levels, on the contrary, they thought that they were all students from the same language level. The same set of interview questions and the same analytic rubric were used in the interviews. When the interviews finished and 12 videos were ready, they were copied by the researcher and presented to each grader in CDs. All the graders scored the speaking interviews individually and presented the score charts to the researcher for analysis. The data set collected from the participants were computed and analysed using the FACETS (Linacre, 2002) program, which is generally prescribed for MFRM analysis to distinguish parameter estimations, vital inspection for conjoint estimation, examination of infit and outfit levels to get fit estimations of the dispersion appropriately.

3. Results and Discussion

While defining rater behaviours, MFRM model is an effective approach to determine rater-scores that are not in the normal distribution. Linacre and Wright (2002) suggest MFRM to be used for performance assessment cases in which a number of dependent or independent variables could be observed in the final grades such as language level difference, item difficulty, graders' scoring difference or score differences stem from rubric components which can ultimately cause serious measurement errors. The four faceted Rasch model presented by Rasch (1980) is,

"*log (Pnijlk /Pnijl(k-1) = Bn - Rj - Di – Tjk"*

In the formulae; Pnijlk stands for the possibility of item n scored as k by rater j; Pnijl(k – 1) is the possibility of item n scored as k – 1 by rater j; Bn stands for the speaking skill of the testee displayed through the interview; Rj is the possible stringency of the rater; Di is the level of item difficulty and Tjk is the difficulty of a single scoring rubric component comparative to other components. Although this equation is a simple linear addition model, logit scale is a negative value ranging from infinity to positive infinity. It is assumed that values in the logit scale are different for each surface.

Linacre and Wright (2002) recommended that the first step to utilise MFRM analysis is to scan the data set in terms of the quantity of the standardised values. It is recommended that less than 5% of z-scores (standardized values) in the data set (the score distribution according to 5 different components out of 4) should be equal to or more than 2, or less than 1% of the z-scores (standardized values) should be equal to or more than the critical level which is 3. It was found that out of 720 score entries (24x6x5=720) in this study 19 (2.63%) were equal or more than 2 and out of 720 score entries 5 (0.69%) were equal or more than 3 and those findings proved that the present data set was fit for the analysis.

In Figure 1, the variable map presents a general view of the analysis of the whole data gathered from students' speaking scores including the measurement scale (1st column), students' ranking (2nd column), rater severity (3rd column), proficiency levels of the students (4th column), difficulty levels of rubric components (5th column) and the score divisions according to the scale's scoring components (6th to 11 columns) respectively. All column names were identified from high-low, severe to lenient and hard to easy to make it easier to recognise the placement differences in the chart.

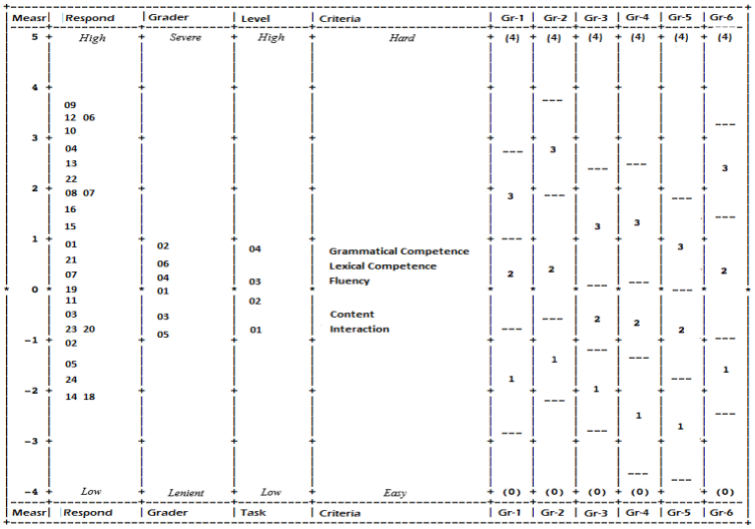


Figure 1: Vertical ruler map presenting the rank of students, graders, language levels and rubric components

Firstly, the student column (2nd column) in Figure 1 reveals the achievement rank of graders from the highest to the lowest score. The map shows that speaking score of student 9 (a participant from A level) was the highest and the first 4 ranks were all students form A level whereas the participants' coded as 14 and 18 (who were D level students) scores were the lowest ones in the score ranking. It should be reminded that the raters did not know the students' language levels and the findings presented in the 2nd column reveal that participants' achievement ranking is parallel with their placement levels at the language school. The third column shows the severity or leniency of the 6 graders via the scores they assigned in this research. Rater 2 (a female rater who had a 26-year-experience in language teaching and a similar expertise in language assessment) was found to be the most stringent rater whereas rater 5 (a male rater who had a 22-year-experience in language teaching and a similar expertise in language assessment) was observed to be the most lenient of the 6 graders. The results presented in the fourth column justified the findings in the second column. According to participants' language proficiency levels, Group 4, which stands for A level, had the highest scores whereas Group 1 (D level students) had the lowest scores from the rater group. As for the difficulty of the analytic rubric's components presented in the 5th column, grammatical and lexical competence components were found to be the most difficult components in the rubric whereas interaction and content components were the ones in which raters were more lenient in scoring. More detailed analysis of each facet will be presented in the following tables.

Table 1: *MFRM Measurement report according to language levels*

Obsv. Score	Obsv. Count	Obsv. Average	Fair Average	Measure	Model S.E.	Infit MnSq	Infit ZStd	Outfit MnSq	Outfit ZStd	Level
628	180	3.5	3.44	0.16	.07	1.1	1	1.1	1	4 (A)
574	180	3.2	3.17	0.06	.07	1.1	0	1.2	0	3 (B)
510	180	2.8	2.85	-0.08	.08	1.0	0	0.9	0	2 (C)
466	180	2.6	2.50	-0.14	.08	0.9	-1	0.8	-1	1 (D)
544.5	180.0	3.0	2.92	.02	.07	1.2	0.1	1.0	-0.0	Count:4
27.0	0.0	0.3	0.26	.12	.00	0.1	1.1	0.1	1.0	S.D.
RMSE (Model): .11 Adj S.D. .43 Separation Index: 1.92 Reliability: .81										
Fixed (all same) chi-square: 18.2 df: 3 significance (p)= .00										
Random (normal) chi-square: 3.1 df: 2 significance (p)= .39										

The results which were presented in Table 1 reveal the total scores students from each language proficiency level received from graders (6 graders scored 6 students out of 5 different components in the rubric). The reliability coefficient in the Rasch analysis is 0.81. This result shows the reliability of the language level discrimination which could be identified as a reliable result since the reliability levels between 0.70 and 0.85 were classified as reliable values according to Eckes (2009). Similar to the reliability estimates for KR 20-21 or Cronbach Alpha tests, the computed reliability degree in Rasch analysis is the same with those analyses. Reliability level is a statistical value between 0-1 and it can be concluded that the higher the reliability level the better the analysis is. Considering the separation index 1.92 and the reliability coefficient 0.81 the null hypothesis about the score difference among students' language levels was rejected (χ_2 = 18.2, df = 3, p = 0.00). Thus, it means that there was a significant score difference between the language levels of the students ($p<0.05$).

MFRM has another superiority when compared with conventional methods in which it presents compared infit and outfit levels of the facets involved in the analysis. In the computation of these levels first, the chi-square test answers the question "Is there a statistical difference between the leniency or stringency of the raters?". Next, if the p value found for the test is less than 0.05, it can be interpreted that there is a significant difference between the

leniency or stringency of the raters while evaluating the students' performances. Thus, if there is a statistical difference between the raters, the raters who scored leniently or harshly can be determined from the detailed analysis (logit scale). The internal fit index (infit) is calculated according to the square statistics of the weighted standard residues, and the external fit (outfit) index is calculated according to the square statistics of the non-weighted standard residues (Engelhard, 1992). Since these fit indices show the difference between the expected value and the observed value with the minimum error, it is recommended to use the infit and outfit indices (Engelhard, 1992). According to Wright and Linacre (1994), the critical values for infit and outfit indices are between 0.6 - 1.4. Consequently, these indices are found according to the score differences estimated by the model and the scoring results of the raters. Thus, it can be concluded that infit and outfit statistics in none of the language level groups (Infit= 0.8-1.1, Outfit = 0.8-1.1) were below or above the critical limits, which means that there was no significant difference between the estimated scores and the students' assigned scores.

Table 2: *Speaking scores' measurement report (MFRM)*

Obsv. Score	Obsv. Count	Obsv. Average	Fair Average	Measure	Model S.E.	Infit MnSq	Infit ZStd	Outfit MnSq	Outfit ZStd	Student
117	30	3.9	3.75	0.25	.16	1.2	1	1.1	1	9
114	30	3.8	3.73	0.14	.16	1.3	1	1.2	1	12
114	30	3.8	3.70	0.12	.15	1.1	0	1.1	0	6
113	30	3.8	3.59	0.04	.15	0.9	1	0.8	-1	10
111	30	3.7	3.46	-0.03	.15	1.1	-1	1.2	0	4
108	30	3.6	3.42	-0.07	.15	1.0	-1	1.0	1	13
105	30	3.5	3.39	-0.10	.15	1.1	0	1.0	1	22
105	30	3.5	3.38	-0.12	.15	1.2	1	1.1	0	8
104	30	3.5	3.27	-0.19	.14	1.1	0	1.0	0	17
102	30	3.4	3.25	-0.22	.14	1.0	-1	1.1	1	16
99	30	3.3	3.18	-0.29	.14	1.1	-1	1.2	1	15
96	30	3.2	3.07	-0.36	.14	1.1	0	1.1	0	1
93	30	3.1	2.92	-0.39	.14	1.0	1	1.1	1	21
90	30	3.0	2.89	-0.41	.14	0.9	0	0.8	0	7
88	30	2.9	2.78	-0.49	.13	0.9	1	0.8	0	19
84	30	2.8	2.70	-0.54	.13	0.9	-1	0.8	-1	11
81	30	2.7	2.63	-0.58	.13	1.1	-2	0.9	0	3
79	30	2.6	2.48	-0.61	.13	1.0	1	1.1	1	23
75	30	2.5	2.34	-0.63	.13	1.1	1	1.0	1	20
72	30	2.4	2.21	-0.73	.13	0.8	-1	0.7	-1	2
69	30	2.3	2.15	-0.85	.12	1.1	-2	1.3	1	5
66	30	2.2	2.09	-0.89	.12	1.0	1	1.1	0	24
63	30	2.1	2.01	-0.92	.12	1.1	1	1.0	1	14
62	30	2.1	1.98	-1.11	.12	1.1	0	1.1	0	18
92.1	30.0	3.3	3.28	-0.48	.14	1.2	0.1	1.0	-0.0	Count:24
8.6	0.0	0.3	0.26	.38	.01	0.2	1.1	0.2	1.0	S.D.
RMSE (Model) .13 Adj S.D. .42 Separation Index: 2.81 Reliability .83										
Fixed (all same) chi-square: 82.4 df: 23 significance (p)= .00										
Random (normal) chi-square: 11.2 df: 22 significance (p)= .37										

The results which were presented in Table 2 reveal the scores each student received from graders out of 5 different components (6 graders scored each student out of 5 different components in the rubric). The reliability coefficient in the Rasch analysis is 0.83. Considering the separation index 2.81 and the reliability coefficient 0.83 the null hypothesis about the score difference among students' speaking scores was rejected (χ_2 = 82.4, df = 23, p = 0.00). Consequently, there was a significant score difference between the speaking scores of 24

students ($p<0.05$). The first 4 students' (participant 9,12, 6 and 10) mean scores in each component of the rubric was 3.8 which is considerably higher than the last 4 students' (participant 5, 24, 14 and 18) mean scores (2.2) in each component. When the infit and outfit statistics are checked, it can be concluded that infit and outfit statistics of none of the students' scores (Infit= 0.8-1.3, Outfit = 0.7-1.2) were below or above the critical limits, which means that there was no significant difference between the students' estimated speaking scores and the assigned scores.

Table 3: *Rater measurement report (MFRM)*

Obsv. Score	Obsv. Count	Obsv. Average	Fair Average	Measure	Model S.E.	Infit MnSq	Infit ZStd	Outfit MnSq	Outfit ZStd	Rater
445	120	3.7	3.32	6.25	.26	1.8	5	1.9	5	5
393	120	3.3	3.20	0.14	.08	1.1	1	1.0	1	3
382	120	3.2	3.06	-0.04	.07	1.1	1	1.0	0	1
357	120	3.0	2.87	-0.21	.07	0.9	-1	1.0	-1	4
336	120	2.8	2.66	-0.38	.07	0.8	-1	0.8	-1	6
276	120	2.3	2.52	-5.59	.06	0.4	-4	0.3	-4	2
364.8	120.0	3.1	2.94	-0.27	.07	1.0	0.1	1.1	-0.1	Count:6
23.1	0.0	0.3	0.33	.21	.01	0.2	.01	0.3	1.2	S.D.
RMSE (Model) .11	Adj S.D. .33	Separation Index: 2.99				Reliability .89				
Fixed (all same) chi-square: 248.2		df:5	significance: .00							
Random (normal) chi-square: 16.1		df:4	significance: .28							

Table 3 reveals the scores each rater assigned to 24 students' speaking performances out of 5 different components (24 students were scored out of 5 different components in the rubric). The reliability coefficient in the Rasch analysis is 0.89. Considering the separation index 2.99 and the reliability coefficient 0.89, the null hypothesis about the score difference among 6 raters was rejected (χ_2 = 248.2, df = 5, p = 0.00). In other words, there was a significant score difference between the judgements of 6 raters ($p<0.05$). It should be underlined once more that all the raters contributed to the study were all trained in speaking assessment and all had at least ten years of grading experience. The analysis revealed that Rater 5 was the most lenient one who gave 3.71 points out of 4 on average to each of the components in the analytic rubric; whereas, Rater 2 was the most stringent one who gave 2.30 points out of 4 on average to the same speaking performances. The infit and outfit results revealed similar findings. When those values for the graders' performances were checked, it can be seen that all the raters except Rater 5 and Rater 2 are within the accepted limits and it could be assumed that the other 4 raters (Rater 1, 3, 4 and 6) can assign closer scores to students' performances to the expected score ranges; however, Grader 5's infit (1.8) and outfit (1.9) and Grader 2's infit (0.4) and outfit (0.3) values are out of the critical limits (0.6 /1.4), which were reported by Wright and Linacre (1994). These findings lead us to conclude that Rater 2 and Rater 5 have significantly different scoring behaviours as Rater 5 is too lenient (3.71 score average out of 4) whereas Rater 2 is too harsh (2.30 score average out of 4) while scoring speaking interviews and these raters should not be paired with the other raters since their scoring difference threatens the reliability of the judgements of the overall rater-pool. A mean score difference of 1.41 out of 4 points between two raters is serious discrepancy despite the fact that both used the same rubric and both took the same trainings in norming sessions for scoring speaking interviews. Moreover, the leniency and stringency of these two graders change the whole score structure and this defect turns the entire score structure into an unreliable measurement in which there are too many outliers which are well above or below the acceptable limits.

Table 4: *Scale components' measurement report (MFRM)*

Obsvd Score	Obsvd Count	Obsvd Average	Fair Average	Measure	Model S.E.	Infit MnSq	Infit ZStd	Outfit MnSq	Outfit ZStd	Component
535	144	3.7	3.31	0.91	.06	1.8	5	1.9	5	Interaction
474	144	3.4	3.20	0.43	.08	1.1	1	1.1	1	Content
447	144	3.1	2.93	-0.08	.10	0.8	1	0.9	1	Fluency
419	144	2.9	2.73	-.31	.11	1.1	0	1.1	0	Lexic. com.
401	144	2.8	2.62	-.96	.12	1.0	-1	0.9	-1	Gram. com.
454.6	144.0	3.2	2.96	.08	.09	1.1	0.1	1.0	-0.1	Count:5
49.7	0.0	0.2	0.40	.48	.02	0.3	2.3	0.3	2.4	S.D.

RMSE (Model) .12 Adj S.D. .62 Separation 4.18 Reliability .80
Fixed (all same) chi-square: 276.4 df:4 significance: .00
Random (normal) chi-square: 24.2 df:3 significance: .29

The results which were presented in Table 4 reveal the scores assigned by 6 raters to students' speaking performances (6 graders scored 24 students). The reliability coefficient in the Rasch analysis is 0.80. Considering the separation index 4.18 and the reliability coefficient 0.80, the null hypothesis about the score difference among students' speaking scores was rejected (χ_2 = 276.4, df = 4, p = 0.00). Consequently, there was a significant score discrepancy between the judgements of 6 raters according to 5 separate components ($p<0.05$). It should be reminded that the analytic scale which was used in the study had 5 components (content, grammatical competence, lexical competence, fluency and interaction) and each was measured out of 4 points. The results also revealed that the mean scores assigned through "interaction" component were significantly higher than the other component scores which, at the same time, should be interpreted as these scores given in "interaction" component were not reliable. When the infit and outfit statistics are checked, it can be concluded that infit and outfit values of none of the components but "interaction" (Infit= 0.8-1.1, Outfit = 0.9-1.1) were below or above the critical limits. The "interaction" component's infit and outfit statistics (Infit= 1.8, Outfit = 1.9) reveal that raters were too lenient (3.70 score average out of 4) in scoring the oral interaction between students while speaking in the interview. The reason of this leniency might have stemmed from the lay out of the speaking exam. In one part of the exam, students have individual tasks in which the other student is not allowed to interfere even if he/she would like to speak. In the second part of the interview, a common task is given two both students and they are told to discuss the matter presented in the question which leads the students interact even if they don't want to, so measuring the quality of this interact in in the exam could be confusing and misunderstood by the raters. Therefore, the score means are exceptionally high in this descriptor.

Conversely, the mean scores of "grammatical competence" and "lexical competence" were significantly lower than the scores assigned for "content" and "fluency". This reveals another important concern in foreign language assessment in Turkey. The raters could be more critical while grading grammar and vocabulary since an important percentage of language teachers in Turkey still believe that just developing grammar and vocabulary knowledge and presenting this knowledge in oral or written performance is enough to succeed in language proficiency tests (Mirici, 2003). Namely, the average score difference between the two components "interaction" (3.70 score average out 4) and "grammatical competence" (2.79 score average out 4) is significant and is worth studying. Considering the fact that all the components in the rubric had an equal score distribution (4 points each), it might be interpreted that all those qualities were expected to be measured equally; however, the average scores assigned in those components revealed that grammar and vocabulary knowledge of learners were brought to the fore more, while the others were not taken into consideration sufficiently by the expert raters participated in this study.

4. Conclusion and Suggestions

This exploratory study, which was carried out in 2019 in a language school of a state university in Eskişehir, aimed to analyse rater behaviours in language assessment according to a number of independent variables including rater differences, students' language level differences and scoring rubric's components. For the purposes of the study, MFRM (Many Faceted Rasch Measurement) was used since each grader in this model is assumed as a distinct facet which allows the researcher to explore probable scoring variety by investigating interactions of other graders with the other facets in the same grading process. Finally, the results of the study revealed that there were significant score differences according to the language learners' proficiency levels and their individual performances. These findings were similar to the findings of McNamara and Ryan (2011) who emphasized the fact that even students from the same language proficiency levels might have been awarded very different scores since rater behaviours might change significantly while grading similar performances. Additionally, the results of the analyses revealed interesting findings in terms of leniency and stringency of the raters while grading the speaking interviews.

Rater measurement results revealed that there was a significant score difference between the judgements of 6 raters; even though all the raters contributed to the study were all trained in speaking assessment and all had at least ten years of language assessment experience. Ducasse and Brown (2009) mentioned about this finding in their study and concluded that regardless of their experience or expertise, raters prefer to make their own interpretations while scoring learners' oral or written performance because of many context-related reasons. The analyses also revealed that Rater 5 was the most lenient one who gave 3.71 points out of 4 on average to each of the components in the analytic rubric; whereas, Rater 2 was the most stringent one who gave 2.30 points out of 4 on average to the same speaking performances. Obviously, a 1.41-point-score difference out of 4 points in the mean scores between two experienced raters is a serious difference and such a problem should be meticulously examined and be explored why these two raters assign such different grades from the average distribution. Such a discrepancy among the raters in a rater group was also stated by Lumley (2002) and it was recommended that too lenient or too stringent graders should not be paired with the other raters who are scoring normally; instead, these raters should be invited to further training in language assessment and be retested before they core in the same rater-pool.

Finally, the analyses related to the rubric components revealed a significant score difference between the judgements of 6 raters according to 5 separate components including content, grammatical competence, lexical competence, fluency and interaction. The results revealed that the mean scores assigned through "interaction" component were significantly higher than the other component scores; whereas, the mean scores of "grammatical competence" and "lexical competence" were significantly lower than the scores assigned for "content" and "fluency". This finding reveals the fact that raters were more lenient while scoring the qualities such as interaction or the content of the oral production while they were more stringent while scoring grammar and vocabulary knowledge. This result leads us to see the fact that even the most experienced and trained raters overvalue the use of correct grammar and a variety of vocabulary items in assessing the speaking performances of language learners ignoring the importance of primary objective of speaking: communication. This finding was also reported by Shi (2001) and it was stated that non-native raters of spoken English care more on qualities like extensive vocabulary or complex grammatical structures and they score these qualities more stringently than do native raters of spoken English.

In conclusion, a number of suggestions could be made on the limitations of this study and related to the use of MFRM in analysing test scores. This study was carried out on voluntary

basis and 6 raters and 24 students participated in the study. Deeper and more reliable results can be taken from Rasch analysis models in which hundreds of students' performances are analysed by a bigger rater pool including more than 30 or 40 raters. Another suggestion can be made for testing units of language schools. The use of MFRM can be very helpful in defining stringent and lenient graders in the rater groups of language schools in the assessment of oral and written products and can serve well to re-train those raters, control and recheck their scoring behaviours and gain more reliable and fair exam results minimising the human effect to acceptable degrees. Eventually, in this study the researcher used some statistical methods and found a number of results using only quantitative data. A mixed method or a qualitative study could also be made on the leniency and stringency of raters and their reasons or feelings about (whether they know their lenient or stringent scoring and their reason of being so) this concern could be explored to have further information on the issue.

5. Conflict of Interest

The author declares that there is no conflict of interest.

6. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Bachman, L. F. (2004). *Statistical analyses for language assessment*. Cambridge, UK: Cambridge University Press.

Brown, A. (1995). The effect of rater variables in the development of an occupation- specific language performance test. *Language Testing, 12,* 1-15.

Cohen, A. D. (1994). *Assessing language ability in the classroom.* (2nd ed.) Boston, MA: Heinle & Heinle.

Congdon, P.J., & McQueen, J. (2000). The stability of rater severity in large-scale assessment programs. *Journal of Educational Measurement, 37(2),* 163–178.

Di Nisio, R. (2010). Measuring school learning through Rasch Analysis: the interpretation of results. *Procedia - Social and Behavioural Sciences, Volume 9,* 2010, Pages 373-377. https://doi.org/10.1016/j.sbspro.2010.12.167

Ducasse, A., & Brown, A. (2009). Assessing paired orals: Raters' orientation to interaction. *Language Testing, 26(3),* 423–443. https://doi.org/10.1177/0265532209104669

Eckes, T. (2009). On common ground? How raters perceive scoring criteria in oral proficiency testing. In A. Brown & K. Hill (Eds.), Tasks and criteria in performance assessment: *Proceedings of the 28th Language Testing Research Colloquium* (pp. 43–73). Frankfurt, Germany: Lang.

Engelhard, G. (2002). Monitoring raters in performance assessments. In G. Tindal & T. M. Haladyna (Eds.), *Large-scale assessment programs for all students: Validity, technical adequacy, and implementation* (pp. 261–287). Mahwah, NJ: Erlbaum.

Fulcher, G. (2003). *Testing Second Language Speaking*. London: Pearson Education Limited.

Hubbard, C., Gilbert, S., & Pidcock, J. (2006). Assessment processes in speaking tests: A pilot verbal protocol study. *Research Notes, 24,* 14–19.

Kubinger, K. D. (2005). Psychological test calibration using the Rasch model: Some critical suggestions on traditional approaches. *International Journal of Testing, 5,* 377–394.

Koizumi, R., Kaneko, E., Setoguchi, R., Innami, Y., & Naganuma, N. (2019). Examination of CEFR-J spoken interaction tasks using many-facet Rasch measurement and generalizability theory. *Language Testing and Assessment 8(2),* 1-33.

Lane, S., & Stone, C.A. (2006). Performance Assessment. In R. L. Brennan (Ed.): *Educational Measurement* (pp 387-431). Wesport, CT: ACE/Praeger.

Linacre, J.M. (2002). Optimizing Rating Scale Category Effectiveness. *Journal of Applied Measurement, 3,* 85-106.

Linacre, J.M., & Wright, B.D. (2002). Construction of Measures from Many-Facet Data. *Journal of Applied Measurement, 3,* 484-509.

Lumley, T. (2002). Assessment criteria in a large-scale writing test: What do they really mean to raters? *Language Testing 19/3*: 246-276.

Lumley, T., & McNamara, T. F. (1995). Rater characteristics and rater bias: Implications for training. *Language Testing, 12/1:* 54–71.

Lunz, M. E., Wright, B. D., & Linacre, J. M. (1990). Measuring the impact of judge severity on examination scores. *Applied Measurement in Education, 3(4*), 331-345.

McMillan, P.D. (2000). Classical, Generalizability, and multifaceted Rasch detection of interrater variability in large, sparse data sets. *Journal of Experimental Education, 68(2),* 167–190.

McNamara, T. F. (2000). *Language testing*. Oxford, UK: Oxford University Press.

McNamara, T., & Ryan, K. (2011). Fairness versus justice in language testing: The place of English literacy in the Australian Citizenship Test. *Language Assessment Quarterly, 8(2),* 161-178.

Milanovic, M., Saville, N. & Shen, S. (1996). A study of the decision-making behavior of composition markers. In: Milanovic, M., Saville, N. (Eds.), *Studies in Language Testing 3: Performance Testing, Cognition and Assessment.* Cambridge University Press, Cambridge.

Mirici, I.H. (2003). The factors affecting the success in English proficiency exams and possible contributions of the internet. *Turkish Online Journal of Distance Education. 4(1)*: 1-8.

Myford, C.M., & Wolfe, E.W. (2004). *Detecting and Measuring Rater Effects Using Many-Facet Rasch Measurement: Part I*. In E. V. Smith y R.M. Smith (Eds.). Introduction to Rasch Measurement (pp. 460-515). Maple Grove, MN: JAM Press.

Orr, M. (2002). The FCE speaking test: Using rater reports to help interpret test scores. *System, 30/2*: 143-154.

Pollitt, A. & Murray, N.L. (1996). What raters really pay attention to? In: Milanovic, M., Saville, N. (Eds.), Studies in Language Testing 3: *Performance Testing, Cognition and Assessment.* Cambridge University Press, Cambridge.

Rasch, G. (1980). *Probabilistic models for some intelligence and attainments tests.* Chicago IL: Mesa Press.

Schaefer, E. (2008). Rater bias patterns in an EFL writing assessment. *Language Testing, 25*, 465-493.

Semerci, Ç. (2011). The evaluation of students on ideas about the department of computer education and instructional technology (CEIT) according to Rasch measurement model. *5th International Computer & Instructional Technologies Symposium Proceedings.*

Shi, I. (2001). Native and non-native speaking EFL teachers' evaluation of Chinese students' English writing. *Language Testing, 18*, 303-325.

Shohamy, E. (1983). "Interrater and intrarater reliability of the oral interview and concurrent validity with cloze procedure in Hebrew". In J.W.Oller (ed.). *Issues in Language Testing Research. Rowley*, MA: Newbury House.

Taylor, L., & Wigglesworth, G. (2009). Are two heads better than one? Pair work in L2 assessment contexts. *Language Testing, 26*, 325–339.

Uyanık, G.K., Güler, N., Teker, G.T., & Demir, S. (2018). Fen bilimleri dersi etkinliklerinin çok düzeyli Rasch modeliyle analizi. *Kastamonu Eğitim Dergisi, 27 (1*): 139-150.

Wang Haizhen. (2008). A Study on Raters' Interpretation and Application of the Rating Criteria in TEM4-Oral. *Theory and Practice of Foreign Languages Teaching 2:*33-39.

Weigle, S. C. (1998). Using FACETS to model rater training effects. *Language Testing, 15*, 263-287.

Wigglesworth, G. (1993). Exploring bias analysis as a tool for improving rater consistency in assessing oral interaction. *Language Testing, 10(3),* 305–319. https://doi.org/10.1177/026553229301000306

Wolfe, E.W. (2004). Identifying rater effects using latent trait models. *Psychology Science, 46(1),* 35–51.

Wolfe, E. W., & Dobria, L. (2008). Applications of the multifaceted Rasch model. In J. W. Osborne (Ed.), *Best practices in quantitative methods* (pp. 71–85). Los Angeles: Sage.

Öztürk, A., & Özyurt, M. (2020). The function of metacognition in instructional skills: A comparative case study. *International Online Journal of Education and Teaching (IOJET), 7*(3). 1143-1166. https://iojet.org/index.php/IOJET/article/view/843

Received: 09.03.2020
Received in revised form: 16.05.2020
Accepted: 19.05.2020

THE FUNCTION OF METACOGNITION IN INSTRUCTIONAL SKILLS: A COMPARATIVE CASE STUDY

Case Study

Ayşe Öztürk
Gaziantep University
ozturkayse2007@gmail.com

Melike Özyurt
Gaziantep University
melike.ozyurt@yahoo.com

Ayşe Öztürk, Ph.D., is an associate professor in the Department of Primary Education at the Faculty of Education, Gaziantep University. Her research interests include curriculum development, democracy and human rights education, child rights education, and higher order thinking skills.

Melike Özyurt, Ph.D., is an assistant professor in the Department of Educational Sciences at the Faculty of Education in Gaziantep University. Her area of expertise is curriculum development and instruction. Her research interests include higher order thinking skills, and 21st century skills.

THE FUNCTION OF METACOGNITION IN INSTRUCTIONAL SKILLS: A COMPARATIVE CASE STUDY

Ayşe Öztürk

ozturkayse2007@gmail.com

Melike Özyurt

melike.ozyurt@yahoo.com

Abstract

This study aimed to investigate the instructional metacognition of pre-service elementary teachers with high and low level of proficiency on teaching skills. The comparative case study was carried out on six pre-service elementary school teachers, three of whom had high level of proficiency (HLP) and the other three with low level of proficiency (LLP) on teaching skills. The research data were collected through unstructured observation and semi-structured interviews. The data were analyzed through content analysis. As a result of the study, the instructional metacognition (IM) strategies and behaviors adopted by the HLPs and the LLPs during the teaching process were modelled, comparatively evaluated, and similarities or dissimilarities were revealed. The present study is significant in terms of uncovering the function of instructional cognitive awareness in the process of professional development in teacher training, discovering what and how the IM has affected the quality of high and low instructional performances and determining the problems encountered in this process.

Keywords: teacher training, professional development, metacognition, instructional metacognition, effective teaching

1. Introduction

Teachers have a significant impact on the development of positive attitudes towards school and learning, and also on academic achievement (Stronge, 2018), and play an important role in providing effective educational changes (Doğanay & Öztürk, 2011). It suggests the need to increase teacher qualifications in order to obtain meaningful learning outcomes. As a matter of fact, the development of professional development programs for teachers which result in the authentic learning of students is one of the prominent goals of educational systems in the world (Galaczi, Nye, Poulter & Allen, 2018).The professional development of teachers refers to comprehensive, sustainable and systematic learning experiences that based on teacher needs, provide effective teaching, and increase the academic achievement and performance of the students (Reese, 2010). The main purpose of professional development is to develop the professional knowledge and skills of teachers and consequently improve student achievement (Guskey, 2000; Day & Sach, 2005; Reese, 2010). Accordingly, the professional development of teachers can be regarded as the process of improving the qualifications of teachers and providing their professional development in order to realize cognitive, affective and psychomotor learning outcomes pre-eminently. Metacognition plays an important role in the professional development of teachers (Jiang, Ma & Gao, 2016; Duffy, Miller, Parsons & Meloth, 2009). Metacognition, which was first

introduced to the literature by John Flavell, refers to the individuals' knowledge regarding cognitive processes and their results (Flavell, 1976). In other words, meta-cognition can be defined to be noticing what somebody knows and does not know, being aware of mental procedures and strategies, and evaluating and contemplating about the intellectual products (Costa, 1984). According to Flavell (1987), these components were listed to be the knowledge of person, the knowledge of task and the knowledge of strategies under three interrelated and interacting categories while Schraw & Moshman (1995) classified them under the headings of the knowledge of cognition and the regulation of cognition. The information of cognition is divided into declarative knowledge, procedural knowledge and conditional knowledge, and the organization of cognition consists of planning, monitoring and evaluation elements (Schraw, 2001). Moreover, metacognition combines various thinking and reflective processes. They can be divided into five main components which are preparing and planning for learning, choosing and using learning strategies, monitoring how to use the strategy, using different strategies in harmony / organizing various strategies, and evaluating strategy use and learning (Fathima, Sasikumar, & Roja, 2014). Metacognition increases the effectiveness of instruction by creating consciousness and control over the instructional processes of teachers. Metacognition in the teaching process includes being aware of someone's own teaching strategies, knowing when, why and how to apply them, planning what and how to teach, monitoring and controlling the course of lesson while teaching, making adjustments according to the needs, and evaluating after the end of lesson (Hartman, 2002). In the context of decision making during the teaching process, metacognition creates consciousness about instructional decisions and the reasons behind by defining, reflecting and evaluating them (Griffith, Bauml & Quebec-Fuentes, 2016). In addition, it is also essential to prioritize during the teaching process, to recognize and to overcome learning difficulties, to make transfers effectively, and to use teaching materials properly in different ways (Georghiades, 2000). All these functions of metacognition are essential for effective teaching and they reflect the instructional behaviors of chartered or efficient teachers. Effective teachers are characterized by their ability to think, plan and adapt depending on the requirements while teaching (Hoffman & Pearson, 2000). These teachers can set realistic goals, encourage learning, apply participatory and different teaching methods, use time effectively by making comprehensive plans, monitor and evaluate the progress of students through the practices appealing to the students' interests, and provide feedback (Anderson, 2004, McBer, 2000; Jasman, 2002, Liakopoulou, 2011).Furthermore, these teachers can make critical evaluations of what and why they do during their teaching processes, and what are the convenient and inconvenient practices (Brookfield, 1995) in addition to making plans considering many contextual variables such as student characteristics, curriculum, classroom environment, teaching methods and strategies (Tsui, 2003).

The relevant literature includes various research that have been carried out to reveal the effect and function of metacognition on the professional development and specialization of teachers. In this regard, Doganay & Ozturk (2011) investigated science and technology teaching processes of experienced and inexperienced elementary teachers, and Artzt & Armor-Thomas (2001) scrutinized problem-solving skill teaching processes of experienced and inexperienced mathematics teachers in terms of metacognition, and they classified the metacognition components that are on the basis of the teaching process. Moreno (2009) examined and proved the effectiveness of metacognitive prompts in learning. Balcikanli (2011) and Jiang, Ma & Gao (2016) developed instruments for instructional metacognition based on the significant effect of metacognition on the professional development of teachers. Baykara (2011) concluded that there was a significant relationship between pre-service teachers' perceptions of teacher competence and metacognitive learning strategies. Baltaci

(2018), Nahrkhalaji, (2014) and Martinez (2006) determined that the metacognition increased together with the rise in the professional experience of instructors. There are also studies examining the reflections of the teachers' instructional metacognition on their educational processes (Nahrkhalaji, 2014; Curwen, Miller, White-Smith& Calfee, 2010; Wilson &Bai, 2010). They determined that metacognition strategies, namely declarative information, planning, evaluation and management, have significantly been related to the educational performance (Nahrkhalaji, 2014). Curwen, Miller, White-Smith & Calfee (2010) confirmed that the metacognition of teachers regarding their own practices guided students to develop metacognition and to acquire more in-depth knowledge about the subject matter. Wilson, Bai (2010), on the other hand, found that the teachers' metacognition approach has been related to their perception of instructional strategies. All the research results indicate the importance of teachers' instructional metacognition in increasing the effectiveness of the teaching-learning process, improving students' metacognition and earning instructional achievement. However, it has been noted in the literature that the metacognitive skills of teachers boosted with professional experience, and they were less frequently exhibited by inexperienced teachers than the experienced ones (Artzt & Armor-Thomas, 2001; Doganay & Ozturk, 2011). Earning instructional achievement or ensuring students' permanent learning are too important to be built on the fulfillment of the instructional development process of teachers based on professional experience. Therefore, it is considered to be a necessity for teachers to develop their instructional metacognitive skills before graduating from teacher training programs, and the pre-service teachers who had graduated with those skills would provide the students with meaningful and permanent learning, and so they can earn instructional achievement through effectively planning and performing their practices during the teaching-learning process from the very beginning of their profession. That's why, pre-service education has a significant effect on the development of teacher quality (Cochran-Smith & Zeichner, 2005). In addition, how the transition from novice to expertise has been realized during teaching is one of the prominent areas of study in teacher education (Byra & Sherman, 1991). However, the overall examination of the studies in literature yielded that they focused on examining the teaching processes of experienced and inexperienced teachers in terms of metacognitive skills. It was also observed that the research on prospective teachers and metacognition focused on the examination of skill levels or the acquisition of metacognitive skills to a great extent. However, there has been no study investigating the pre-service teachers' instructional metacognition. Improving prospective teachers' instructional metacognition during the pre-service period requires determining the level of development in instructional metacognitive skills as a part of the specialization procedure. A scientific study to examine the instructional metacognition of pre-service teachers will reveal the awareness of their own teaching processes, demonstrate how they have exploited metacognition during this process, and provide information on the qualifications of their professional development. In this regard, a comparative study of the instructional metacognition skills of pre-service teachers with high and low level of proficiency on teaching skills will contribute to the explanation of how the metacognition skills of pre-service teachers are shaped and changed, and the function of metacognition in the process of transition to expertise in terms of instructional skillsthrough determining the problems encountered in this very process. In addition, it is hoped that the research results will contribute to the enrichment of teacher training programs specific to instructional metacognition in terms of determining the needs of teacher candidates for professional development and preparedness to teaching. Furthermore, the present study is considered to be useful as it enables the determination of the function of instructional metacognition in instructional skills and attempts to fill the gap related to the subject matter in literature. Besides, our study is fruitful as it has been conducted with prospective elementary school teachers, the students' metacognition can be improved by that

of teachers(Curwen, Miller, White-Smith, & Calfee, 2010)and young children are quite limited in their knowledge about cognitive phenomena or in their metacognition (Flavell, 1979, Veenman et al. 2006). In line with the aforementioned rationales, this study aimed to investigate the instructional metacognition of pre-service elementary school teachers with high and low level of proficiency on teaching skills.

2. Method

2.1. Research Model

This study, which aimed to scrutinize the instructional metacognition of pre-service elementary teachers with high and low level of proficiency on teaching skills, was designed as a comparative case study (Christensen, Burke & Turner, 2015). Case study is a qualitative research method in which one or more cases are scrutinized comprehensively (Christensen, Burke & Turner, 2015, Lochmiller & Lester, 2017).In case studies, rich and verifiable variety of data can be obtained using more than one qualitative data collection method. Thus, an in-depth and holistic understanding of the case under investigation could be arrived (Yildirim & Simsek, 2018).There are two or more cases in comparative case studies. They are compared through in-depth examination, and differences and similarities are uncovered (Christensen et al., Bogdan & Biklen, 1998).In this study, there are two groups of prospective elementary teachers with high and low level of proficiency on teaching skills. Within the scope of the study, it was aimed to obtain in-depth information about their metacognition regarding teaching processes, to reveal the similarities and differences and to determine the function of metacognition in the differentiation of quality in terms of instructional skills by investigating the instructional metacognition of the groups of teachers who differ in terms of teaching skills.

2.2. Participants of the Study

The participating group were determined through deviant case sampling among purpose sampling methods and consisted of pre-service elementary teachers studying at a state university in Turkey, three of whom had high level of proficiency (HLP) and the other three with low level of proficiency (LLP) on teaching skills. The participants were determined by following a three-step process. In the first step, the central evaluation scores of pre-service teachers for teaching practice (CETP) were taken into account. The CETP scores indicate the quality of instructional skills of pre-service teachers in the process of internship. The CETP scores of pre-service teachers were sorted in descending order to determine the lowest six and the highest six. In the second step, the achievement scores of those pre-service teachers regarding all the pedagogy courses in undergraduate education program were examined and the opinions of the instructors were taken about the teaching skill development of the aforementioned pre-service teachers. In the final step, the instructors who are the advisors of the course of teaching practice were asked to evaluate the pre-service teachers in terms of instructional skill development based on their active practices during lessons. Following these procedures, six pre-service teachers, highest three and lowest three depending on level of proficiency on instructional skills, were determined to be the participants of this study. The participants were included in the study on the basis of willingness after they were informed about the purpose of the study and that their personal information would be kept confidential. The pseudonyms of HLP-1, HLP-2, HLP-3 for the pre-service teachers with high instructional skills and LLP-1, LLP-2, LLP-3 for those with low instructional skills were used. Information about teacher candidates was submitted in Table 1.

Table 1. *The characteristics and pseudonyms of HLPs and LLPs*

The Characteristics of HLPs		*The Characteristics of LLPs*	
HLP-1	The pre-service teacher is a senior at the faculty of education, and she is 21 years old. She had also graduated from the department of child development. She continues her internship training in a primary school with middle socioeconomic status in Gaziantep city centre and has one year of private lesson experience. Her CETP score is AA and the scores of pedagogy courses in undergraduate education are also AA to a great extent. Her undergraduate diploma grade is 3.67.	LLP-1	The pre-service teacher is a senior at the faculty of education, and he is 22 years old. He continues his internship training in a primary school with middle socioeconomic status in Gaziantep city centre and has no teaching experience such as private lessons and etc. His CETP score is CB and the scores of pedagogy courses in undergraduate education are CC to a great extent. His undergraduate diploma grade is 2.87.
HLP-2	The pre-service teacher is a senior at the faculty of education, and she is 21 years old. She continues her internship training in a primary school with middle socioeconomic status in Gaziantep city centre and has three years of permanent private lesson experience. Her CETP score is AA and the scores of pedagogy courses in undergraduate education are also AA to a great extent. Her undergraduate diploma grade is 3.39.	LLP-2	The pre-service teacher is a senior at the faculty of education, and she is 21 years old. She continues her internship training in a primary school with middle socioeconomic status in Gaziantep city centre and has no teaching experience such as private lessons and etc. Her CETP score is CB and the scores of pedagogy courses in undergraduate education are also CB to a great extent. Her undergraduate diploma grade is 2.92.
HLP-3	The pre-service teacher is a senior at the faculty of education, and she is 22 years old. She continues her internship training in a primary school with middle socioeconomic status in Gaziantep city centre, has two years of permanent private lesson experience and has been a voluntary intern for a year in a private primary school to become experienced. Her CETP score is AA and the scores of pedagogy courses in undergraduate education are also AA to a great extent. Her undergraduate diploma grade is 3.63.	LLP-3	The pre-service teacher is a senior at the faculty of education, and he is 21 years old. He continues his internship training in a primary school with middle socioeconomic status in Gaziantep city centre and has no teaching experience such as private lessons and etc. His CETP score is CB and the scores of pedagogy courses in undergraduate education are CC to a great extent. His undergraduate diploma grade is 2.93.

2.3. Data Collection Instruments of the Study

In the study, unstructured observation (camera recordings) and Instructional Metacognition Interview Form were used to collect information about the present condition of HLPs and LLPs in implementing the IM strategies and exhibiting the IM behaviors.

2.4. Unstructured Observation (Camera Recordings)

Through the unstructured observation, it was aimed to collect in-depth information about the instructional metacognition through examining the teaching practices in real-class environment in the course of teaching practice. Within the scope of the study, four-week observation data, one hour per week, were collected from each teacher candidate. The lessons in which teacher candidates can use their instructional metacognition skills effectively were chosen to be observed. Accordingly, observations were held in the courses of mathematics, science, Turkish and social studies.

2.5. Instructional Metacognition Interview Form (IMIF)

The Instructional Metacognition Interview Form (IMIF) was obtained by revising the questions of Metacognition Assessment Interview Form developed by Doganay & Ozturk (2011) to evaluate the IM skills of elementary teachers in science and technology lessons. During the process, the questions were checked in terms of being easy to understand, not being generic and abstract, being open-ended, not being multi-dimensional, and not being directive. In order to ensure validity, the revised form was submitted to the opinions of two faculty members as experts in metacognition, and it was adjusted in line with the obtained feedback. Then, the interview form was finalized after pilot scheme with five prospective teachers. Consequently, four groups of open-ended questions were included in the IMIF (Appendix-1).

2.6. Data Collection

The research data were collected in the spring semester of 2018-2019 academic year. First, observation data, and then interview data were collected in the process of data collection. During the observation procedure, the class was held on the specified days and hours, and it was recorded with a camera without interfering with the teaching-learning process. Camera recording was used to prevent data loss. Therefore, it was possible to monitor in-class behaviors at different times, which enabled the process to be examined by other researchers. Thus, measures were taken for validity and reliability studies. After the end of observations, interviews with prospective teachers were held. During the interviews with prospective teachers, they were firstly informed about the purpose of the study, and it was underlined that their identity and the information they provided would be kept confidential. Firstly, the personal information of teacher candidates was obtained, and then the questions in the IMIF were posed. It was paid attention not to be directive in the course of interviews. Audio recording was used to prevent data loss during the interviewing procedure using semi-structured interview protocol.

2.7. Data Analysis

The analyses were performed to examine the IMs of the HLPs and the LLPs and to reveal the function of the IM. In the analysis procedure carried out to reveal the IMs of the HLPs and the LLPs, the datasets of observations and interviews were analyzed through content analysis among qualitative data analysis methods. Firstly, the datasets of observations and interviews were examined line by line in terms of the IM. Subsequently, codes for the IM behaviors were created. The codes were re-examined and those with similar purposes were

brought together and gathered under distinct IM strategies. In addition, the codes were created for the problems related to the IM behaviors and they accompanied the relevant strategies. The IM strategies and behaviors were modelled according to the instructional stages (preparation, teaching and evaluation).Afterwards, the frameworks related to the IMs of the HLPs and the LLPs were established.

The analyses carried out to reveal the function of the IM were based on the results of the IM analysis of the HLPs and the LLPs. In this regard, inferences about the function of the IM were made by evaluating the qualities (features) of the arrangements done by the HLPs and the LLPs on the basis of the obtained results regarding preparation, teaching and evaluation stages. An example inference was presented in Table 2.

Table 2. *Sample frameworks for inference analysis regarding the functionality of the IM*

STAGE	IM based arrangements of the HLPs	IM based arrangements the of LLPs	Functional implications of the IM
Preparation	Making comprehensive and student-centered plans considering a vast number of variables	Making plans considering few variables	More comprehensive planning Planning student-centered practices
	Scheduling regularly	Not planning regularly	Regular planning
	The provision of materials, activity papers, etc. for preliminary preparation	The improvision of materials, activity papers, etc. for preliminary preparation	Increasing the quality of practices in the process of preliminary preparation

According to Table 2, it can be observed that there are differences between the IM-based arrangements of the HLPs and the LLPs in preparation phase, and the functional implications regarding the IM are based on these differences. In this regard, it has been deduced that the effective use of the IM has functions in making more comprehensive and student-centered plans, planning regularly and increasing the quality of practices such as material development and the preparation of activity papers during the process of preliminary preparation.

2.8. Reliability and Validity of Data Analysis

It was also attempted to ensure the reliability and validity of the research results. Accordingly, the research results were confirmed through gathering data by different data collection methods. The sampling, data collection and data analysis procedures were given in detail as clearly as possible to make sure that each reader can figure out. In addition, observation and interview processes were recorded to prevent data loss and the findings were accompanied by direct quotations to enable the readers to visualize the obtained results. Encoder reliability was used to ensure reliability. In this regard, the researchers analyzed the dataset independently. Then, the researchers came together and compared their coding to get a consensus through discussing the codes with disagreement. After this procedure, the dataset was submitted to the opinion of an independent encoder who was an expert on qualitative research and metacognition. The coding by the independent encoder and by the researchers were compared and the similarities and differences were revealed. For the estimation of the reliability of the analysis results, the reliability formula suggested by Miles & Huberman (1994) was used and the encoder reliability was found to be 97%. After these studies, consensus was arrived regarding the coding with dissensus.

3. Findings

The research findings related to the instructional metacognition of the HLPs and the LLPs were presented under independent frameworks for both groups. They were defined as “the framework related to the instructional metacognition of the HLPs” and “the framework related to the instructional metacognition of the LLPs.”They were given in Figure 1 and Figure 2.

Based on the framework given in Figure 1 regarding the instructional metacognition of the HLPs, it can be concluded that the HLPs exhibit a great many instructional metacognition behaviors during the preparation, teaching and post-implementation evaluation stages. In addition, it was determined that all the HLPs adopted monitoring and organization-based implementation process while teaching.

The framework given in Figure 2 regarding the instructional metacognition of the LLPs implied that the LLPs displayed the IM behaviors during the preparation, teaching and post-implementation stages. However, the IM behaviors were found to be few in number. In addition, it was established that two different approaches, namely practices with and without monitoring and organization, were adopted in the teaching process, and two of the LLPs exhibited the IM behaviors for evaluative purposes after the implementation stage was over.

The findings regarding the instructional metacognition of the HLPs and the LLPs were submitted respectively under three headings of the IM behaviors during the preparation, teaching and evaluation stages.

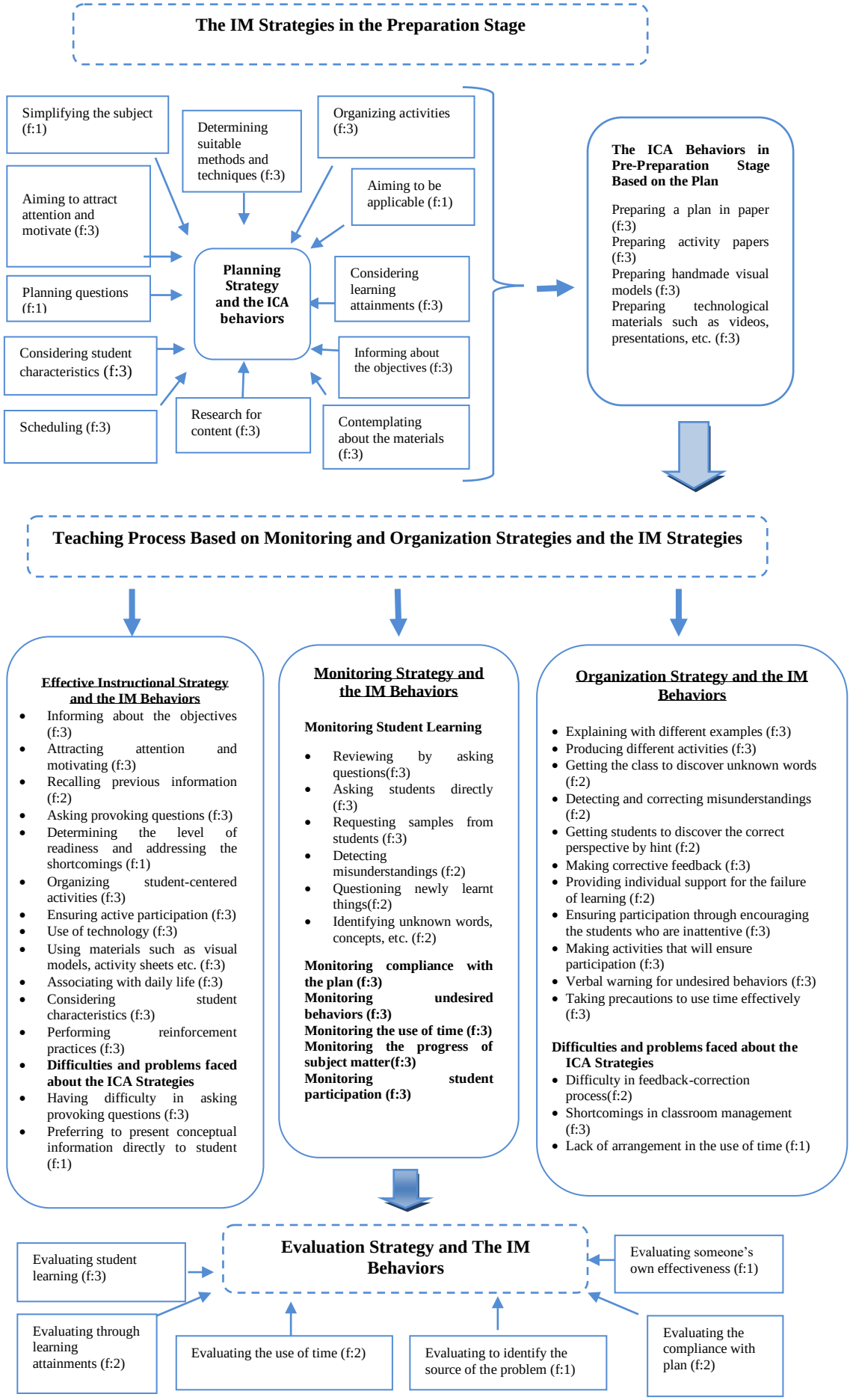


Figure 1. The framework regarding the IMs of the HLP

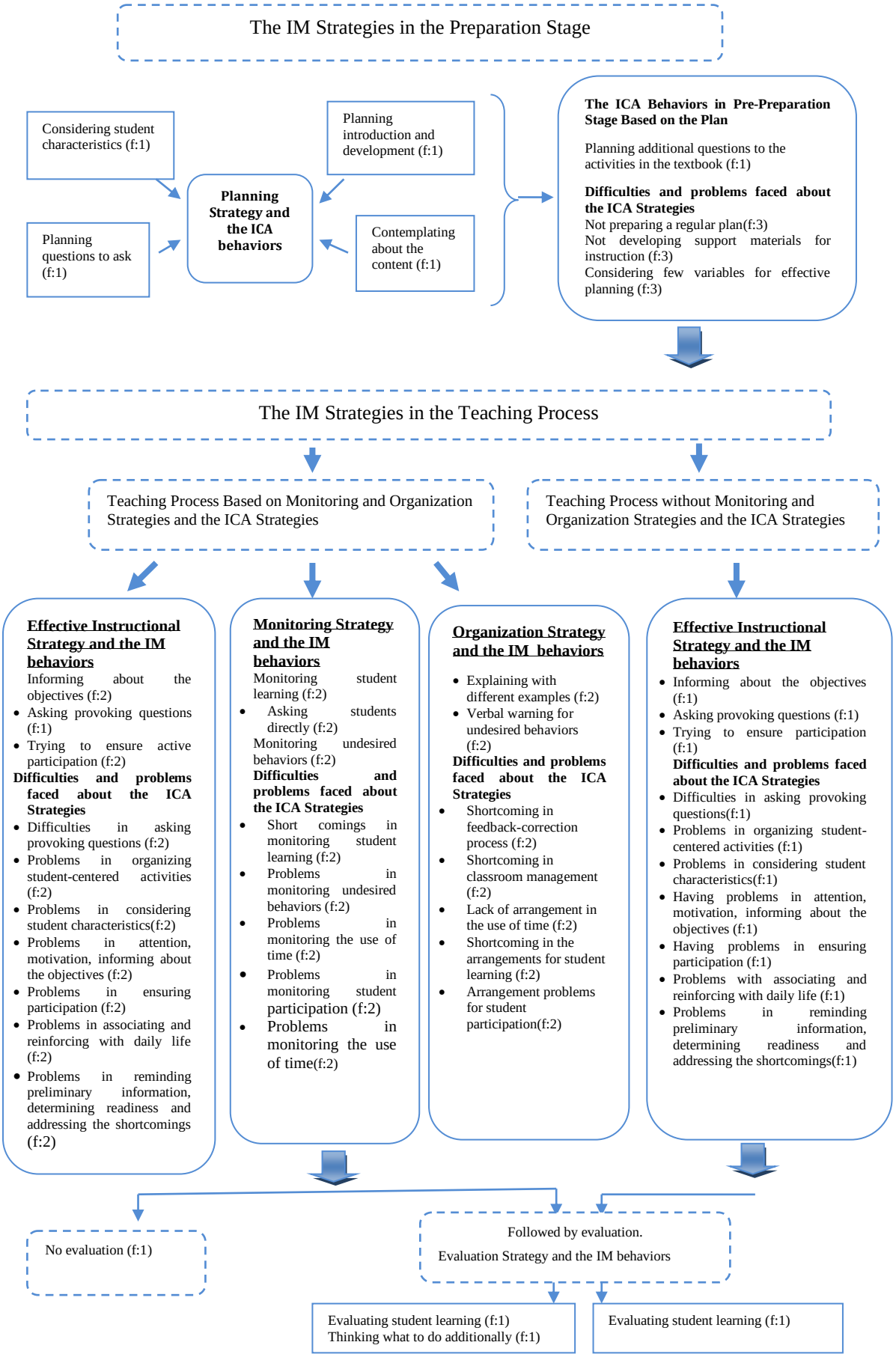


Figure 2. The framework regarding the IMs of the LLPs

3.1. Findings Regarding the IM in the Preparation Stage

The research findings related to both frameworks indicated that the HLPs and the LLPs exploited the planning strategy and the IM behaviors in preparation stage and the pre-preparation stage based on the plan. The findings revealed that the HLPs made more comprehensive planning and exhibited a wide variety of IM behaviors rather than the LLPs. Based on the observations and the interviews, it was also determined that the HLPs regularly made plans in paper in contrast to the LLPs who declared that they planned intellectually, but it wasn't found to be permanent based on the observations. In fact, it was observed that one of the LLPs sometimes came to classes without any preparation and s/he maintained the lesson by asking random questions in his/her own mind. At the same time, it was revealed that the LLPs preferred to follow the textbook instead of making specific and need-based plans, and only one of them prepared questions in addition to the activities in the textbook. It implies that the HLPs and the LLPs have differentiated their IMs regarding planning. When the planning stage is analyzed in terms of the IM behaviors, it was decided that all the HLPs considered the learning attainments, course content and student characteristics, aimed to inform about the objectives, attracted attention and motivated at the very beginning of the lesson, organized activities, determined suitable methods and techniques to achieve the objectives, contemplated about the materials, and scheduled. In addition, unlike the others, one of the HLPs uttered that she prioritized the feasibility of the plan, the other one simplified the subject and the last one worked on the planning of the questions. Unlike the HLPs, no common IM behavior shared by the whole group can be identified in the LLPs. While one of the LLPs voiced that s/he maintained directly from the book, prepared additional questions, and thought about what to do in the introduction and development during the planning process, the other one focused only on the content and contemplated about what to focus on, and the last one expressed that s/he had no information at the beginning and paid attention to the student characteristics in following days. However, when the LLPs were asked to elaborate on what they declared, they were unable to do so. For example, they were unable to provide explanatory information about what they meant "according to the students", how they prepared questions or how they determined what was important in the content. On the other hand, the HLPs stated that they considered the readiness levels, student needs and the way of learning depending on their development levels in relation to student characteristics. One of the HLPs (HLP-1) expressed that she considered the characteristics of children and time planning with *"…frankly, I estimate the duration of my activities in my mind… I prepare by considering what the readiness of children is and how they can learn the subject matter, what they need in that group of age…"*One of the HLPs (HLP-3) explained her practices about the content with *"…I do research on the subject matter. I identify the sub-titles. I determine how I can simplify the subject matter…".*In addition, it was determined that the HLPs highlighted the factors of realizing the learning attainments, being compatible with student characteristics, having the potential to ensure active participation, being student-centered, being feasible with physical conditions with regard to the determination of suitable methods and techniques. In this regard, it can be alleged that they conceived a number of variables in connection with each other during the planning process. In pre-preparation stage based on the plan, it was concluded that the HLPs prepared plans in paper, developed handmade materials such as activity papers and visual models in accordance with their plans, and produced technological materials such as videos, documentaries and presentations. In this regard, it can be claimed that the HLPs exhibited a great many of IM behaviors during the preparation stage.

On the other hand, it was ascertained that the LLPs did not use the IM behaviors effectively in this stage and that only one of the LLPs prepared additional questions for the

activities in the textbook. Considering the shortcomings experienced by the LLPs in both the planning stage and the pre-preparation stage based on the plan, the difficulties encountered in terms of the IM were listed to be not preparing a regular plan, not creating support materials for instruction and taking few features into consideration during the planning process, not making process organization fit for purpose and context (student characteristics, active participation etc.).

The overall evaluation of the findings implies that the HLPs have better IM than the LLPs within the scope of planning strategy and preparation based on the plan. The evaluation of the process in terms of the function of the IM indicates that the effective employment of the IM is effective in planning more detailed and student-centered practices, making regular plans and increasing the quality in the pre-preparation stage when the differences in the planning process with regard to the IM behaviors used by the LLPs and the HLPs are taken into account.

3.2. Findings Regarding the IM in the Teaching Process

When the IM findings related to the teaching process in both frameworks are examined, it can be observed that various IM behaviors have been exhibited within the scope of "Effective teaching strategies", "Monitoring strategies" and "Organization strategies". It was found that the implementation stages of the HLPs and the LLPs differed significantly based on the IM behaviors and the IM problems faced within the scope of these strategies. In this regard, it was revealed that all the HLPs appealed to effective teaching, monitoring and organization strategies in the teaching process and adopted a common instructional approach. On the other hand, it is clear that the approaches adopted by the LLPs during the teaching process differed. In this regard, it is uncovered that two of the LLPs, similar to the HLPs, used effective teaching, monitoring and organization strategies within the scope of the IM, but one of the LLPs benefited solely from effective teaching strategy in this stage. In addition, it was concluded that the IM behaviors within the scope of these strategies in both frameworks differed, and the HLPs exhibited a variety of IM behaviors when compared to the LLPs. The findings related to the IM during the teaching process were presented comparatively under three sub-titles: "Findings regarding effective teaching strategies", "Findings regarding monitoring strategies" and "Findings regarding organization strategies."

3.3. Findings Regarding Effective Teaching Strategies

The teaching strategies for the IM include the awareness of the arrangements to ensure effective learning. According to the framework related to the IM behaviors exhibited by the HLPs, they informed about the objectives, drew attention and motivated, considered student characteristics, determined the level of readiness and addressed the shortcomings, recalled previous information, ensured active participation, organized student-centered activities, utilized technology, asked provoking questions, used materials such as visual models, activity sheets etc., associated and reinforced the course with daily life. It has been determined that the efforts to inform about the objectives, ask provoking questions and ensure participation are also included in the two distinct teaching approaches in the framework related to the behaviors of the LLPs. In addition, the observation findings revealed that the LLPs' behaviors of informing about the objectives were not permanent. It was observed that they only told the purpose of the lesson such as "*Our lesson is problem solving today*" (LLP-1) or they started the lesson by opening the relevant page directly from the book. The observation findings indicated that the HLPs also attracted attention and motivated, determined the level of readiness and addressed the shortcomings, and recalled previous information along with informing about the objectives as a warm-up activity. In this regard, it was noticed that they created awareness about the outcomes of the lesson by attracting students' attention and

motivating them through using a story, case study, attractive questions or materials. It was discovered that the HLPs generally used question-answer or brainstorming methods to address their shortcomings through determining the readiness levels of students. In this context, one of the HLPs practiced the following: In the lesson which was about a reading text on technology, she firstly received the students' opinions through brainstorming to reveal the level of readiness about what technology is, and then, she tried to eliminate the misinformation and disinformation and gave a complete insight of what technology is by evaluating the ideas put forward about technology together with the students. It was witnessed that the practices for recalling previous information by HLPs were mostly conducted as a follow-up study. Considering the IM behaviors performed to be start-up activities, it can be alleged that both the LLPs and the HLPs had awareness for informing students about the objectives in order to attract them for the lesson, but the HLPs carried out more comprehensive studies in this context. In addition, it is possible to say that the LLPs experienced difficulties and shortcomings in relation to the IM in terms of addressing their shortcomings, motivating and informing about the objectives and recalling the preliminary information through determining the readiness levels of the students at the very beginning of the lesson.

It can be claimed that both the HLPs and the LLPs tried to ensure the active participation of students, but the groups differed in terms of the ways of ensuring participation and organizing student-centered activities when the IM behaviors carried out within the scope of effective teaching strategies were evaluated in detail. The HLPs mainly used methods and techniques such as student-centered drama, experiment, learning stations, brainstorming, question-answer or exploited activity materials to ensure the active participation of students. In addition, all students were involved in the implementation stage. However, one of the HLPs, in particular, was found to be tended to present conceptual information directly to children. To exemplify, it was noticed that she directly presented theoretical information about all subtypes of adjectives, and then enabled students to actively participate in the process with questions and activities in a course where she taught the adjectives. In this regard, the preference of presenting conceptual information directly to children has been defined as a difficulty (problem) experienced by the HLPs within the scope of the IM.

It was observed that the LLPs did not use student-centered methods and techniques to ensure the active participation of students other than using question-answer technique, and they basically organized a teacher-centered learning process. In addition, it was noticed that student participation was particularly concentrated on few students in these practices. On the other hand, they followed the textbooks in their teaching processes, did not prepare any additional materials or activity papers, and sometimes taught the lessons without preparation. To exemplify, it was witnessed that one of the LLPs had the students open their notebooks and write down problems from his/her mind even erroneously (just for one time) in one of the math lessons. Thus, it was concluded that they did not make any arrangements considering the student characteristics in practice though they asserted the contrary in the interviews. For asking provoking questions, it was observed that the LLPs directed the questions given in the activities of the textbooks to the students, and only one of them asked a few questions other than the textbook. Accordingly, it was witnessed that the LLP-2 posed questions to the children in Social Sciences such as "*What kind of life would we have had if Mustafa Kemal Atatürk had not started the struggle for liberation?*"It was also observed that the HLPs included provoking questions in their activities, but they were few in number and focused more on informative questions. In light of these findings, it can be asserted that both the HLPs and the LLPs had problems in asking provoking questions. On the other hand, it was determined that reinforcement studies, the use of handmade and technological materials,

associating with daily life had an important place in the teaching processes of the HLPs. For example, in a course about living in space, one of the HLPs taught the lesson with handmade materials and documentaries, actively participated the students in the lesson through the questions she asked, and then performed reinforcement practices. Another HLP also consistently organized activities for students to associate and transfer what they learnt into daily life in a math class where she taught the measurements. On the other hand, it was observed that the LLPs did not carry out studies to reinforce, associate with daily life or transfer other than the textbook, they also did not prepare any additional material, and used the projector only to reflect the textbook. In this regard, it can be claimed that the LLPs have problems with the IM in terms of reinforcement, including technology in the process and using materials, associating with daily life.

The overall evaluation of the findings implies that the HLPs are better in applying the IM strategies and exhibiting the relevant behaviors when compared to the LLPs, but there are various difficulties and shortcomings about instructional metacognition in both groups. In addition, it can be asserted that the contexts with the actively employment of the IM behaviors facilitate adopting a student-centered learning approach instead of a teacher-centered one which positively affects the quality of teaching, incorporating technology into the process, and organizing a learning experience associated with real life and enriched with materials and considering learning shortcomings.

3.4. Findings Regarding Monitoring and Organization Strategies

Monitoring strategies cover organizing teaching activities deliberatively in order to ensure effective learning, to check whether the progress is compatible with the plan, and to reveal the need to make evaluations throughout the process. Organization strategies include making decisions and new arrangements depending on the needs revealed by monitoring strategies to ensure effective learning. When both frameworks were analyzed, it was understood that all the HLPs and two of the LLPs used monitoring and organization strategies except for one of the LLPs. Within the scope of monitoring strategy, the HLPs carried out the IM behaviors for monitoring student learning, monitoring undesired behaviors, monitoring compliance with the plan, monitoring the use of time, monitoring the progress of subject matter and monitoring student participation. It was observed that the IM behaviors related to monitoring undesired behaviors and student learning were also exhibited by the LLPs using this strategy, but the monitoring activities of the LLPs were just limited. Within the scope of organization strategies, the HLPs exhibited various ICA behaviors for student learning, undesired behaviors, the use of time and student participation. It was concluded that the arrangements for undesired behaviors and student learning were also done by the LLPs. The behaviors within the scope of these arrangements differed in both groups.

As a result of the study, it was determined that the HLPs used examining by asking questions, asking students directly, asking students for examples, detecting misunderstandings, questioning newly learnt things, identifying unknown words, concepts, etc. within the scope of the strategies for monitoring student learning. On the other hand, it was found that the LLPs were only able to ask students directly under this strategy .In this context, it was observed that the LLPs asked questions such as “*Is it understood?*”, “*Is there anything you don't understand?*”On the other hand, the HLPs exploited making different activities, explaining with different examples, discovering unknown words, correcting misunderstandings, getting students to discover the correct perspective by hint, giving corrective feedback and providing individual support for lack of within the scope of their arrangements for student learning. However, it was observed that the LLPs only narrated with

a different example. A sample dialogue from the science class can be given for the HLPs' making different activities:

> -Is there anyone want to be an astronaut? Yes, my teacher. - Why do you want to be an astronaut? That's why, I can see the Earth more closely. Do you see more clearly at a distance or it is closer? -When it is closer my teacher…-Actually, we see at a distance as we look from the outside.–I'm going to watch a video about that. Then, you'll better understand what I'm saying (HLP-3).

When the dialogue is analyzed, it can be understood that the abovementioned HLP attempted to make an activity intended to watch videos and to provide visual experience as the verbal explanations were not enough.

Another aspect that needs to be carefully examined during the process is feedback-correction studies. Unlike the LLPs, it was decided that the HLPs made feedback-correction studies to restructure the learning processes of students. In this regard, they used discovering by hints or explaining the correct answer explaining with reasons. However, it was observed that the HLPs did not exhibit these behaviors consistently, and especially one of them used feedbacks such as "right" and "wrong" sometimes or recognizing someone else directly. It was considered to be the difficulties and shortcomings faced by the HLPs within the scope of organization strategies. On the other hand, it was witnessed that the LLPs used only "no" as feedbacks or recognizing someone else directly without any feedback like the HLPs in the feedback-correction process, or they maintained the lesson without explaining why the answer was correct by saying "yes". In this context, one of the LLP scaled the students to the blackboard one by one for the solution of the problems in math classes, chose another one if the answer was wrong by saying "*Sit down*" following "*No*" response to his question of "*Is it right?*" and continued the practice until the correct answer was found. Then, he gave instructions to the class by saying "*Right. Let everyone write*" (LLP-1).It was clear that he did not perform feedback-correction procedures to get the students to discover the mistakes or to explain the reasons of correct answers. It was also considered among the difficulties and shortcomings faced by the LLPs within the scope of organization strategies as in the HLPs. Moreover, the LLPs' having inadequacies in monitoring and organizing student learning indicated the difficulties related to implementing the IM strategies. In addition, the HLPs stated that they checked whether they were progressing according to the plan during the process, and that they maintained the written plan from time to time as well as intellectual inquiry with regard to the implementation of monitoring strategies.

Both the HLPs and the LLPs attempted to prevent undesired behaviors. The pre-service teachers in both groups similarly used verbal warnings with the expressions of "*keep quiet, sit down, listen to the lesson*". However, it was observed that the LLP-2 did not warn or take any precautions for the undesired behaviors of students such as walking around, talking with each other and not listening to the lesson. It was observed in the camera recordings that the advisor had to intervene due to the aforementioned LLP's indifference. While this was considered to be a shortcoming in monitoring undesired behaviors by the LLPs, the solely use of verbal warnings and the permanence of undesirable behaviors indicated that both groups experienced difficulties and shortcomings related to classroom management.

It was observed that only the HLPs included the practices for monitoring student participation and they attempted to provide the participation of all students during the process. Within the scope of organization strategies, they recognized the students who did not participate in the process with the expression of "*You did not attend the course today*" or organized activities to make sure the students' attendance respectively. For example, the HLP-1 used a cube with facial expressions in order to reflect different feelings, and made

creative drama and group animations in a lesson in which emotions were handled. The HLP-2, on the other hand, prepared activity papers and another HLP benefited from learning station method to ensure the participation of all students.

For the use of time and the progress of subject matter within the scope of monitoring and organization, the HLPs made plans to use time effectively, and gave assignments when necessary during the process and when they realized that the students completely understood the subject. Accordingly, one of the HLPs made time arrangement with the expressions of "*Let's answer the first two questions in the activity paper-Let's complete it later-You have already understood it*" (HLP-2).However, one of the HLPs could not complete the lesson when the bell was ringing, that is, she could not fulfill one of the planned activities during one observation solely. On the other hand, all the LLPs had a problem in using time, and the activities were interrupted when the bell was ringing except for two of the observed lessons. In addition, the LLP-3 had a disruption due to the early completion of the activities he prepared, and the advisory teacher gave support of new examples to fill the time.

Based on the overall evaluation of the findings, it can be asserted that the HLPs are better than the LLPs in implementing monitoring and organization strategies. Nevertheless, they had similar characteristics within the scope of arrangements for classroom management in that they exhibited similar behaviors for the use of feedback, correction and time and experienced shortcomings from time to time. In addition, it is possible to say that the effective use of monitoring and organization strategies is useful in maintaining the process in a controlled way, configuring information through correcting the misunderstandings and ensuring the active participation of children.

3.5. Findings Regarding Evaluation Strategy

The evaluation strategy includes determining the quality of the practices following the teaching process, specifying the pros and cons, and getting pre-service teachers to make inferences about their own effectiveness and proficiency. In this regard, all the HLPs and two of the LLPs evaluated the effectiveness of the lesson after it was over. It was revealed that the HLPs exhibited the behaviors of evaluating student learning, evaluating by learning attainments, evaluating the use of time, evaluating to identify the source of the problem, evaluating someone's own effectiveness and evaluating the compliance with plan. It was concluded that the LLPs evaluated what to do additionally and student learning. The assessment of student learning was carried out by three of the HLPs and just one of the LLPs. One of the HLPs uttered that "*I consider whether the students are provided with meaningful and permanent learning*" (HLP-1), and one another highlighted the assessment to identify the source of the problem with "*If children fail, there is a problem. I'm trying to figure out where it stems from. I watched and evaluated the videos with my friends. I noticed that a student did not understand due to misconception. I practiced with him/her and s/he understood the subject…*" (HLP-2). Assessment based on learning attainments and the use of time was highlighted by one of the HLPs with "*I consider the learning attainments and evaluate them. I review time and take notes*". One of the LLPs underlined what can be done differently with "*–Often it doesn't proceed the way I've planned. I ask myself questions, what can I do differently?*" (LLP-1).The assessment of the compliance with plan was voiced by one of the HLPs with "*I contemplate about whether I am compatible with the plan I've made before. I ask whether the activities were in time.*" (HLP-2).When evaluating her effectiveness, one of the HLPs stated that she operated intellectual process to identify the pros and cons with "*…I do this both to evaluate myself and not to repeat my mistakes in following lessons or to perform the good performance again by recognizing my good and bad sides.*" (HLP-1).

The overall evaluation of the findings related to the evaluation strategy indicates that the HLPs had more comprehensive assessment strategies than the LLPs and they exhibited much more IM behaviors. On the other hand, it can be claimed that the LLPs hardly ever displayed IM behaviors for evaluation. To sum up, it is possible to say that the effective use of the IM is functional in determining the effectiveness of the practices performed, identifying the shortcomings, making subsequent practices more effective and increasing the quality of prospective teachers' professional development based on the scope of the IM behaviors employed for the evaluation strategy and the differentiation between the two groups.

4. Discussion and Conclusion

As a result of the study, the IMs of the HLPs and the LLPs regarding planning were differentiated in the preparation stage. It was found that the HLPs regularly made written plans, and all the HLPs considered learning attainments, course content and student characteristics for planning, and aimed to inform students about the objectives, attracted attention and motivated them at the very beginning of the lesson. In addition, it was revealed that the HLPs organized activities, determined suitable methods and techniques to achieve the goals, contemplated about teaching materials, planned time and reflected it to the plan during the preparation stage. Similarly, Tsui (2003) noted that effective teachers make plans by considering a great many contextual variables such as student characteristics, curriculum, classroom environment, teaching methods and strategies. In addition to preparing a plan in paper during the preparation process, it was also ascertained that the HLPs prepared activity papers, handmade visual models and technological materials such as videos and presentations. On the other hand, it was observed the planning practices of the LLPs were not permanent, they preferred to follow the textbook and did not make any preparation for some courses. Similarly, Tok (2010) found that inexperienced teachers had planning problems, and Artzt & Armor-Thomas (2001) concluded that inexperienced teachers adhered to the content of the lesson while experienced ones preferred student-centered lessons similar to the IM behaviors exhibited by the HLPs. It was established that the HLPs had no shortcomings or difficulties while exhibiting the IM strategies and behaviors. The findings yielded that all the LLPs had difficulties and shortcomings in terms of preparing a regular plan, developing supportive instructional materials - developing teaching materials - and taking into account the variables for effective planning. Fernandez & Ritchic (1992) also determined that inexperienced teachers had difficulties in planning the teaching process.

It was uncovered that all participants displayed the IM behaviors in the teaching process within the scope of effective teaching, monitoring and organization strategies, but the instructional approaches of the LLPs varied while all the HLPs exhibited common instructional behaviors. Though both groups carried out activities to inform about the objectives, to ask provoking questions and to ensure participation, the HLPs were also found to display the behaviors such as attracting attention and motivating, considering student characteristics, determining the level of readiness and addressing the shortcomings, recalling previous information, organizing student-centered activities, utilizing technology, using materials such as visual models, activity sheets etc., associating with daily life and performing reinforcement activities permanently within the context of effective teaching strategies. Similarly, Freitas, et al. (2004) discovered that experienced teachers structure their lessons to make the students more active. That's why, a teacher with advanced metacognition can use the knowledge of "when" and "how" effectively during the teaching process (Armor-Thomas, 1989).

The research results indicated that the HLPs had difficulties in only asking provoking questions and shortcomings in terms of presenting the conceptual information directly to the

student within the scope of effective teaching strategies. Besides them, the LLPs had difficulties and shortcomings in all other IM behaviors exhibited by the HLPs. Similarly, Tok (2010) confirmed that inexperienced teachers have difficulty in using teaching materials.

It was concluded that all the HLPs and some of the LLPs implemented monitoring and organization strategies. All of the participants who used the monitoring and organization strategies displayed the IM behaviors for monitoring student learning and monitoring undesired behaviors. In addition, the HLPs also exhibited the IM behaviors for monitoring the use of time, monitoring the progress of subject matter and monitoring student participation. Another research result was that the variety of IM behaviors displayed by the HLPs, but the number of the LLPs was limited. The IM behaviors of the HLPs in monitoring student learning were found to be reviewing by asking questions, asking students directly, requesting samples from students, detecting misunderstandings, questioning newly learnt things, and identifying unknown words, concepts, etc. while the LLPs solely preferred asking students directly. While no difficulties or shortcomings have been identified in HLPs' implementing monitoring strategies, the LLPs had difficulty in monitoring student learning and undesirable behaviors, and were inadequate in monitoring the use of time, the progress of subject matter and student participation. Tok (2010) also revealed that inexperienced teachers had problems in subject matter knowledge, the use of teaching materials, time management and behavior management. The LLPs' lack of monitoring student learning, use of time, undesirable behaviors, and the progress of subject matter may be caused by their having difficulties in preparing plans and considering variables for effective planning and their lecturing unpreparedly on occasion. That's why; the success of the course depends on good planning and the effective implementation of the plan. Planning ensures the determination and effective use of time devoted to a particular subject matter (Koc, 2009), and thus, a great many classroom management problems can be prevented (Arends, 1998).

The research findings regarding organization strategies implied that both groups exhibited the IM behaviors to control student learning and undesired behaviors. However, it was determined that the IM behaviors of the HLPs were much more composite. Zohar (2006) also ascertained that metacognition enables teachers to organize learning activities depending on student characteristics, objectives and situational conditions. It was found that both groups had shortcomings in the IM behaviors related to feedback-correction process, classroom management and the use of time within the scope of organization. In addition, the LLPs had shortcomings both in the arrangements for student learning and for student participation. Artzt & Armor-Thomas (2001) also revealed that inexperienced teachers were unable to adjust their plans according to the learning characteristics of the students and strictly adhered to the available plans. It can also be regarded as a reflection of the shortcomings on the IM behaviors of the LLPs regarding monitoring. That's why, organization strategies are shaped on the basis of monitoring strategies. Thus, it is hardly possible to expect an organization strategy to be followed for non-monitored IM behaviors.

Regarding the use of evaluation strategies, the participants in both groups, apart from one of the LLPs, were found to make evaluations about the effectiveness of the lesson after it was over. While the HLPs evaluated a great number of aspects such as student learning, learning attainments, use of time, the determination of the source of the problem, compliance with the plan, and the assessment of their own effectiveness, the LLPs exhibited limited number of IM behaviors only in terms of what can be done additionally and evaluating student learning. Similarly, Fernandez & Ritchic (1992) determined that inexperienced teachers are inadequate in evaluating student learning. Artzt & Armor-Thomas (2001), on the other hand, found that inexperienced teachers perceive themselves as people who distribute information and are weak in providing feedback to students.

In summary, the HLPs demonstrated a wide variety of IM behaviors than the LLPs and were more effective in terms of the use of evaluation strategies within the context of reflections during and after implementation as in planning, effective teaching, monitoring and organization strategies. Ozturk & Doganay (2011) also found that experienced teachers are more successful in implementing monitoring, organization and planning strategies than the inexperienced ones. That's why, effective teachers with high instructional skills can make critical evaluations of what and why they do during their teaching process, and what are the convenient and inconvenient practices (Brookfield, 1995).

As a result of the study, both the HLPs and the LLPs were found to exhibit several instructional metacognition behaviors during the preparation, teaching and evaluation stages of instructional activities. While all the HLPs often exhibited these behaviors in all stages of the teaching process in an effective and composite way, the LLPs displayed limited number and variety of them from time to time. In addition, the active employment of IM behaviors positively affected the quality of education, and furthermore, contributed to the adoption of a student-centered learning approach rather than a teacher-centered one, to the inclusion of technology in the process, and to the organization of real life-related learning experiences based on student characteristics. According to Wilson & Bai (2010), there is a relationship between teachers' understanding of metacognition and their perceptions about teaching strategies. In light of these, it can be alleged that the IM has an important function in the development process of teaching skills. Marchant (1989) pointed out that metacognition increases the effectiveness of teachers. Similarly, Wen (2012) emphasized that the use of metacognition enables teachers to enrich lesson plans, monitor and evaluate teaching. In this regard, it is important to focus on the planning of teacher training programs that will improve the instructional metacognition of prospective teachers.

In light of the research results, program developers and practitioners were recommended to include plans that will improve the instructional metacognition of teacher candidates into teacher training programs. In particular, courses such as Teaching Practice and School Experience can be handled in this context. The present study was carried out with prospective teachers studying at the department of elementary teaching. In addition to similar studies to be conducted with teachers, the reflections of instructional metacognition on students can be addressed in different studies within the context of learning, the permanence of learning, attitudes towards the course and academic achievement. Moreover, the researchers were recommended to study on program development to enrich teacher training programs and in-service training programs with instructional metacognition development by conducting in-depth research on how to improve the instructional metacognition of teachers and prospective teachers.

5. Conflict of Interest

The authors declare that there is no conflict of interest.

6. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Arends, R. I. (1998). Resource handbook: Learning to teach. Boston: McGraw-Hill. Retrieved on 22.04.2020 from https://hasanahummi.files.wordpress.com/2017/04/connect-learn succeed-richard-arends-learning-to-teach-mcgraw-hill-2012.pdf

Armour-Thomas, E. (1989). The application of teacher cognition in the classroom: A new teaching competency. *Journal of Research & Development in Education, 22*(3), 29 37.

Artzt, A., & Armour-Thomas, E. (2001). Mathematics teaching as problem solving: SA framework for studying teacher metacognition underlying instructional practice in mathematics. H. J. Hartman (Ed.), In *Metacognition in learning and instruction* (pp.127-148). Netherlands: Kluwer Academic Publishers.

Balcikanli, C. (2011). Metacognitive awareness inventory for teachers (MAIT). *Electronic Journal of Research in Education,* 9(3), 1309-1332. doi:10.5539/jel.v6n4p78

Baltaci, A.(2018). School Administrators' Metacognitive Awareness Levels. *Trakya Journal of Education*, *8*(4), 840-854. doi: 10.24315/trkefd.313693.

Baykara, K. (2011). A study on "teacher efficacy perceptions" and "metacognitive learning strategies" of prospective teachers. *Hacettepe University Journal of Education*, *40*(40), 80-92. Retrieved on 19.02.2020 from: http://efdergi.hacettepe.edu.tr/shw_artcl396.html

Bogdan, R. C. & Biklen, S. K. (1998). *Qualitative research for education: An Introduction to theory and methods*. Boston: Allyn and Bacon Publications.

Brookfield, S. B.(1995). *Becoming a critically reflective teacher*. San Francisco: Jossey Bass.

Byra, M., & Sherman, M. (1991). *Preactive and interactive decission of experienced and inexperienced novice teachers*. Paper presented at the Round table presentation at the annual meeting of the American Educational Research Association, Chicago, IL.

Christensen, L. B., Burke Johnson, R., & Turner, L. A. (2015). *Research methods design and analysis*. (A. Aypay, Trans.). Ankara: Anı Publishment.

Cochran-Smith, M., & Zeichner, K. (2005). *Studying teacher education: The report of the AERA panel on research and teacher education.* Mahwah, NJ: Erlbaum.

Costa, A. (1984). "Thinking: How do we know students are getting better at it?" *Roeper Review*: *A Journal on Gifted Education,* 6(4), 197-199. doi:10.1080/02783198409552809.

Curwen, M. S., Miller, R. G., White-Smith, K. A., & Calfee, R. C. (2010). Increasing teachers' metacognition develops students' higher learning during content area literacy instruction: Findings from the read-write cycle project. *Issues in Teacher Education.* 19(2), 127-151. Retrieved on 20.01.2020 from:https://files.eric.ed.gov/fulltext/EJ902679.pdf

Doganay, A., & Ozturk, A. (2011). An investigation of experienced and inexperienced primary school teachers' teaching process in science and technology classes in terms of metacognitive strategies. *Educational Sciences: Theory and Practice*, *11*(3), 1320-1325.

Duffy, G. G., Miller, S., Parsons, S., & Meloth, M. (2009). Teachers as metacognitive professionals. D.J. Hacker, J. Dunlosky, A.C. Graasser (Eds.).In *Handbook of metacognition in education* (pp.240-256). doi: 10.4324/9780203876428.ch13.

Fathima, M., Sasikumar, N., & Roja, M. P. (2014). Enhancing teaching competency of graduate teacher trainees through metacognitive intervention strategies. *American Journal of Applied Psychology*, *2*(1), 27-32. doi: 10.12691/ajap-2-1-5.

Fernandez, T. F., & Ritchic, G. R. (1992). Reconstructing the interactive science pedagogy: Experiences of beginning teachers implementing the interactive science pedagogy. *Research in Science Education*, 22, 123-131. doi: 10.1007/BF02356887.

Flavell, J. H. (1976). "Metacognitive Aspects of Problem Solving", In L. Resnick (Ed.), The Nature of Intelligence (s.231-235), Hillsdale, NJ: Lawrence Erlbaum Associates.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive developmental inquiry. *American Psychologist, 34*(10), 906911. doi:10.1037/0003 066X.34.10.906

Flavell, J. H. (1987). Speculations about the nature and development of metacognition. In F. Weinert & R. Kluwe (Eds.), Metacognition, motivation, and understanding (pp. 21 29). Hillsdale, NJ: Erlbaum.

Freitas, I. M., Jiménez, R., & Mellado, V. (2004). Solving physics problems: The conceptions and practice of an experienced teacher and an inexperienced teacher. *Research in Science Education, 34*(1), 113-133. doi: 10.1023/B:RISE.0000021000.61909.66.

Galaczi, E., N., A., Poulter, M., & Allen, H. (2018). Teacher professional development. Cambridge: UCLES. Retrieved on 11.09.2019 from https://www.cambridgeenglish. org/Images/539683perspectivesteacherprofessional-development.pdf

Georghiades, P. (2000). Beyond conceptual change learning in science education: Focusing on transfer, durability and metacognition. *Educational Research, 42* (2), 119-139. doi: 10.1080/001318800363773.

Griffith, R., Bauml, M., & Quebec-Fuentes, S. (2016). Promoting metacognitive decision making in teacher education. *Theory into Practice*, *55*(3), 242-249. doi: 10.1080/00405841.2016.1173997.

Guskey, T. R. (2000). *Evaluating professional development*. California: Corwin Press.

Hartman, H. J. (2001). Metacognition in science teaching and learning. H. J. Hartman (Ed.), In *Metacognition in learning and instruction* (pp.127-148). Netherlands: Kluwer Academic Publishers.

Hoffman, J., & Pearson, P. D. (2000). Reading teacher education in the next millennium: What your grandmother's teacher didn't know that your granddaughter's teacher should. *Reading Research Quarterly*, *35*(1), 28-44. doi: 10.1598/RRQ.35.1.3

Jiang, Y., Ma, L., & Gao, L. (2016). Assessing teachers' metacognition in teaching: The teacher metacognition inventory. *Teaching and Teacher Education*, *59*, 403-413. doi: 10.1016/j.tate.2016.07.014.

Koc, G. (2009). Öğretimin planlanması ve uygulanması [Planning and implementation of teaching], A. Doganay (Eds), In *Ögretim ilke ve yöntemleri* [Teaching principles and methods], (385-421). Ankara: PegemA Publications.

Liakopoulou, M. (2011). The Professional Competence of Teachers: Which qualities, attitudes, skills and knowledge contribute to a teacher's effectiveness. *International Journal of Humanities and Social Science*, *1*(21), 66-78. Retrieved on 12.01.2020 from https://www.academia.edu/28086348/The_Professional_Competence_of_Teachers_Whichqualities_attitudes_skills_and_knowledge_contribute_to_a_teachers_efectivness

Lochmiller, C.R. & Lester, J.N. (2017). An Introduction to educational research. London: Sage Publications.

Marchant, G. J. (1989). Metateaching: A metaphor for reflective teaching. *Education*, 109, 487-489.

Martinez, M. E. (2006). What is metacognition? *Phi Delta Kappan*, *87* (9), 696-699. doi: 10.1177/003172170608700916.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks and London: Sage.

Moreno, R. (2009). Learning from animated classroom exemplars: The case for guiding student teachers' observations with metacognitive prompts. *Educational Research and Evaluation*, *15*(5), 487-501. doi: 10.1080/13803610903444592.

Nahrkhalaji, S. (2014). EFL Teachers' metacognitive awareness as a predictor of their professional success. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, *8*(6), 1665-1669. Retrieved on 10.01.2020 from https://publications.waset.org/9998414/efl-teachers-metacognitiveawarenessas-apredictor-of-their-professional-success

Reese, S. (2010). Traditional or alternative finding new teachers along different pathways. *Techniques: Connecting Education and Careers (J1)*, *85*(1), 16-21. doi:10.117/10570837030130001010 2.

Sachs, J. (2005). Teacher education and the development of professional identity: Learning to be a teacher. P.M. Denicolo & M. Kompf (Eds.) In *Connecting policy and practice: Challenges for teaching and learning in schools and universities* (pp. 5-21). Routledge: Taylor and Francis Group.

Schraw, G. (2001). Promoting general metacognitive awareness. H. J. Hartman (Ed.), In *Metacognition in learning and instruction* (pp.127-148). Netherlands: Kluwer Academic Publishers.

Schraw, G., & Moshman, D. (1995). Metacognitive theories. *Educational Psychology Review*, 7(4), 351–371. doi:10.1007/BF02212307

Stronge, J. H. (2018). *Qualities of effective teachers*. USA: ASCD.

Temur, Ö. D., Özsoy, G., & Turgut, S. (2019). Metacognitive instructional behaviours of preschool teachers in mathematical activities. *ZDM*, 51(4), 655-666. doi: 10.1007/s11858-019-01069-1.

Tok, S. (2010). The problems of teacher candidate's about teaching skills during teaching practice. *Procedia-Social and Behavioral Sciences*, *2*(2), 4142-4146. doi: 10.1016/j.sbspro.2010.03.654.

Tsui, A. B. (2003). Characteristics of expert and novice teachers. In *Understanding expertise in teaching*: *Case studies in ESL teaching* (pp.22-41). England: Cambridge University

Press. Retrieved on 17.11.2019 from https://www.eflbooks.co.uk/samples/ 9780521635691.pdf

Veenman, M. V. J., Van Hout-Wolters, B. H. A. M., & Afflerbach, P. (2006). Metacognition and learning: conceptual and methodological considerations. *Metacognition and Learning*, 1, 3–14.

Yildirim, A. & Simsek, H. (2018). *Sosyal bilimlerde araştırma yöntemleri* [Research methods in social sciences]. Ankara: Seckin Publishing.

Wen, Y. H. (2012). A study on metacognition of college teachers. *The Journal of Human Resource and Adult Learning, 8*(1), 80- 91. Retrieved on 19.11.2019 from http://www.hraljournal.com/Page/9%20Wen,%20Ya-Hui.pdf at 12.11.2019.

Wilson, N. S., & Bai, H. (2010). The relationships and impact of teachers' metacognitive knowledge and pedagogical understandings of metacognition. *Metacognition and Learning, 5*(3), 269-288. doi: 10.1007/s11409-010-9062-4.

Zohar, A. (2006). The nature and development of teachers' metastrategic knowledge in the context of teaching higher order thinking. *The Journal of the Learning Sciences, 15*(3), 331-377. doi: 10.1207/s15327809jls1503_2.

Appendix-1

6.1. Interview Questions

· Do you plan before the teaching process?
- If so, how do you plan and what do you consider? Please explain.
- If not, can you explain why?

· Do you check whether your lessons maintain as you planned during the teaching process?
- If so, how do you do? –Why do you need to do such a control? Or what prompts you to do so? Please explain why?
-If not, please explain why?

·Would you take any precautions if the teaching process does not maintain as you planned? Or do you make new arrangements?
- If yes, what would you do?
- If no, why not? Please explain why?

· Do you evaluate on whether the lesson maintained the way you had planned after it was over?
- If so, how do you assess? What triggers you to make such an assessment? Please explain.

Tütüniş, B. & Yalman (2020). Teacher education and foreign language teacher professionalism in the 21st century. *International Online Journal of Education and Teaching (IOJET), 7*(3). 1168-1176. https://iojet.org/index.php/IOJET/article/view/812

Received: 09.01.2020
Received in revised form: 24.02.2020
Accepted: 13.05.2020

TEACHER EDUCATION AND FOREIGN LANGUAGE TEACHER PROFESSIONALISM IN THE 21st CENTURY

Research article

Birsen Tütüniş

Istanbul Kültür University

tutunisster@gmail.com

Duygu Yalman

duyguyalman@gmail.com

Fatih Sultan Mehmet Vakıf University

Dr. Tütüniş (PhD from University of Sussex, UK), has published articles and books on a variety of topics. She has been awarded Istanbul Kültür University Scientific Award – BILSAP, 2018. Her latest contribution is to the book "Learning Strategy Instruction in the Language Classroom" (Multilingual Matters 2019).

Dr. Yalman (PhD from Marmara University, 2014) has worked at Istanbul Kültür University as a lecturer transferring her field knowledge as a kindergarden teacher to teacher candidates. She has articles and books on children's literature. She currently works at Fatih Sultan Mehmet Vakıf University.

TEACHER EDUCATION AND FOREIGN LANGUAGE TEACHER PROFESSIONALISM IN THE 21st CENTURY

Birsen Tütüniş

tutunisster@gmail.com

Duygu Yalman

duyguyalman@gmail.com

Abstract

The quality of foreign language teaching improves so long as foreign language teacher education quality is increased. However, it is not easy to measure the quality of Foreign Language Teacher Education (FLTE) programmes due to the factors related not to the programme but to the learner variables. It has been proved by the research (Sutton Trust 2011) that improving teacher effectiveness has a great impact on learner outcomes. In the 21st century, Professional development of the teacher has gained importance due to the precedence given to the learners. For this reason frameworks and models have been proposed to enhance the quality of teacher education (i.e. NIE, VSK Model, 2009).This paper focuses on Teacher Education programme models and the criteria put forward by these models. A comparison of Turkish and other FLTE programmes is given in order to bring clarity to the concept of professionalism. The small-scale research results conducted in Turkish context (n81) to check upon foreign language teacher knowledge and beliefs on efficacy and professionalism are also displayed.

Keywords: Foreign Language Teacher Education (FLTE), English Language Teaching (ELT), Teacher Education (TE), Values, Skills and Knowledge (VSK).

1. Introduction

The quality of foreign language teaching depends on the quality of foreign language teacher education. The vision for 21st century learning P21 (Bellanca, 2010) offers a holistic and systemic view of how we can reconceptualize and reinvigorate public education bringing together all the elements- 21st century student outcomes and 21st century education support systems- into a unified framework (p.xiv).The framework covers life and career skills; learning and innovation skills; information media and technology skills; core subjects, 21st century skills and 21st century education support systems (p.xv).The main purpose is stated to be the preparation of the students for a better learning that would support them in their lifelong struggles. This framework is closely related to the good quality teacher training/ education models suggested by scholars (Sang, 2010), (Kürsteiner, 2016). The belief that doing well in school no longer guarantees a lifelong job or career, as it did in the past. Future learning is highly different from the past. Gardner (Gardner, 2010) also believes that education has to undergo fundamental changes and with the forces of globalization, he suggests it is essential to develop other kinds of minds such as; the disciplined mind, the synthesizing mind, the creating mind, the respectful mind and the ethical mind.

1.1. Related Literature

It has been proved by the research (Higgins, May, 2011) that improving teacher effectiveness has a great impact on learner outcomes. It is not easy to conceptualize teacher professionalism. Teacher resistance can not be ignored. However maintaining high standards of teaching is not dependent on teachers only. We need to create Professional learning communities and support teachers for professionalism.

Economic Cooperation and Development (OECD) report, Supporting Teacher Professionalism, based on the Teaching and Learning International Survey (TALIS) (OECD, 2018), conceptualizes teacher professionalism as being comprised of: knowledge, autonomy, and peer networks and it emphasizes the importance of these elements to maintain high standards of teaching.

In many countries throughout the World, Pre-service teacher education equips student teachers with the necessary knowledge for the profession, but in many contexts this type of education does not help teacher candidates to possess teacher autonomy. It is left to the novice teacher to decide whether to join the network or to create a network for peer checks and reflection.

In the 21st century, Professional development of the teacher has gained importance due to the precedence given to the learners. For this reason frameworks and models have been proposed to enhance the quality of teacher education National Institute of Education in Singapore for example, reviewed and enhanced their initial teacher training programmes in 2005 and a Value-Skills- Knowledge (VSK) model was developed (NIE, May 2015). According to this model student teachers need to reflect upon their personal and Professional values like; Respect for Diversity, Commitment and dedication to the profession, Collaboration, sharing and team spirit, desire for continuous learning, and excellence and innovation. Student teachers also need to possess 21st Century skills to create better learning environments for learners.

Singapore carried out a Project which could be a good example for all teacher education/ training programmes. Singapore's visionary education framework- *Teach Less Learn More*-was created for the nation's entry into the 21st century (Education, 2004). This part of the framework consists of four components: vision for the whole nation, vision for Singaporean education, vision for implementing school change, vision for the professional learning communities (PLC). The concept of *Teach Less Learn More* is directly related to lifelong, life fulfilling, and life sustaining learning. It is reported that although there is teacher resistance for the concept *Teach Less*, after long discussions teachers realize that it is managable with a wider and deeper instructional repertoire. In England, Knowsleys, UK Project of student input on the other hand, despite teacher resistance, is another good example which takes learner as the central point and brings in a pedagogical change. The Project created teacher resistance, but the results show that pedagogy has to change to enable 21st century learning. (Birkett, 2001)

Quali-T Project (Quali-T, 2009-2011) funded under the European Commission's Lifelong Learning Grundtwig programme was carried out with the aim of comparing the role of quality management in adult education in general, with special regard to quality in language learning in the various countries and within the different types of organizations involved. One of the products of the Quali-T project was a report based on a survey of learners and teachers carried out in the seven countries within the partnership, the UK, Spain, Czech Republic, Estonia, Sweden, Germany and Austria. The results shown in the report were striking since the learners' and teachers' views on the quality of a teacher did not show

much difference: For learners, the most important aspects of being a good teacher were that they knew their subject well, they were encouraging, supportive and approachable, that they explained things clearly and were well-prepared. Teachers agreed with these opinions although they also felt it was important that teachers were enthusiastic.

A close analysis of the results of this survey show us the correlation between the 21st century students' outcomes mentioned above (Bellanca, 2010). Adapting teaching to suit different abilities in class, requires possession of learning and innovation skills consisting of four Cs (creativity, communication, collaboration and critical thinking). An effective teacher would create real life situations in class for communication and collaboration enabling students for dialogic co-construction of meaning.

1.1.1. Turkish Context: Comparison

In Turkish context, under the influence of above mentioned teacher education models and the 21st Century Learning and Innovation Skills Framework, the Ministry of Education and Higher Education Organization decided to make changes in teacher education programmes in their XVII. Meeting, 2006 (Kavak, 2007). According to article 53, teacher education programmes should be enriched with the courses that require taking social responsibilities and in article 69, it is stated that the teacher education programmes should be designed to enhance student teachers' creativity, critical thinking and oral and written communication skills.

Looking at VSK model, Turkish FLTE programmes are good at educating the teacher candidates on values and pedagogical knowledge, but they fail in enhancing student teachers' learning and innovation skills, soft skills, and life and career skills for future which in return causes failure in professionalism.

Education is a tool to be used to achieve the necessary skills and we have to look for quality in education on at least three levels: learner, teacher/ trainer and institution.

2. Method

We conducted a small scale research and aimed to investigate the ELT teachers' (n81) beliefs and attitudes towards self efficacy and professionalism in the 21st century. Teachers' answers were important for us since we believe they depict their mindset that effects their classroom applications.

2.1.Research Method

In this research, quantitative research method was used.

2.2.Research Questions

Q1:What do we need to possess to become an effectıve and professional teacher?

Q2: Please wrıte reasons for each item you wrote for q1.

2.3. Sample/Participants

The sample of the study was 81 randomly selected teachers of English as a second language (ELT) from various institutions (kindergarten to university) in Turkey.

45 (55.56%) of the participants were females and 36 (44.44%) of the participants were males. The participants ranged in age from 22 to 50 and up. 22 (27,16%) of the participants were in 20-25 years range; 8 (9,87%) of the participants were in 26-30 years range, 18 (22,22%) of the participants were in the 31-35 years range, 16 (19,75%) of the participants were in 36-40 years range, 7 (8,64%) of the participants were in 41-45 years range, 5 (6,17%)

of the participants were in 46-50 years range. In terms of education level, 37 (45,68%) of the participants had BA degree, 30 (37,04%) of the participants had MA degree and 14 (%17,28) had Phd degree. Regarding the teaching experience, the teachers who have 1-5 years experience constitute %33,34 of the sample while teachers who have 6-10 years experience constitute %22,23 of the sample. *11-15 years of experience*; *16-20 years experience* and *20 years and up experience* range has the same percentage constituting %14,81 of the sample.

2.4. Research Instruments

How To Be an Efficient and Professional Teacher" Questionnaire: The data were gathered by a questionnaire developed by the researchers to identify the demographic information of ELT teachers as well as their attitudes and beliefs on how to become an efficient and Professional teacher. The questionnaire was prepared by analyzing related literature. The validity of the questionnaire used in this study was verified by the three field experts before the implementation.

It has two parts. First part includes demographic information of the ELT teachers e.g. age, gender, level of education, teaching experience. The second part consists of questions about professional development. The questionnaire was designed in open-ended question format and it has two questions.

2.5. Data collection procedures

In this study, data was collected through the questionnaire from the teachers working in state and private institutions (kindergarten to universities) in Turkey. At the beginning of the research, a pilot study was conducted with 20 teachers. By analyzing the answers, the third question was omitted from the form. Therefore, the final version of the questionnaire has two questions. The implementation of questionnaire forms were distributed by researchers in Istanbul. The participants from other cities filled the form in Word format and sent it back to the researchers by email.

2.6.Data analysis

The demographic data of the ELT teachers' was analyzed by using tthe SPSS 23.0 (Statistical Package for Social Sciences) program. The demographic data (age, gender, education level, teaching experience) was described as percentage and frequency. In order to analyze the data obtained from open-ended questions, content analysis was used. Content analysis can be defined as bringing together similar data within the framework of specific concepts and themes and interpreting them in a way that readers can understand (Yıldırım, 2013) .

The answers from two open-ended questions from 81 ELT teachers, collected in separate sheets and the texts were thematically coded using an inductive and interpretive approach (Creswell, 2012).

Each researcher has followed this coding process: first frequency calculations of words made and according to the frequency results, categories and themes were identified. Two researchers separately analyzed the data to ensure the validity of interpretation and then gathered to see the similarities and differences on their coding sheets. The reliability of the analysis was made according to Miles & Huberman (Miles, 1994).

Each teacher's answers were coded as T1, T2, T3,. etc.

3. Findings

3.1. Research Question 1: What do we need to possess to become an effectıve and professional teacher?

Based on the views of teachers, researchers identified **five** themes. These themes are shown below:

Table 1. *Main Themes*

	Themes	**f**
1	Knowledge	81
2	Skills	57
3	Professional Development	35
4	Technology	9
5	Experience	6

Turkish Ministry of Education established "General Proficiency of Teaching Profession" report in 2017. In this report, teachers' proficiencies are reported as: Professional knowledge, Professional skills, attitudes and values. In parallel with this report, participants of this study first of all emphasized the importance of knowledge. According to the frequencies of this theme, sub-themes are determined: pedagogical knowledge (55), general knowledge (20) and linguistics knowledge (6) (n81). ELT teachers consider pedagogical knowledge as the most important one that a teacher must possess in order to be an efficient teacher.

Under the skills theme, we identified four sub-themes: General skills (25), Interpersonal skills (18), Patience (9) and Social skills (5) (n57). Regarding ELT teachers' skills, interpersonal skills are very crucial in order to keep students active and express themselves during FL classes. The frequency (18) of this theme verifies the principle on language teaching.

Comparing with other themes, *"professional development* "seems less important, however, ELT teachers express their beliefs with more precise and detailed sentences such as; reading trend articles, attending seminars and improving language teaching skills as given in the statements below:

T23: "Being knowledgeable about the subjects, the latest developments in language teaching, the latest trends".

T46: "We need to update our knowledge about language teaching. Take part in seminars/conferences, read articles, improve teaching skills".

T57: "Reading on current teaching approaches,
Being a member of an association of any teacher group,
Joining any campaign (website/interest)".

3.2. Research Question 2: Please wrıte reasons for each item you wrote for Q.1.

The participants of the research, wrote their reasons for the first question'. According to the content analysis, **three** themes were revealed as shown below:

Table 2. *Reasons for being an effective teacher theme*

	Themes	**f**
1	Knowledge	76
2	Values	30
3	Skills	21

According to the frequencies of the theme **"knowledge",** sub-themes as; pedagogical knowledge (51) and general knowledge (19) and linguistic knowledge (6) were determined which were in line with the answers to the first question. The skills that ELT teachers express as important are gathered under the following sub-themes: Teaching skills (11), communication skills (4), and listening skills (3). The fact that teaching skills are in the first place is not seen as a surprising result.The **values** theme (VSK Model, 2015) has the sub-themes named as; respect for students' individual differences (11), dedication to the profession (16), Collaboration within the scope of 21st century skills (3) These results show us that ELT teachers are not aware of the concepts which describe the need for 21st century skills related with professionalism in the literature.

4. Discussion

These findings urge us to rethink about the FLTE programmes in Turkish context. We need to ask the following questions: Do the courses satisfy candidates that they will be ready for taking a class responsibility and perform the teaching profession properly? Are the requirements of the profession as efficient and professional teachers so complex and difficult to accomplish? If so, how do we need to prepare teacher candidates for this complexity?

Teachers' cognition, knowledge, techniques, methods and styles are the sources behind the understanding and learning process of their learners (Borg, 2006). Teachers need to apply their pedagogical content knowledge and their practical knowledge into their classes. However, if this knowledge is not updated, teachers fall behind their students and the learning process in classes deteriorates. Performing teaching profession properly depends on teachers' continuously updated knowledge. The requirements of teaching profession as efficient and Professional teachers are complex but not that difficult to accomplish. FLTE programmes in Turkish context need to revised and training teacher candidates for skills development needs to be inserted as compulsory courses to be studied. Future teachers need to possess 21st century (hard and soft) skills along with the pedagogical content knowledge.

The codes that form the general knowledge sub-theme emphasize that in order to become an effective ELT teacher, knowledge in the professional and linguistics field is required. Teaching the language effectively is related to having sufficient knowledge in the field of linguistics. The necessities of teaching and learning require some techniques to be employed. However, having the required knowledge doesn't mean that a teacher can put this knowledge into action efficiently. The all participants in this study state the importance of pedagogical and linguistic knowledge for efficacy and professionalism. However, on the other hand, only three of the participants mention the importance of 21st century skills, the four Cs- creativity, critical thinking, communication and collaboration.

Globalization in the 21st century entail major changes in our lives and the need for essential skills development emerge for a better adaptation. 21st century skills are underemphasized in today's schooling due to the lack of Professional development (Dede, 2010). The question "Do teacher education programmes make sure that student teachers are

confident about their own knowledge and abilities?" needs to be discussed. Could formation of Professional learning communities be a solution? (DuFour, 2010) Teacher education programmes throughout the world needs to go under a huge revision to bring the aspired quality in teaching and learning.

5. Conclusion

The quality of foreign language teacher education is determined with the learners' achievement results. The main purpose of the 21st Century Learning Skills Framework is stated to be the preparation of the students for a better learning that would support them in their lifelong struggles and this framework is closely related to the good quality teacher training and education. Future learning is highly different from the past. Therefore, teachers need to be educated according to the needs of future learners.

Generation Z students are in schools today. They are smarter than previous generations and they possess skills and knowledge better than the others. Therefore, it is time for the teachers to change. We need to teach in such a way that, our goal should not be to transfer our knowledge only but to empower our students to become global citizens who embrace lifelong learning. The participants of this study show no knowledge (except for only 3) related to 21st century hard and soft skills to be practiced in classes. They believe in individual differences (11) but they emphasize the teachers pedagogical knowledge which is related more to the whole class instruction than individual tasks. The results indicate that for the participants of this study, being an effective and professional teacher depends on general, pedagogical and linguistic knowledge.

Professionalism is defined as the process of using education and certification to enhance the quality of performance of those within an occupational field (Shanahan, 1994). The participant teachers of this study believe in the necessity for Professional Development but they do not seem to have attended any seminars or conferences. These teachers can be taken as the representatives of the whole ELT teachers in Turkey. Any change brought in towards the education of Generation Z will have an impact on their language teaching skills as well. The quality of foreign language teaching improves so long as foreign language teacher education quality is enhanced. Foreign Language teaching is not linguistic knowledge to the learners. It is not using one's pedagogical knowledge to talk about the language being learnt. It is not showing the learners that the knowledgeable person knows a lot about the structure of the language being taught. It is activating the whole class for meaningful communication, for the use of foreign language both inside and outside the class, going beyond the classroom walls. The results of this study implies that not only the teachers but teacher trainers and educators also need to update themselves to be able to train/educate FL teachers to teach future generations.

6. Conflict of interests

The authors declare that there is no conflict of interest.

7. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Bellanca, J. a. (2010). *21st Century Skills Rethinking hoe students learn.* Bloomington: Solution Tree Press.

Birkett, D. (2001). *The School I'd Like.* accessed at www.guardian.co.uk/guardianeducation/story on 04.08.2019 : The Guardian.

Bishop, J. (2002). *Partnership for 21st Century Skills (P21)* . P21: Battelle for Kids.

Borg, S. (2006). *Teacher Cognition and Language Education: research and practice.* NewYork: Continium International Publishing Group.

Corden, R. (2009). *Literacy and Learning through talk.* Open University Press.

Creswell, J. (2012). *Qualitative Inquiry& research design: choosing among five approaches.* Thousand Oaks: CA:Sage.

Dede, C. (2010). Comparing Frameworks for 21st century skills. J. a. Bellanca içinde, *21st Century Skillsw* (s. 51-75). Bloomington: olution Tree Press.

DuFour, R. &. (2010). The Role of Professional Learning Communities in Advancing 21st Century Skills. J. a. Bellanca içinde, *'1st Century Skills* (s. 77-93). Bloomington: Solution Tree Press.

Education, S. M. (2004). *Teach Less learn More: Reignitting Passion and Mission.* accessed at www.MOE.edu.sg/bluesky/tllm on 04.08.2019: Singapore Ministry of Education.

Gardner, H. (2010). Five Minds of Future. J. a. Bellanca içinde, *21st Century Skills* (s. 9-31). Bloomington: Solution Tree Press.

Gruntvig. (2009-2011). *QUALİ-T: quality in language teaching for adults.* https://sites.google.com/site/grundtvigqualit/: seven partners.

Higgins, S. a. (May, 2011). *Toolkit of strategies to improve learning.* Durham, UK: CEM.

Kavak, Y. A. (2007). *Öğretmen Yetiştirme ve Eğitim Fakülteleri 1982-2007.* Ankara: Yüksek Öğretim Kurulu Yayını 2007-5.

Kürsteiner, B. e. (2016). *Teacher Education in the 21st Century A Focus on Convergence.* Newcastle upon Tyne: Cambridge Scholars Publishing.

Miles, M. (1994). *Qualitative Data Analysis: An expanded Sourcebook.* Thousand Oaks: Sage.

Ministry of Education, S. (2004). *Teach Less Learn More: Reignitting Passion and Mission.* www.MOE.edu.sg/bluesky/tllm accessed 04.08.2019: Singapore Ministry of Education.

NIE. (May 2015). *P21 Framework for 21st Century Learning.* Singapore: NIE.

OECD. (2018). *TALIS.* UK: OECD.

Parker, M. &. (2007, 59 (3)). Teachers' use of questioning and modelling Comprehension skills in primary classrooms. *Educational Review*, s. 299-314.

Partnership, G. L. (2009-2011). *QUALI-T : quality in language teaching for adults.* https://sites.google.com/site/grundtvigqualit/project-definition: Gruntvig Learning Partnership.

Quali-T. (2009-2011). *Guidelines for quality in language teaching.* 7 countries: Quali-T.

Sang, T. (2010). *21st Century Teacher Education: A Singapore Case.* Singapore: Nanyang Technological University.

Sedova, K. ,. (2014, 3(4)). Troubles with dialogic teaching learning culture and socail interaction. *Teaching and Teacher Education*, s. 274-285.

Shanahan, T. e. (1994). *The professionalization of the Adult Literacy Teacher.* NCAL Technical Report TR94-11.

Wells, G. &. (2006, July). Dialogue in the Classroom. Journal of the Learning Sciences, 15, 379-428. . *Journal of the Learning Sciences*, s. 379-428.

Yıldırım, A. Ş. (2013). *Sosyal Bilimlerde Nitel araştırma yöntemleri.* Ankara: Seçkin.

Hamalosmanoğlu, M., Kızılay, E. & Saylan Kırmızıgül, A. (2020). The effects of using animated films in the environmental education course on prospective teachers' behavior towards environmental problems and their attitude towards solid waste and recycling. *International Online Journal of Education and Teaching (IOJET), 7*(3). 1178-1187. https://iojet.org/index.php/IOJET/article/view/943

Received: 03.05.2020
Received in revised form: 08.06.2020
Accepted: 15.06.2020

THE EFFECTS OF USING ANIMATED FILMS IN THE ENVIRONMENTAL EDUCATION COURSE ON PROSPECTIVE TEACHERS' BEHAVIOR TOWARDS ENVIRONMENTAL PROBLEMS AND THEIR ATTITUDE TOWARDS SOLID WASTE AND RECYCLING

Research Article

Mustafa Hamalosmanoğlu

Erciyes University

hamalosmanoglu@erciyes.edu.tr

Esra Kızılay

Erciyes University

eguven@erciyes.edu.tr

Aslı Saylan Kırmızıgül

Erciyes University

aslisaylan@erciyes.edu.tr

Mustafa Hamalosmanoğlu is an assistant professor at the Science Education of Faculty of Education at Erciyes University, Kayseri, Turkey.

Esra Kızılay is an assistant professor at the Science Education of Faculty of Education at Erciyes University, Kayseri, Turkey.

Aslı Saylan Kırmızıgül is a research assistance (Dr.) at the Science Education of Faculty of Education at Erciyes University, Kayseri, Turkey.

THE EFFECTS OF USING ANIMATED FILMS IN THE ENVIRONMENTAL EDUCATION COURSE ON PROSPECTIVE TEACHERS' BEHAVIOR TOWARDS ENVIRONMENTAL PROBLEMS AND THEIR ATTITUDE TOWARDS SOLID WASTE AND RECYCLING

Mustafa Hamalosmanoğlu
hamalosmanoglu@erciyes.edu.tr

Esra Kızılay
eguven@erciyes.edu.tr

Aslı Saylan Kırmızıgül
aslisaylan@erciyes.edu.tr

Abstract

This research aimed to investigate the effect of Wall-E films on prospective teachers' behavior towards environmental problems and attitude towards solid waste and recycling. In the research, one-group pre-test and post-test experimental design was used. The study group consisted of 130 prospective teachers at the Classroom Teacher Department, and the Department of Social Sciences Teaching in a Faculty of Education of a state university in Turkey. where they took Environmental Education course in 2018-2019 academic year. The data collection tools of the study were "Environmental Problems Behavior Scale" and "Solid Waste and Recycling Attitude Scale". After the scales were administered as a pre-test, the participants were invited to watch the movie Wall-E for a period of three weeks. Then the scales were re-administered as the post-test. It was found out that, watching the film, the participants' behavior towards environmental problems and their attitude towards solid waste and recycling increased in a positive way. The findings also revealed that attitude towards solid waste and recycling was a significant predictor of the prospective teachers' behavior towards environmental problems.

Keywords: Environmental education, animated films, recycling, environmental behavior, environmental attitude, prospective teachers

1. Introduction

The natural environment in which all living things live, has been in existence for many years without any problems in interaction with living things. However, factors such as increase in population, unplanned urbanization, industrialization, excessive consumption, damage to the natural environment and reduction of natural resources have caused many environmental problems. As a result of environmental problems becoming uncontrollable, solutions were tried to be found. These efforts to find solutions revealed the concept of environmental education by turning towards the person, who is responsible for the problems (ÇOB, 2007; Çolakoğlu, 2010; Doğan, 1997; Yücel & Morgil, 1998).

The concept of environmental education includes educational activities for people, who are the principal cause of environmental problems. Therefore, environmental education includes

all the trainings carried out in order to ensure that every individual in the society understand the environment, develop environmental awareness, gain environmentally friendly behaviors and take an active role in environmental problems (ÇOB, 2004; Öztürk, 2008; Uğurlu & Demirer, 2008).

When the environmental problems and the concept of environmental education are examined, it is seen that both are global. Because the planet and environment we live in is a common area for all living things. For this reason, environmental education has become a common concern worldwide. The first activity on environmental education was the United Nations Conference on the Human Environment held in 1972. The United Nations Environment Program (UNEP) established at the end of this conference. On June 5, the day of the conference, was accepted as the World Environment Day (Akçay, 2006; Doğan, 1997; Simpson, Hungerford, & Volk, 1988; Yıldız, Sipahioğlu, & Yılmaz, 2009). In 1975, an International Environmental Education Program (IEEP) was created in addition to UNEP (Doğan, 1997). The biggest activity related to environmental education was the Intergovernmental Conference on Environmental Education held in 1977 in cooperation with UNESCO-UNEP. This conference is also called as the Tbilisi Conference. Environmental education was examined in many aspects at the conference (Intergovernmental Conference on Environmental Education-Final Report, 1978; Simpson, Hungerford, & Volk, 1988). At Tbilisi Conference, statements such as developing ecological solidarity awareness, providing opportunities for each individual to gain the necessary knowledge and attitude in order to protect the environment, and creating new forms of behavior towards the environment in individuals and society are included as the main aims of environmental education (Intergovernmental Conference on Environmental Education-Final Report, 1978).

When the objectives of environmental education mentioned at the Tbilisi Conference are examined, it is seen that the basis of solving environmental problems is changing people's attitudes, consciousness, behavior. For this reason, it is important for children, whom we entrust our future and environment, to raise awareness about the environment, environmental problems and their solutions (Erentay & Erdoğan, 2009). In this framework, teachers, who are role models and play a guiding role in the structuring of what children learn and transforming what they learn into behavior, have great duties (Ada, Baysal, & Şahenk Erkan, 2017). Therefore, teachers should also be environmentally conscious, environmentally sensitive individuals and behave environmentally friendly. As a matter of fact, attention was drawn to this point with the statement "S/he is sensitive to the protection of the natural environment, and historical and cultural heritage", which is among the general competencies of the teaching profession (MoNE, 2017). In this context, many studies were conducted to examine and improve the environmental consciousness, environmental sensitivity, environmental attitudes and environmental behavior of teachers and prospective teachers.

In the literature, some studies investigated the attitudes of teachers and prospective teachers towards the environment and environmental problems (Gürbüz, Kışoğlu, & Erkol, 2007; Gürbüzoğlu Yalmancı, & Gözüm, 2011; Güven, 2013; Kayalı, 2010; Larijani & Yeshodhara, 2008). Some studies examining the environmental behavior of teachers and prospective teachers are also included in the literature (Erten, 2005; Güven & Aydoğdu, 2012). In some other studies, different variables were examined together. For instance, Keleş, Uzun and Varnacı Uzun (2010) investigated the prospective teachers' environmental awareness, environmental attitude, thoughts and behaviors. Adejoke, Mji and Mukhola (2014) investigated teachers' attitudes and awareness of environmental pollution. According to the literature, in addition to examining the environmental attitudes, behaviors and awareness of teachers and prospective teachers, some researches were conducted to develop these variables through experimental studies.

When the literature is examined, it was seen that films were used as environmental education tools in some studies (e.g. Benzer, Güven Yıldırım, & Önder, 2019; Göktepe Duran, 2019; Janpol & Dilts, 2016; Liu, 2018; Leeds et al., 2017; Skanavis & Sakellari, 2006). It was found that most of these studies were not carried out with prospective teachers and the studies conducted with prospective teachers examined different variables. In this context, this research aims to investigate the effect of Wall-E film on the prospective teachers' behavior towards environmental problems and attitudes towards solid waste and recycling. In addition, the study aims to examine the relationship between prospective teachers' behavior towards environmental problems and attitude towards solid waste and recycling.

The study focuses on the main research problem; "***What are the effects of using animated films in the Environmental Education Course on prospective teachers' behavior towards environmental problems and their attitude towards solid waste and recycling?"***

Based on this main research problem the sub-research problems can be stated as follows:

1. What is the prospective teachers' behavior like towards environmental problems?
2. What is the prospective teachers' attitude like towards solid waste and recycling?
3. Is there a significant elation ship between the prospective teachers' behavior and attitude towards environmental problems and the solid waste and recycling?

2. Method

2.1. Research Design

In the research, one-group pre-test and post-test experimental design, one of the quantitative research models, was utilized (Fraenkel, Wallen, & Hyun, 2012). This design, which aims to analyze the behavior of a single group instead of comparing multiple groups, is an effective way to influence a specified variable and to test hypotheses about cause-effect relationships (Creswell, 2012).

2.2. Participants

The institution of the participants was selected through convenience sampling methods in the study. In this sampling, the researcher selects individuals or groups that are easy to access (Fraenkel, Wallen, & Hyun, 2012). In line with the purpose of the research, criterion sampling method was adopted while determining the study group. The criterion was to take the environmental education course. In this regard, the research was carried out with students teachers who took environmental education course in the 2018-2019 academic year in Classroom Teaching Department and the Department of Social Sciences Teaching in the Faculty of Education of a state university in Turkey. Accordingly, 60 students from the Classroom Teaching Department and 70 students from the Department of Social Sciences Teaching participated in the study. Demographic information of the study group is given in Table 1.

Table 1. *Demographic information of the study group*

Department	Female (n)	Male (n)	Total (n)
Social Sciences Teaching	35	25	60
Classroom Teaching	57	13	70
Total	92	38	130

2.3. Data Collection Tools

In the research, two scales were used as data collection tools.

2.3.1. Environmental problems behavior scale

"Environmental Problems Behavior Scale" is a three-point Likert-type scale with six factors and 40 items which was developed for prospective teachers. Cronbach Alpha reliability coefficient of the scale was calculated as 0.85 (Güven & Aydoğdu, 2012). In order to use the scale in the research, necessary written permission was obtained from the authors.

2.3.2. Solid waste and recycling attitude scale

"Solid Waste and Recycling Attitude Scale" is a five-point Likert-type scale with three factors and 33 items which was developed for prospective teachers. Cronbach Alpha reliability coefficients for all factors of the scale were found to be above 0.85 (Karatekin, 2013). The necessary written permission was obtained from the author to use the scale.

2.4. Intervention

Before starting the research, first, a detailed literature review related to environmental films was conducted. It was decided to use the movie Wall-E, which was found didactic and interesting for the participant students.

The Wall-E movie is a science fiction film that has received the Academy Award for best animated feature film in 2009. The film shows how the utopia of the world emerged when people left and forgot the Earth after excessive environmental pollution. Wall-E portrays people as factors that cause environmental disasters. Therefore, in the film, people's environmental damage and consumption frenzy were criticized. The film addressed the environmental damage caused by industrialization, excessive consumption, and wasting natural resources (Madureira, 2012; Turhan, 2017). The film focuses on extreme capitalism, the destructive cycle of mass production and consumption, and eventually environmental collapse and environmental apocalypse. The film makes a bold warning to society in the framework of this capitalism and destruction, and calls for protection of our environment before it is too late (Anderson, 2012; Bose, 2017; Chaudhary, 2019). In the film, the subjects are covered within the framework of themes such as environmental awareness, environmental insensitivity, environmental pollution, waste, unconscious consumption (Göktepe Duran, 2019). For this reason, it was decided to get prospective teachers to watch the film within the scope of environmental education course in terms of environmental problems, human behavior and attitudes towards environmental problems and waste.

The scales were administered prospective teachers as a pre-test in their Environmental Education course. Then, they were asked to watch the movie Wall-E in a period of three weeks. While watching the film, the prospective teachers were reminded to pay attention to the following points:

- Environmental concepts in the film,
- Environmental problems in the film,
- Causes of environmental problems in the film,
- The role of people in environmental problems,
- Drawing a conclusion from the film about environmental problems,
- Drawing conclusions from the film about solid waste and recycling.

The scales were re-administered as the post-test four weeks later the pre-test.

2.5. Data Analysis

In the analysis of the data obtained in the research, items with negative statement were reverse coded firstly. Then, the data were analyzed via Statistical Package for the Social Sciences (SPSS) 22.

Before deciding the tests to analyze data, it was examined whether the data showed a normal distribution or not. For this purpose, pre-tests and post-tests were analyzed through Kolmogorov-Smirnov test. As a result of the analysis, it was seen that p value for all tests was above .05 and it was determined that the data showed normal distribution. Accordingly, it was decided to use parametric tests for the analysis (Pallant, 2007).

In the study, the data were analyzed through paired samples t-test in order to examine the effect of Wall-E film on the prospective teachers' behavior towards environmental problems and attitudes towards solid waste and recycling. Simple linear regression analysis was conducted to examine the relationship between prospective teachers' behavior towards environmental problems and attitude towards solid waste and recycling.

3. Findings

3.1. Findings Regarding Behavior Towards Environmental Problems

In the study, paired samples t test was performed on pre-test and post-test data in order to examine the effect of Wall-E film on the prospective teachers' behaviors towards environmental problems. The findings are given in Table 2.

Table 2. *Paired samples t-test results regarding behaviors towards environmental problems*

Score	Groups	n	$\bar{x}$	t	df	p
Behavior score towards environmental problems	pre-test	130	96.95	-18.077	129	.00
	post-test	130	99.55			

When Table 2 is examined, it is seen that the prospective teachers' mean behavior score towards environmental problems is 96.95 before watching the Wall-E movie, whereas it is 99.55 after watching the movie. It has been determined that the prospective teachers' mean behavior score towards environmental problems has increased after watching the film. This increase was found statistically significant (p<.05).

3.2. Findings Regarding Attitude Towards Solid Waste and Recycling

In the study, paired samples t test was performed on pre-test and post-test data in order to examine the effect of Wall-E film on the prospective teachers' attitudes towards solid waste and recycling. The findings are given in Table 3.

Table 3. *Paired samples t test results regarding attitude towards solid waste and recycling*

Score	Groups	n	$\bar{x}$	t	df	p
Attitude score towards solid waste and recycling	pre-test	130	130.47	-4.731	129	.00
	post-test	130	132.06			

When Table 3 is examined, it is seen that the prospective teachers' mean attitude score towards solid waste and recycling is 130.47 before watching the Wall-E movie, while it is 132.06 after wathing the movie. It was determined that the prospective teachers' mean attitude score towards solid waste and recycling has increased after watching the film. This increase was found statistically significant (p<.05).

3.3. Findings Regarding the Relationship Between Behavior and Attitude

In the research, simple linear regression analysis was conducted to examine whether the prospective teachers' attitude towards solid waste and recycling are a significant predictor of their behavior towards environmental problems. The findings are given in Table 4.

Table 4. *Regression analysis results related to the relationship between behavior and attitude*

Variable	B	Std. Error	β	t	p
Constant	28.870	2.002	-	14.417	.00
Attitude towards solid waste and recycling	.535	.015	0.953	35.494	.00
R=0.953					
R_2=0.908					
$F_{(1-130)}$=1259.843					
p= .00					

As a result of the simple linear regression analysis, a significant relationship was found between the two variables (R=0.953; R_2=0.908). It was determined that the attitude towards solid waste and recycling is a significant predictor of the prospective teachers' behavior towards environmental problems ($F_{(1-130)}$=1259.843; p< .05). When the value of R_2 was examined, it was seen that approximately 91% of the change in the prospective teachers' behavior towards environmental problems can be explained by the attitude towards solid waste and recycling. The significance test for attitude also showed that this variable is a significant predictor. According to the regression analysis result, the regression equation is given below.

Behavior towards environmental problems = (0.535 x Attitude towards solid waste and recycling) + 28.870

4. Conclusion and Discussion

Animated films can be used in Science and Environmental Education. The environment-themed animation films can raise individuals' environmental consciousness, awareness and attitude (Göktepe Duran, 2019; Skanavis & Sakellari, 2006). When the literature on prospective teachers was examined, it was seen that the frequency of prospective teachers to follow environmental programs on television or radio is low, whereas they stated that television and radio are the sources that will contribute most to people's awareness of the environment (Erol, 2005). In this context, it was aimed to investigate the effect of Wall-E film on the prospective teachers' behavior towards environmental problems and attitude towards solid waste and recycling within the framework of environmental education.

In the research, it was found that the prospective teachers' mean behavior score towards environmental problems increased after watching the Wall-E movie. This increase was found statistically significant (p<.05). In the study, it was found that the prospective teachers' mean attitude score towards solid waste and recycling increased after watching the Wall-E movie. This increase was also found statistically significant (p<.05). As a result, the research shows

that environment-related films can be used in environmental education. In a study conducted by Benzer, Güven Yıldırım and Önder (2019), it was found that educational films did not make a significant difference on the attitudes of prospective classroom teachers towards environmental problems. Nevertheless, it was revealed that educational films had a significant positive effect on the prospective teachers' awareness of environmental issues. In another study, it was realized that the environmental perceptions and behavioral reactions of the students who watched a documentary film *emphasizing* the natural environment were positively affected (Janpol & Dilts, 2016). In a study conducted by Liu (2018), it was revealed that the university students who received environmental education through documentaries developed more positive attitudes towards the environment. (Leeds et al., 2017).

As a result of the research, it was also determined that the attitude towards solid waste and recycling is a significant predictor of prospective teachers' behavior towards environmental problems. It was also revealed that approximately 91% of the change in the prospective teachers' behavior towards environmental problems can be explained by the attitude towards solid waste and recycling. This relationship between behavior and attitude probably results from the fact that both variables are components of environmental literacy. According to the literature, attitude and behavior are among the sub-dimensions of environmental literacy (Akıllı & Genç, 2015; Hollweg et al., 2011; McBeth & Volk, 2010), and environmental attitude is expressed as a strong predictor of ecological behavior (Kaiser, Wölfing, & Fuhrer, 1999).

5. Recommendations

The animated films are found effective in the process of Environmental Education for teacher education. Therefore, the effects of integrating films in teacher education can be investigated by designing similar studies in an extended way for different levels of formal education.

In the research, it was also determined that using films in Environmental Education affected the prospective teachers' behavior towards environmental problems and their attitude towards solid waste and recycling in a positive way. In other studies, the effects of using films on different variables related to environment can also be scrutinized.

As a limitation of the research, only one environment-related animated film was provided for the prospective teachers in a limited period of time. Within this framework, films with a longer duration with different environmental themes can be offered, and their effects can be investigated in a wider perspective.

6. Conflict of Interest

The authors declare that there is no conflict of interest.

7. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Ada, S., Baysal, Z. N., & Şahenk Erkan, S. S. (2017). *Çeşitli boyutları ile çevre eğitimi.* Ankara: Nobel.

Adejoke, O. C., Mji, A. & Mukhola, M. S. (2014). Students' and teachers' awareness of and attitude towards environmental pollution: a multivariate analysis using biographical variables. *Journal of Human Ecology, 45*, 167-175.

Akçay, İ. (2006). *Farklı ülkelerde okul öncesi öğrencilerine yönelik çevre eğitimi.* Yüksek lisans tezi. Uludağ Üniversitesi Sosyal Bilimler Enstitüsü, Bursa.

Akıllı, M. & Genç, M. (2015). Examination of middle school students' sub-dimensions of environmental literacy in terms of various variables. *Sakarya University Journal of Education, 5*(2), 81-97.

Anderson, C. T. (2012). Post-apocalyptic nostalgia: Wall-E, garbage, and American ambivalence toward manufactured goods. *Lit: Literature Interpretation Theory, 23*(3), 267-282.

Benzer, S., Güven Yıldırım, E. & Önder, A. N. (2019). The impact of educational films on attitude and awareness towards environmental problems. *Trakya Journal of Education, 9*(4), 757-770.

Bose, M. (2017). Immaterial Thoughts: Brand Value, Environmental Sustainability, and Wall-E. *Criticism, 59*(2), 247-277.

Chaudhary, N. (2019). *An ecocritical deconstruction of Disney's Wall-E.* International Conference on Recent Trends in Humanities, Education, Arts, Culture, Languages, Literature, Philosophy, Religion, Gender and Management Studies.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* Boston: Pearson Education.

ÇOB (2004). *Türkiye çevre atlası*. Ankara. Web sayfası: http://www.cedgm.gov.tr/CED/Files/cevreatlası/atlas_metni.pdf

ÇOB (2007). *Türkiye çevre durum raporu*. Ankara. Web sayfası: http://www.cedgm.gov.tr/CED/AnaSayfa/webUygulama/turkiyeCevreDurumRaporu.aspx?sflang=tr

Çolakoğlu, E. (2010). Haklar söyleminde çevre eğitiminin yeri ve Türkiye'de çevre eğitiminin anayasal dayanakları. *Türkiye Barolar Birliği Dergisi, 88*, 151-171.

Doğan, M. (1997). *Ulusal çevre eylem planı: Eğitim ve katılım*. Web sayfası: http://ekutup.dpt.gov.tr/cevre/eylempla/doganm.pdf

Erentay, N. & Erdoğan, M. (2009). *22 Adımda doğa eğitimi,* Ankara: ODTÜ Yayıncılık.

Erol, G. H. (2005). *Sınıf öğretmenliği ikinci sınıf öğrencilerinin çevre ve çevre sorunlarına yönelik tutumları*. Yüksek Lisans Tezi, Pamukkale Üniversitesi Fen Bilimleri Enstitüsü.

Erten, S. (2005). Investigation of preservice preschool teachers' behaviors related to environmental awareness. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 28(*28), 91-100.

Fraenkel, J. R., Wallen, N. E., & Hyun, H., H. (2012). *How to design and evaluate research in education* (8th ed.). New York, NY: McGraw-Hill.

Göktepe Duran, B. (2019). *Çevre eğitimi için uygun animasyon filmlerin belirlenmesi ve fen bilimleri dersi öğretim programı ile ilişkilendirilmesi*. Yüksek Lisans Tezi, Balıkesir Üniversitesi Fen Bilimleri Enstitüsü.

Gürbüz, H., Kışoğlu, M., & Erkol, M. (2007). Biyoloji öğretmen adaylarının çevreye yönelik tutumlarının informal ve formal eğitim ortamları açısından değerlendirilmesi. *A. Ü. Bayburt Eğitim Fakültesi Dergisi, 2*(3), 74-84.

Gürbüzoğlu Yalmancı, S. & Gözüm, A. İ. C. (2011). Kafkas üniversitesi öğretmen adaylarının çevre sorunlarına ilişkin tutumlarının bazı değişkenlere göre incelenmesi. *International Online Journal of Educational Sciences, 3*(3), 1109-1132.

Güven, E. (2013). Development of environmental problems attitude scale and determination of teacher candidates' attitudes. *GEFAD, 33*(2), 411-430.

Güven, E. & Aydoğdu, M. (2012). Development of environmental problems behaviour scale and determination of teacher candidates' behaviour levels. *Uludağ Üniversitesi Eğitim Fakültesi Dergisi, 25*(2), 573-590.

Hollweg, K. S., Taylor, J. R., Bybee, R. W., Marcinkowski, T. J., McBeth, W. C. & Zoido, P. (2011). *Developing a framework for assessing environmental literacy*. Washington, DC: North American Association for Environmental Education.

Intergovernmental Conference on Environmental Education-Final Report (1978). Unesco-UNEP, Tbilisi (USSR), 14-26 October 1977.

Janpol, H. L., & Dilts, R. (2016). Does viewing documentary films affect environmental perceptions and behaviors?. *Applied Environmental Education & Communication, 15*(1), 90-98.

Kaiser, F. G., Wölfing, S. & Fuhrer, U. (1999). Environmental attitude and ecological behavior. *Journal of Environmental Psychology, 19,* 1-19.

Karatekin, K. (2013). Developing a scale to measure pre-service teachers' attitudes towards solid waste and recycling: A validity and reliability study. *Uluslararası Avrasya Sosyal Bilimler Dergisi, 4*(10), 71-90.

Kayalı, H. (2010). Sosyal bilgiler, Türkçe ve sınıf öğretmenliği öğretmen adaylarının çevre sorunlarına yönelik tutumları. *Marmara Coğrafya Dergisi, 21*, 258-268.

Keleş, Ö., Uzun, N. & Varnacı Uzun, F. (2010). The change of teacher candidates" environmental consciousness, attitude, thought and behaviors with nature training project and the assessment of its permanence. *Electronic Journal of Social Sciences, 9(*32), 384-401.

Larijanı, M. & Yeshodhara, K. (2008). An empirical study of environmental attitude among higher primary school teachers of India and Iran. *Journal of Human Ecology, 24*(3), 195-200.

Leeds, A., Lukas, K. E., Kendall, C. J., Slavin, M. A., Ross, E. A., Robbins, M. M., Weeghel, D. & Bergl, R. A. (2017). Evaluating the effect of a year-long film focused environmental education program on Ugandan student knowledge of and attitudes toward great apes. *American Journal of Primatology, 79*(8), 1-9.

Liu, S. C. (2018). Environmental education through documentaries: Assessing learning outcomes of a general environmental studies course. *Eurasia Journal of Mathematics, Science and Technology Education, 14*(4), 1371-1381.

Madureira, M. A. V. (2012). *Ecocriticism in Disney/Pixar-Wall-E and the de-greening cycle*. Yüksek Lisans Tezi, Universidade de Coimbra.

McBeth, W., & Volk, T. L. (2010). The national environmental literacy project: A baseline study of middle grade students in the United States. *The Journal of Environmental Education*, *41*(1), 55-67.

Ministry of National Education [MoNE] (2017). *Öğretmenlik mesleği genel yeterlikleri*. Ankara.

Pallant, J. (2007). *SPSS survival manual: A step by step guide to data analysis using SPSS.* Buckingham: Open University Press.

Öztürk, O. (2008). *Ülkemiz yazılı basınında çıkan çevre haberleri ve yükseköğretimimizdeki çevre habercilik eğitiminin değerlendirilmesi.* Yüksek lisans tezi, Marmara Üniversitesi Fen Bilimleri Enstitüsü, İstanbul.

Skanavis, C. & Sakellari, M. (2006). *Environmental stereotypes on the big screen: Films as an Environmental Education tool.* Proceedings of International Conference on Protection and Restoration of the Environment VIII.

Simpson, P. R., Hungerford, H., & Volk, T. L. (Eds.) (1988). *Environmental education: A process for pre-service teacher training curriculum development*. UNESCO-UNEP International Environmental Education Programme, Environmental Education Series 26. Web page: http://unesdoc.unesco.org/images/0008/000822/082271eb.pdf

Turhan, G. (2017). The evaluation of the movie ‘‘wall-e’’ with regard to environmental ethics. *Researcher: Social Science Studies, 5*(4), 298-309.

Uğurlu, Ö. & Demirer, Y. (2008). Disiplinlerarası çevre eğitimi üzerine ulusal ve uluslararası örnekler: bilimsel faaliyet, siyasi karar verme süreci ve eğitim. *Eğitim Bilim Toplum Dergisi*, *6*(23), 94-111.

Yıldız, K., Sipahioğlu, Ş., & M. Yılmaz. (2009). *Çevre bilimi ve eğitimi* (2. Baskı). Ankara: Gündüz Eğitim ve Yayıncılık.

Yücel, A. S. & Morgil, F. İ. (1998). Yüksek öğretimde çevre olgusunun araştırılması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 14*, 84-91.

Tofur, S., & Gökkaya, Y. (2020). Examining the pre-school curriculum in terms of the stem approach *International Online Journal of Education and Teaching (IOJET), 7*(3). 1189-1203. https://iojet.org/index.php/IOJET/article/view/526

Received: 18.09.2018
Received in revised form: 14.04.2020
Accepted: 28.05.2020

EXAMINING THE PRE-SCHOOL CURRICULUM IN TERMS OF THE STEM APPROACH

Research article

Sezen Tofur

Manisa Celal Bayar University

sezentofur@gmail.com

Yusuf Gökkaya

Manisa Celal Bayar University

Yusufgokkaya1001@gmail.com

Sezen Tofur is an assistant professor at Manisa Celal Bayar University Faculty of Education, Department of Education Management. She has interdisciplinary studies on educational management.

Yusuf Gökkaya is a research assistant at Manisa Celal Bayar University Faculty of Education, Department of Basic Education. His bachelor degree (Ankara University) and his master degree (Gazi University) are on Pre-School Education.

EXAMINING THE PRE-SCHOOL CURRICULUM IN TERMS OF THE STEM APPROACH[1] [2]

Sezen Tofur

sezentofur@gmail.com

Yusuf Gökkaya

Yusufgokkaya1001@gmail.com

Abstract

The aim of this study was to examine the pre-school curriculum in terms of the STEM approach. Qualitative method was adopted in the study. Document analysis was performed. In the data analysis, inductive content analysis technique was used. Seven themes related to the STEM approach were revealed in the pre-school curriculum. These themes included turning theoretical knowledge into practice/product, problem solving, development of skills, teaching of skills, the use of technology, integration and other statements related to the approach, respectively. The findings showed that the pre-school curriculum was adequate in terms of turning theoretical knowledge into practice, development and teaching of skills and problem solving with regard to the STEM approach, while being limited in integration, using technology, and including construction games. The issue that was emphasised the most in the curriculum was skills. No content regarding how children can properly use technology was encountered. As a result, there should be more emphasis on addressing the outcomes with an interdisciplinary approach, and the curriculum should be improved for the use of technology. The curriculum content should be re-structured to attach the same degree of importance to all themes mentioned in this study to make it compatible with the STEM approach.

Key words: Curriculum, pre-school, pre-school curriculum, STEM, FeTeMM.

1. Introduction

Today's world where rapid changes and transformations are experienced has been going through global-scale developments in the field of education as in every other field (Tofur, 2015). Due to globalisation and developments in technology, competition between countries is increasing rapidly, and thus countries make more investment in science, engineering and innovations. Accordingly, individuals of the 21st century are expected to possess creativity, critical-thinking, problem-solving and cooperation skills. Developing such skills in individuals is only possibly with schools' performing a transformation in a way to provide practice-oriented education and raise productive students. Current curricula fail to equip individuals with the skills required in the 21st century; in fact, science, mathematics and technology contents are taught in separate subjects independently (Akgündüz et al., 2015;

1 "This study was funded by the Scientific Research Projects Coordination Unit of Manisa Celal Bayar University (Project no: 2018-032)"

2 "A preliminary version of this paper was presented at the ERPA International Congress on Education 2018."

Büyüktaşkapu, Çeliköz & Akman, 2012). The changes that occurred in the nature and methodology of science in this century have an influence on the instructional processes in every area of life (Aşık, Küçük, Helvacı & Çorlu, 2017). Most countries seek for changing and developing their educational policies depending on constantly emerging technology (Balat & Günşen, 2017). The changes in educational policies also affect the competition between countries.

Countries' competing with each other (Corlu, Capraro & Capraro, 2014), being a leader in science and economy and maintaining their leadership depend on the importance they attach to innovative STEM education and the extent to which they raise individuals' awareness for acquiring a profession in such areas (Şahin, Ayar & Adıgüzel, 2014). The instructional processes that are referred to as STEM or Science, Technology, Engineering and Mathematics are the reflection of the changes in science to instruction (Aşık, Küçük, Helvacı & Çorlu, 2017). STEM involves many disciplines and various education systems (National Research Council, 2011). STEM education has characteristics such as being interdisciplinary, not limiting learning to class hours and the school, and producing knowledge-informed solutions for daily problems (Akgündüz et al., 2015). The primary objective of STEM education is to combine education, knowledge, skills and beliefs by promoting the productivity of today's generation, enable students to become aware of their thought processes, and increase their use of technology. A STEM curriculum consists of group activities, experiments and projects. These components can help students make better decisions in citizenship issues including public health, energy supplies, environmental quality, the use of resources and national security by equipping them with the basic skills of the 21st century. The STEM education also aims to develop students in STEM-related career fields, foster their scientific literacy and equip the workforce of the future properly so as to ensure the country's development. It helps them understand individual and universal problems as well as economic, political and cultural values (Bybee, 2010; Corlu, Capraro & Capraro, 2014; National Research Council, 2011).

The STEM education is a necessity for Turkey as it is for other countries in the world (Akgündüz et al., 2015). In order for Turkey to follow the developments in science and technology and stay in the global competition, effective STEM practices should be implemented at the earliest period possible, or in other words in pre-school (Tofur & Gökkaya, 2019). Children are eager to explore the world around them in pre-school, and this is the best period to start teaching them science. They form basic concepts by actively communicating with and exploring their environment (Büyüktaşkapu, Çeliköz & Akman, 2012; Faulkner & Schneider, 2005; Gökkaya, 2018; Kefi, Çeliköz & Erişen, 2013; Lind, 1988; Pawilen & Yuzon, 2019; Şahin, Güven, Yurdatapan, 2011; Ünal & Akman, 2006). In pre-school, children start acquiring many concepts related to science, technology and engineering (Balat & Günşen, 2017; Lind, 1998). They combine these concepts with those they have already formed, and need environments where they can turn the new concepts into practice. Children's curiosity and interests should be addressed through appropriate questions by preparing environments where they can develop STEM skills in the pre-school period (Balat & Günşen, 2017; Bray, Green & Kay, 2010). In this period, they often ask questions like "Why?", "For what?" or "How?" as they examine everything around them like a scientist. Children's curiosity should be exploited and they should be introduced with scientific questioning and research at early ages. Pre-school is thus the most suitable period for starting science education. Children should be taught scientific skills such as doing research and analysing at very early ages (Lind, 1998).

Technology, engineering, mathematics and science are natural motivators for children. During the pre-school years, they are interested in learning STEM through various ways and

thinking extensively and thoroughly about this subject (Clements & Sarama, 2016). Pre-school children are involved in STEM-related activities in every moment of their lives (Balat & Günşen, 2017). For instance, putting forks and spoons on the table for every individual, naming, recognising and examining the plants they see around, and making towers with blocks and building and shaping sandcastles are among the mathematics, science and engineering activities in which they are involved everyday. Today, children of all socio-economic levels are surrounded by technology, and consequently, digital media and technology rapidly change children's learning environment in the pre-school period. Those who are eager to examine and discover their environment are also affected from this change. Children are observed to use technological devices such as tablets and mobile phones very well. The use of tablets, smart phones, e-books, interactive whiteboards and other technological is vitally important in early childhood education. However, these technologies should be used in accordance with the age, developmental levels and needs of children (Blackwell & Wartella, 2015). When used appropriately, technology contributes to children's social and affective development. The conscious use of technology can be effective in supporting children's learning and development (Paciga & Donohue; 2017).

The most important investment that our country can make to pre-school children is to ensure the development of their STEM skills (Balat & Günşen, 2017). There are many opportunities for STEM education in the pre-school period. Children can acquire concepts and skills related to mathematics and science by means of traditional early childhood activities such as using blocks, water, sand and manipulative materials, dramatic games, cooking and open-air games (Lind, 1998). The knowledge that children gain at an early age is mostly related to science as in nature, life and the environment they live in. Therefore, in order to prepare children for elementary school and for life in general, opportunities for activities that help them gain research skills should be provided in the pre-school period. Science education aims not only to teach children scientific knowledge, but also to teach them how to engage in science through scientific process skills. They can gain these skills that enable them to carry out scientific examinations starting from pre-school (Büyüktaşkapu, Çeliköz & Akman, 2012). To be able to provide good science education to children, a suitable learning environment should be created to support their scientific process skills. The prerequisite for learning science permanently and for every individual in the society to be science literate is learning scientific process skills (Kefi, Çeliköz & Erişen, 2013; Şahin, Güven, Yurdatapan, 2011). These skills include observation, classification, scientific communication, measurement, prediction and inference (Akman, Uyanık-Balat, & Yıldız, 2010), and they constitute the basic building blocks of STEM education.

One of the methods that can increase pre-school children's levels of science achievement and using science process skills is project-based education (Anlıak, Yılmaz, & Şahin Beyazkürk, 2008; Helm & Katz, 2001; Helm & Beneke, 2003; Katz, 1994; Şahin, Güven, Yurdatapan, 2011). It aims to gain in-depth knowledge about the project topic and produce a product at the end of the process. The project-based learning approach enables practitioners to use many disciplines and learning-teaching approaches together (Korkmaz & Kaptan; 2002). In this approach, children's interests and curiosity are considered, and the instructional process is planned accordingly. Children show more active participation in project-based activities because these activities are formed based on their interests and they answer questions like "Why?", "For what?" and "How?" while being engaged in these activities. In project-based learning, children are active and their learning is maximised when activities are conducted in the form of games. This is because children of this period learn about life in this way, and games are the most basic learning tool in pre-school. The success of pre-school STEM activities depends on their being integrated with games as the most important struggle

of children (Koçyiğit, Tuğluk & Koç, 2007). All activities in education are carried out in accordance with existing curricula. Therefore, the activities in the pre-school curriculum should be reviewed in detail in terms of STEM education.

Previous studies on STEM education mostly focused on the course contents that constitute STEM. Although it is stated that current curricula should be re-organised in line with STEM, the research on organising the pre-school curriculum according to STEM is quite limited. This study thus focuses on the STEM approach in the pre-school education curriculum. The study would make a contribution to the literature and guide further projects/research on STEM in pre-school education. It is expected to contribute to practice by evaluating the pre-school curriculum so that quality STEM activities can be conducted in the future.

1.1. Aim of the Study

The primary aim of this study was to examine the pre-school education curriculum in terms of the STEM approach. For this purpose, the research question "What is the place of the STEM approach in the pre-school education curriculum?" was addressed in the study. Evaluating the pre-school education curriculum in terms of the STEM approach is of significance for revealing the strengths and weaknesses of the curriculum with regard to this approach. The study is thought to provide curriculum developers insights about the re-structuring of the curriculum towards the STEM approach. Moreover, it can also set an example for the examination of other course curricula in terms of STEM.

2. Method

In this section, the research model, data sources, data gathering, data analysis, validity, researcher's role and ethical considerations are presented in the context of this study.

2.1. Research Model

Qualitative method was adopted in the study and document analysis was performed. Yıldırım & Şimşek (2008) emphasized that document analysis can be used as a research method alone in cases where it is not possible to observe and interview in qualitative research. Documents are important data sources for qualitative studies They can consist of private or official documents (Creswell, 2005). Document analysis is the analysis of written materials that include information regarding the phenomena or events under examination. It is performed in five steps (Yıldırım & Şimşek, 2008): (i) accessing documents, (ii) checking originality, (iii) understanding documents, (iv) analysing the data, (v) using the data. In this study, document analysis was performed since the aim was to carry out an objective and comprehensive analysis of findings by examining the pre-school education curriculum (2013) in terms of the STEM approach. The document used in the study was the pre-school education curriculum of the Turkish Ministry of National Education (2013).

2.2. Data Sources/Analysis Unit

The data sources of the study consisted of the written documents in the pre-school education curriculum of the Turkish Ministry of National Education (2013). The evaluation of STEM, a practice-oriented approach, in pre-school education curricula was done on the contents of the 2013 pre-school education curriculum implemented by the Ministry.

2.3. Data Gathering

The data sources were accessed by the researcher, and the pre-school education curriculum was downloaded as a PDF document from the web site of the General Directorate of Basic Education, Ministry of National Education.

2.4. Data Analysis

In the data analysis, inductive content analysis technique was used. Inductive analysis is necessary when there is no theory about the phenomenon under examination (Strauss & Corbin, 1990), and it is based on coding. In this analysis, the researcher reads the data line by line, and tries to determine the important dimensions considering the research aim. In this way, the codes within the data and the relationships between these codes can be revealed (Yıldırım & Şimşek, 2008). In the present study, the analysis process included four steps: (i) *Coding the data:* This is the first step in content analysis. The coding process was carried out based on the data. The coding of the data was done independently by two faculty members who have experience in qualitative research. For the reliability of the analysis, the formula "Reliability=Agreement/Disagreement+Agreement x 100" was used on the codes revealed by the researchers (Miles & Huberman, 1994). According to Şencan (2005), the percentage of agreement between researchers should be 70% or above to ensure reliability in qualitative research. In this study, the agreement percentage was found to be 91%. (ii) *Forming the themes:* Participants, researchers and the literature can be used in forming the themes. In the present study, the themes were determined based on the researcher and the literature. The themes were obtained by grouping the codes considering their similarities and differences. It was paid due attention to the formation of the themes in a way that they formed a meaningful whole. (iii) *Organising the codes and the themes:* The compatibility of the themes with the subsequent codes were checked. A total of seven themes were obtained. (iv) *Presenting the findings:* The themes obtained in the study and the necessary information about them were presented descriptively (frequency(f)), and the results were revealed by interpreting these themes.

2.5. Validity

Validity in qualitative research means accuracy (Neuman, 2010). There are certain strategies that can be used to ensure validity in qualitative research. Qualitative researchers do not have to use all of these strategies. They are chosen according to their topic and applicability (McMillan & Schumacher, 2006). In this study, the following strategies were followed to address validity: (i) *Long-term interaction*: The researchers conducted the analysis of the pre-school curriculum in a period of one month by reviewing the components of the program repeatedly. (ii) *Triangulation:* In the process of and prior to data gathering and analysis, the relevant literature was reviewed, and the results obtained were compared. (iii) *Direct quotations:* In the presentation of the findings, the curriculum contents associated with each theme were reported with direct quotations. (iv) *Multiple researchers:* The steps of analysing the data, forming the themes, reporting the findings, making interpretations, discussing the findings and drawing conclusions were fulfilled by two faculty members, one of whom is an expert in educational administration and the other in pre-school education.

2.6. Researcher's Role and Research Ethics

The fact that one of the researchers is a scholar of educational administration and the other is a scholar of pre-school education is thought to have contributed to the formation and interpretation of the findings. As for ethical considerations, the necessary permissions were obtained from the authorities concerned.

3. Findings and Interpretation

A total of seven themes related to the STEM approach were revealed as a result of evaluating the pre-school curriculum in terms of this approach. Thirty-nine of the contents obtained were found to be related to STEM. The themes with the least content in the scope of the STEM approach were "the use of technology" (f=3) and "integration" (f=3). The theme

with the most content was "turning theoretical knowledge into practice/product" (f=10). The statements that were included in the curriculum with regard to the approach but could not be associated with other themes (f=2) were examined under the theme "other statements related to the approach". The themes that are related to the STEM approach in the pre-school curriculum are presented in Table 1.

Table 1. *Themes that relate to the stem approach in the pre-school curriculum*

No.	Themes associated with the STEM approach	Number of contents associated with the theme (f)
1.	Turning theoretical knowledge into practice / product	10
2	Problem solving	7
3.	Development of skills	7
4.	Teaching of skills	7
5.	Use of technology	3
6.	Integration	3
7.	Other statements related to the approach	2
	TOTAL	39

3.1. Findings Related to the Theme 'Turning Theoretical Knowledge into Practice/Product' in the Pre-school Curriculum

The theme with the most content that relates to the STEM approach in the pre-school curriculum was "turning theoretical knowledge into practice/product" (f=10). The contents under this category were coded as teachers' enabling students to produce something in their learning process, children's producing original products, being able to transfer what is learned to different situations in daily life, exhibiting the products, and planning the learning process in a way in which children can produce multiple products. Some of the content statements thought to be related to the theme "turning theoretical knowledge into practice/product" are as follows: (Page 14, Line 30): *Teachers should provide as many opportunities as possible for children to plan, practice, organise, question, do research, discuss and produce in the learning process.* (Page 16, Line 2): *Children's active participation in the learning process, transferring what they learn to different situations and use it in new situations are important in learning by discovery.* (Page 20, Line 16): *Children should be supported to use what they remember in different situations effectively (by associating it with daily life skills).* (Page 25, Line 29): *They appropriately use the words they have just learned in accordance with their meanings.* (Page 28, Line 12): *Children create products with original characteristics. Children's creating original products means making the product different from others by reflecting their feelings, thoughts and dreams in a way that is unique to them, and using their imagination.* (Page 40, Line 31): *It is a centre that aims to enable children to produce new ideas and original products based on their past experiences and learning, and in which they can make discoveries and have different experiences through interaction with different*

materials. (Page 41, Line 3): *Children's products should be exhibited by them and at their sight.* (Page 42, Line 38): *Groups implement their decisions and produce different three-dimensional products.* (Page 44, Line 10): *In assessment, children can be asked to prepare different materials such as posters and paintings.* (Page 45, Line 23): *The process is not planned merely to produce a single product.*

3.2. Findings Related to the Theme 'Problem Solving' in the Pre-school Curriculum

Another theme with considerable content that relates to the STEM approach in the pre-school curriculum was "problem solving" (f=7). The content statements within this category consisted of the codes including producing solutions for problems, developing problem-solving skills, developing creative problem-solving skills, and reasoning. Some of the content statements thought to be related to the theme "problem solving" are as follows: (Page 23, Line 13):…*They produce solutions for problems.* (Page 30, Line 35): *…The objective of this outcome is to develop children's problem-solving skills in their social relationships.* (Page 37, Line 3) *…well-designed educational environments support children's active learning and develop their creative problem-solving skills.* (Page 43, Line 6): *By means of the mathematics activities implemented, children should be able to realise the patterns around them, develop and test assumptions, solve problems, reason, and communicate by using mathematical concepts.* (Page 45, Line 6): *…Problem-solving and prediction activities.* (Page 45, Line 16): *These are the activities that enable children to solve problems and think critically and in a solution-oriented way by using their creativity and imagination.* (Page 49, Line 34)*:…Field trips aim to meet children's needs of direct and meaningful learning through research, problem solving and on-site observations.*

3.3. Findings Related to the Theme 'Development of Skills' in the Pre-school Curriculum

Another theme with content that relates to the STEM approach in the pre-school curriculum was "development of problems" (f=7). The content statements under this category comprised of codes including skills-development and improving the levels of skills based on age groups. The skills that were emphasised were children's imagination, language and communication skills, creativity and critical thinking skills, mathematical questioning skills, life skills, self-care skills, listening skills and basic pre-elementary school skills. Some of the content statements thought to be related to the theme "development of skills" are as follows: (Page 11, Line 24): *Children's imagination, creative and critical thinking skills, communication and behaviours to express their feelings should be developed.* (Page 38, Line 4): *Besides, different centres can be prepared for children to independently develop and apply life skills in places like a bank, a post office, a restaurant, a hospital or a store.* (Page 40, Line 2): *This learning centre that aims to develop positive attitudes towards reading-writing activities and books in children, and support their communication and language skills should be in a comfortable, bright and relatively quiet place.* (Page 43, Line 15): *Furthermore, mathematics activities should aim to develop mathematical questioning skills in children.* (Page 44, Line 35): *The examples presented below are for supporting the development of basic skills in preparation to elementary school…* (Page 45, Line 9): *Activities to develop self-care skills.* (Page 41, Line 1): *Simple materials should be used at the beginning of the semester and at a younger age, and materials should be more complex as children's levels of skills improve.*

3.4. Findings Related to the Theme 'Teaching of Skills' in the Pre-school Curriculum

A theme with content that relates to the STEM approach in the pre-school curriculum was "teaching of skills" (f=7). The content statements under this category were related to the

codes of teaching children listening, speaking and movement skills and the preliminary skills for them to learn basal reading and writing at elementary school. Moreover, it was emphasised that the acquisition of a skills took long years and was not an easy process. Some of the content statements thought to be related to the theme "teaching of skills" are as follows: (Page 46, Line 2): *The objective of Turkish language activities is to enable children to use Turkish properly, pronounce sounds, understand and use different syntactic structures, acquire listening skills, express their feelings in verbal and non-verbal ways, adjust their tone of voice and produce words accurately.* (Page 44, Line 29): *The aim of pre-school education is not to teach children reading and writing, but to equip them with the preliminary skills necessary to easily learn reading and writing at elementary school.* (Page 48, Line 23): *Children will both enjoy saying these and gain accurate and fluent speaking skills.* (Page 44, Line 16): *Children need long years to be able to fully acquire a skill.* (Page 48, Line 21): *Music activities have great contributions to children's motor development. Children gain the skill of moving in accordance with the character and rhythm of the music and in a certain order by combining physical movements.* (Page 48, Line 23): *Music activities also teach the hand-eye coordination and using both hands simultaneously by playing simple percussion instruments.* (Page 49, Line 26): *Movement activities can be used both for supporting children's motor development and movement skills and also as a transition activity.*

3.5. Findings Related to the Theme 'Integration' in the Pre-school Curriculum

A theme with content that relates to the STEM approach in the pre-school curriculum was "integration" (f=3). The content statements within this category gathered around the codes of preparing activities by bringing outcomes together, and planning an activity by combining multiple activities. Some of the content statements thought to be related to the theme "integration" are as follows: (Page 15, Line 5): *Teacher can bring together outcomes, indicators and concepts included in the curriculum in different ways, prepared activities in integrated or independent way, and enrich learning processes by exploiting various topics, activities, contexts and materials.* (Page 42, Line 25): *Activities can be planned and implemented individually, while they can also be prepared in an integrated way by bringing together multiple activities.* (Page 43, Line 7): *Integrated activities are made of bringing together multiple activities with smooth transitions. Integration does not mean simply listing activities one after another in the learning process of an activity plan.*

3.6. Findings Related to the Theme 'Use of Technology' in the Pre-school Curriculum

The last theme with content that relates to the STEM approach in the pre-school curriculum was "use of technology" (f=3). The content statements under this category consisted of codes including the use of movies, documentaries, videos, CDs and computers. Some of the content statements thought to be related to the theme "use of technology" are as follows: (Page 23, Line 34): *...For example, phenomena or stories such as Atatürk's place of birth, his father's and mother's names, his career as a soldier and commander, his love for children, and his present of a festival for children should be taught through role-plays, book reviews, movies and documentaries.* (Page 26, Line 4): *...the expression "What they watched" refers to what they heard and saw while watching a movie, a video, a TV show, a play and a concert.* (Page 40, Line 10): *...CDs that tell a story, computers, projectors ...*

3.7. Findings Related to the Theme 'Other Statements' in the Pre-school Curriculum

Two content statements that relate to the STEM approach in the pre-school curriculum were regarded as "other statements related to the approach" (f=2). The contents under this theme included the statements that were related to the approach, but could not evaluated within other themes. Some of the content statements thought to be related to this theme are as

follows: (Page 15, Line 17): *In this curriculum, in order to raise individuals needed in the 21st century and meet national needs, a synthesis was achieved by using the child-centred practices in various learning theories and models.* Raising individuals who meet the needs of the 21st century is an objective that is often emphasised in the STEM approach. Because this particulur statement points out raising individuals in accordance with the needs of this century, it is directly related to the objective of the STEM approach. (Page 39, Line 15): *It is a centre that enables children to realise the figures of different dimensions, shapes and colours in their environment and the relationships between them, and to use their creativity through construction games by using different figures.* The construction games emphasised in this statement can be regarded as an activity that ensures children's development related to engineering as in the STEM approach.

4. Discussion, Result and Suggestions

This study revealed seven themes related to the STEM approach in the pre-school curriculum implemented in Turkey. These themes were problem solving, integration, the use of technology, development of skills, teaching of skills, turning theoretical knowledge into practice/product, and other statements related to the approach.

The frequencies of the contents associated with the approach were considered in determining the proportion of the themes in the pre-school curriculum. Accordingly, the theme that was mentioned most in relation to the STEM approach in the pre-school curriculum was "turning theoretical knowledge into practice/product". This was followed in the second place by the themes "development of skills", "teaching of skills" and "problem solving" all with the same frequencies. The themes "integration" and "use of technology" were in the third place as they had the same frequencies. When the themes related to skills are considered together, this sequence seems to change, in that the issue that is emphasised the most with regard to the STEM approach in the pre-school curriculum is related to skills.

The content statements under the theme "development of skills" pertained to skills-development and improving the levels of skills based on age groups. Skills-development mostly referred to children's imagination, language and communication skills, creativity and critical thinking skills, mathematical questioning skills, life skills, self-care skills, listening skills and basic pre-elementary school skills.

In the pre-school curriculum, the content statements under the theme "teaching of skills" mostly features teaching children listening, speaking and movement skills and the preliminary skills for them to learn basal reading and writing at elementary school. Besides, it was stated that a skill could be fully acquired only in a long process. Kapıkıran, İvrendi and Adak (2006) highlighted the necessity of systematically teaching children social skills to adapt to the society by means of various methods starting from early ages. In this sense, the pre-school curriculum attached importance to the teaching of skills, and emphasised this frequently.

The theme "turning theoretical knowledge into practice/product" included more contents than the other themes. Therefore, it can be stated that the education aimed to be provided to children in the scope of pre-school education was planned by focusing on practice and producing a product. Accordingly, the curriculum emphasised children's producing original products, being able to transfer what is learned to different situations in daily life, exhibiting the products, and planning the learning process in a way in which children can produce multiple products. Today, designing and producing a product is increasingly gaining importance (Akdağ & Güneş, 2017). The fact that turning theoretical knowledge into

practice/product is frequently highlighted in the pre-school curriculum overlaps with the objective of STEM education in raising productive individuals. In this respect, the existing pre-school education curriculum can be said to enable raising productive individuals and forming a productive society.

The content statements within the theme "problem solving" were related to producing solutions for problems, developing problem-solving skills, developing creative problem-solving skills, and reasoning. Problem solving is about producing new solutions for a problem by going beyond the use of prior experiences (Korkut, 2002). It helps people overcome the difficulties they encounter by making their life easier, and thus it is an important life skill that individuals should acquire. The problem-solving skill also constitutes an important place in STEM education, and cooperation-based problem solving is of significance as well (Mulnix & Vandegrift, 2014). A variety of problems can arise today depending on the advancement of knowledge and technology, and solving these problems as an individual is getting more difficult every passing day. At this point, it is of great importance for all individuals to acquire cooperation-based problem-solving skills at the earliest time possible, which is the pre-school period. As a matter of fact, the importance of the problem-solving skill was featured in the pre-school curriculum and it was aimed to develop this skill at an earlier period. The pre-school education curriculum can be said to attach the necessary importance to the problem-solving skill that every individual of our century should have, and to have common objectives with STEM education in this regard.

In the theme "integration", the content statements touched upon preparing activities by bringing outcomes together, and planning an activity by combining multiple activities. Integration is the most important component of STEM education that includes an interdisciplinary education model. It refers to being engaged in science, technology, engineering and mathematics activities with an interdisciplinary approach (Meng, Idris & Eu, 2014). Integrated STEM activities provide pre-school children a natural environment for collaboration and communication. Integrated and exciting learning experiences in STEM improve students' interests and learning and help them prepare for the 21st century (DeJarnette, 2018). In the pre-school education curriculum, it was emphasised that different types of activities should be combined in the content of a single activity. The integration objectives of the pre-school curriculum and the interdisciplinary characteristics of STEM education identically overlap with each other. In the pre-school period, the purpose of integration is to implement an interdisciplinary educational process.

The appropriate use of technology has positive contributions to children's language and cognitive development. Therefore, technology should be presented to children in a way in which they can start using it as of early ages (Akkoyunlu & Tuğrul, 2002). Technology education for young children is about developing, designing, inventing and creating something related to engineering science. With technology education in children, it will be ensured how the objects are developed, how they work, what tools can be developed to solve a problem, and their curiosity and creativity to make changes in technology (Pawilen & Yuzon, 2019). In Te Whariki program implemented in New Zealand, digital technologies are seen as a part of children's lives. The program aims to ensure that children understand the technologies they encounter and make the best use of these technologies. Digital literacy and digital fluency are considered important in the program (The Whariki Online, 2020). In the pre-school curriculum, the content statements related to the use of technology focused on the use of movies, documentaries, videos, CDs and computers. However, no further explanations were provided with regard to how such technologies should be used in the instructional process. This may cause inappropriate use of technology in pre-school education. In order to teach children how to use technology, these tools should be purposefully integrated with the

instructional process. When the pre-school curriculum is evaluated in terms of the technology component of STEM, it can be stated that the curriculum is not sufficient for ensuring technology integration. The curriculum should put more emphasis on technology and its aspect of using technology should be improved to be able to raise individuals in accordance with the needs of this age.

The other content statements related to the STEM approach in the pre-school curriculum highlighted the objectives of pre-school education that overlapped with those of STEM education, and the relationship of construction games included in the curriculum with the engineering aspect of the STEM approach. '*Raising individuals needed in the 21st century'* is among the objectives of pre-school education (MEB, 2013). This objective is clearly consistent with the objectives of the STEM approach. STEM education aims to equip individuals with the skills of the 21st century. In the pre-school curriculum, it is aimed to develop individuals' 21st century skills through problem solving, teaching and development of skills, turning theoretical knowledge into practice and enhancing the use of technology. The construction games mentioned in the pre-school curriculum can be regarded as an activity that ensures children's development related to engineering as in the STEM approach. By means of construction games, pre-school children learn to distinguish the similarities and differences between objects by using their imagination (MEB, 2013). With these games played in this period, children gain their first experiences of engineering. When children experience engineering in this period, information about engineering increases, and their expectations for pursuing a career in engineering also increase (Pawilen & Yuzon, 2019). Özdemir (2016) reported that the block centres where children played construction games were among the centres in which children spent most of their time. Children are interested in engineering from the moment they are born. It can thus be stated that the pre-school curriculum should be improved by putting more emphasis on construction games in a way to support children's engineering skills in line with the STEM approach. Some pre-school education programs in the world have integrated the STEM curriculum into their programs. STEM is among the important elements of the programs in Head Start and Bank Street approach. In the Head Start approach, it is thought that scaffolding, play and social interactions are important opportunities for teachers to support children's STEM discoveries. In approach, daily materials and language seem to be important in supporting STEM. It is emphasized that STEM learning can be supported with books, songs, poems and games about STEM ("Bank Street College", 2020; Head Start ECLKC, 2020). A study by Aldemir, & Kermani (2017), found that a curriculum that instills STEM through child-centered and applied learning activities helps children to understand STEM concepts strongly and develop STEM skills that can increase their future learning. Consequently, STEM education has contributed significantly to increasing the success of children with Head Start education.

As a result, the findings obtained in the study and the suggestions that can be offered accordingly can be listed as follows: (i) The pre-school curriculum has overlapping aspects with the STEM approach in terms of its objective, turning theoretical knowledge to practice, problem solving, teaching and development of skills, integration and the use of technology. (ii) The theme that was mentioned the most in relation to the STEM approach in the pre-school curriculum was "turning theoretical knowledge into practice/product". (iii) The issue that was emphasised the most in the pre-school curriculum was the teaching and development of skills. (iv) While the integration theme showed that the pre-school curriculum included interdisciplinary planning, the proportion of this theme within the curriculum content was low. STEM education is an interdisciplinary approach and there should be more emphasis on achieving the pre-school outcomes with an interdisciplinary approach. (v) The content of the pre-school curriculum should be improved with regard to the use of technology. No further

explanations were provided in the curriculum regarding how technology should be used in the instructional process. No content for how children can use technology properly was encountered. (vi) The pre-school curriculum should be improved in terms of construction games in a way to support children's engineering skills in line with the STEM approach. (vii) The content of the pre-school curriculum should be re-structured to put the same emphasis on all themes mentioned in this study to make it compatible with the STEM approach.

5. Conflict of Interest

The authors declare that there is no conflict of interest.

6. Ethics Committee Approval

The authors confirm that ethics committee approval was obtained from Manisa Celal Bayar University with a number of 13/02/2018-E.14952.

References

Aldemir, J., & Kermani, H. (2017). Integrated STEM curriculum: improving educational outcomes for head start children. *Early Child Development and Care, 187*(11), 1694-1706.

Akdağ, F. T., & Güneş, T. (2015). Science high school made about applications of stem students and teachers about energy. STEM applications.*International Journal of Social Sciences and Education Research, 3*(5), 1643-1656.

Akgündüz, D., Aydeniz, M. , Çakmakçı, G. , Çavaş, B. , Çorlu, M. S. , Öner, T. , & Özdemir, S. (2015). *STEM Eğitimi Türkiye Raporu [STEM Education Turkey Report]. İstanbul: Scala Basım*.

Akkoyunlu, B., & Tuğrul, B. (2002). Pre-school children's home life impact on the technological interactions in computer literacy skills. *Hacettepe University Journal of the Faculty of Eduction, 23*(23), 12-21.

Akman B., Uyanık - Balat G., & Yıldız, T. G. (Ed.). (2010). *Okul öncesi dönemde fen eğitimi* [*Science education in pre-school]*. Ankara: Pegem.

Anlıak, Ş., Yılmaz, H., & Şahin-Beyazkürk, D. (2008). *In pre-school and elementary education project approach and implementation phases*. *National Education, 179*, 101-111.

Asik, G., Kucuk, Z. D., Helvaci, B. , & Corlu, M. S. (2017). Integrated teaching project: A sustainable approach to teacher education. *Turkısh Journal of Educatıon, 6*(4), 200-215.

Balat, G. U., & Günşen, G. (2017). Stem approach to pre-school. *Social Surveys Academic Journal, 5*(42), 337-348.

Bank Street College of Education. (2020). Program highlights. Retrieved from: https://www.bankstreet.edu/education-for-children/liberty-leads/our-program-2/ on 11.04.2020.

Büyüktaşkapu, S., Çeliköz, N. , & Akman, B. (2012). The constructivist science education program, children ages 6 to the effect of the scientific process skills. *Education and Science, 37*(165), 275-292.

Bray, J. B., Green, K. A. , & Kay, K. (2010). Up to the challenge: The role of career and technical education and 21st century skills in college and career readiness. Retreived from: https://files.eric.ed.gov/fulltext/ED519335.pdf on 11.04.2020.

Blackwell, C. K., Wartella, E., Lauricella, A. R., & Robb, M. (2015). Technology in the lives of educators and early childhood programs: Trends in access, use and professional development from 2012 to 2014. *Center on Media and Human Development at Northwestern University, Evanston, IL*.

Bybee, R. W. (2010). What is STEM education?. *Science, 329*(5995), 996.

Clements, D. H., & Sarama, J. (2016). Math, science, and technology in the early grades. *The Future of Children, 26*(2), 75-94.

Corlu, M. S., Capraro, R. M., & Capraro, M. M. (2014). Introducing STEM education: implications for educating our teachers for the age of innovation. *Education and Science, 39*(171), 74-85.

Creswell, J. W. (2005). *Educational research: planning, conducting and evaluating quantitive and qualitative research.* USA: PearsonPrenticeHall.

DeJarnette, N. K. (2018). Implementing STEAM in the Early Childhood Classroom. *European Journal of STEM Education*, *3*(3), 18.

Gökkaya, Y. (2018). *Okul öncesi eğitimde kullanılan eğitsel etkinlik uyarlamalarının çeşitli değişkenler açısından incelenmesi [Investigating the adaptation of educational activities used in pre-school education in terms of various variables].* Unpublished master thesis, Gazi University, Institute of Education Sciences, Ankara.

Head Start ECLKC (2020). Understanding steam and how children use it. Retrieved from: https://eclkc.ohs.acf.hhs.gov/sites/default/files/pdf/steam-ipdf.pdf on 11.04.2020.

Helm, J. H., & Beneke, S. (Eds.). (2003). *The power of projects: Meeting contemporary challenges in early childhood classrooms—strategies and solutions*. Teachers College Press.

Helm, J. H., & Katz, L. G. (2001). *Young investigators: The project approach in the early years*. Teachers College Press.

Kapıkıran, N. A., İvrendi, A. B., & Adak, A. (2006). Social skills in pre school cildren: case detection. *Pamukkale University Journal of the Faculty of Eduction*, *19*(19), 19-27.

Katz, L ., G., (1994). *The project approach. ERIC Digest. ERIC Clearinghouse on Elementary and Early Childhood Education* Urbana IL. ED368509

Kefi, S. , Çeliköz, N. , & Erişen, Y. (2013). The level of use of basic science process skills of pre-school teachers. *Journal of Educational Research and Training*, *2* (2), 300-319.

Koçyiğit, S. , Tuğluk, M. N. , & Kök, M. (2007). Play as educational activity in the child's development process. *Atatürk University Kazım Karabekir Journal of the Faculty of Eduction*, (16), 324-342.

Korkmaz, H. , & Kaptan, F. (2002). Academic achievement of elementary school students in science education of project-based learning approach, its impact on academic self-concept and working time . *Hacettepe University Journal of the Faculty of Eduction*, 22, 91-97.

Korkut, F. (2002). Problem-solving skills of high school students. *Hacettepe University Journal of the Faculty of Eduction*, *23*, 177-184.

Lind, K. K. (1998). Science in Early Childhood: Developing and Acquiring Fundamental Concepts and Skills. Retreived from: http://www.project2061.org/publications/earlychild/online/experience/lind.htm on 11.04.2020.

National Research Council. (2011). *Successful STEM education: A workshop summary*. National Academies Press.

McMillan, J. H., & Schumacher, S. (2006). *Research in education evidence-based inquiry*. Boston: Pearson.

Meng, C. C., Idris, N., & Eu, L. K. (2014). Secondary Students' Perceptions of Assessments in Science, Technology, Engineering, and Mathematics (STEM). *Eurasia Journal of Mathematics, Science & Technology Education*, *10*(3), 219-227.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: an expanded sourcebook.* Thousand Oaks, CA: Sage.

Ministry of Education [MEB], (2013). Okul Öncesi Eğitim Programı [Pre-school education program]. Retreived from: https://tegm.meb.gov.tr/dosya/okuloncesi/ooproram.pdf on 09.07.2018.

Mulnix, A. B., & Vandegrift, E. V. (2014). A tipping point in STEM education reform. *Journal of College Science Teaching*, *43*(3), 14-16.

Neuman, W. L. (2010). Toplumsal araştırma yöntemleri nitel ve nicel yaklaşımlar [Social research methods, qualitative and quantitive approaches]. İstanbul: Yayın odası.

Özdemir, S. (2016). Examination of children ages 5-6 free time activities and games in toy preferences. *Journal of Educational Science, 2*(2), 1-15.

Paciga, K.A. & Donohue, C. (2017). *Technology and Interactive Media for Young Children: A Whole Child Approach Connecting the Vision of Fred Rogers with Research and Practice*. Latrobe, PA: Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College.

Pawilen, G. T., & Yuzon, M. R. A. (2019). Planning a Science, Technology, Engineering, and Mathematics (STEM) Curriculum for Young Children: A Collaborative Project for Pre-service Teacher Education. *International Journal of Curriculum and Instruction, 11*(2), 130-146.

Schneider, L. A. (2005). *Childcare teachers attitudes, beliefs and knowledge regarding science and the impact on early childhood learning opportunitites* (Unpublished master's thesis). University of Oklahoma, Norman, OK. UMI.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: grounded theory procedures and techniques*. Newbury Park, CA: Sage.

Şahin, A. , Ayar, M. C. , & Adıgüzel, T. (2014). Science, teknology, engineering ve mathematics content effects on after school activities and students. *Theory and Practice of Education Science 14*(1), 1-26.

Şencan, H. (2005). Sosyal ve davranışsal ölçümlerde güvenilirlik ve geçerlik [Reliabilty and validity in social behavioral measurements]. Ankara: Seçkin.

Te Whariki Online. (2020). Digital technologies. Retrieved from: https://tewhariki.tki.org.nz/ on 11.04.2020.

Tofur, S. (2015). *21. yy Türk eğitim politikalarının oluşturulmasında kaynaklık eden belgelerin Fullan'ın kavramsallaştırması açısından değerlendirilmesi: 1980-2014 [Evaluation of 21. Century Turkish education policy documents based on Fullan's conceptualizations:1980-2014]*. Unpublished doctoral dissertation, Eskişehir Osmangazi University, Institute of Education Sciences, Eskişehir.

Tofur, S., & Gökkaya, Y. (2019). Bağımsız okul öncesi eğitim kurumu müdürlerine göre stem/fetemm yaklaşımı: Manisa ili örneği. A. Dönger, & H. Yıldız (Eds.). In *Eğitim Bilimlerinde Akademik Çalışmalar - 2019/2* (pp. 25-40). Centinje: IVPE.

Ünal, M., & Akman, B. (2006). The attitude they showed against the science education of pre-school teachers. *Hacettepe University Journal of the Faculty of Eduction, 30,* 251-257.

Yıldırım, A., & Şimşek, H. (2008). Sosyal bilimlerde nitel araştırma yöntemleri [*Qualitative research methods in the social science]* (6th ed.). Ankara: Seçkin.

Eguz, E. (2020). Using Web 2.0 tools in and beyond the university classrooms: A case study of Edmodo. *International Online Journal of Education and Teaching (IOJET)*, 7(3). 1205-1219. https://iojet.org/index.php/IOJET/article/view/660

Received: 06.07.2019
Received in revised form: 19.02.2020
Accepted: 21.05.2020

USING WEB 2.0 TOOLS IN AND BEYOND THE UNIVERSITY CLASSROOMS: A CASE STUDY OF EDMODO

Case Study

Esra Egüz

Trinity College Dublin

eeguz@tcd.ie

Esra Eguz graduated from Istanbul University, Department of Turkish Language and Literature. She received her MA and PhD in Classical Turkish Literature from the same university. She also earned MPhil degree in Applied Linguistics from the Trinity College Dublin.

USING WEB 2.0 TOOLS IN AND BEYOND THE UNIVERSITY CLASSROOMS: A CASE STUDY OF EDMODO

Esra EGUZ

eeguz@tcd.ie

Abstract

New internet technologies have not only transformed communication but also revolutionized teaching and learning. One of the greatest steps forward in this area was Web 2.0 technology. In addition, new technologies such as podcasts, social networking, and online learning communities started to shape communication between teachers and students, and these became tools for sharing educational content. This paper examines the use of Web 2.0 tools in higher education, specifically in a case study of Edmodo. The first section of the paper provides information about the relationship between Web technologies and education. The second section focuses on a case study using Edmodo as a Web 2.0 tool to teach classical Turkish literature to third-year undergraduate students. The main purpose of the case study is to identify and classify the purposes for which the students and teacher preferred to use Edmodo for communication and in which ways they communicated with each other. A mixed research methodology with a combination of qualitative and quantitative methods was used to collect the data. An open-ended survey was also conducted via SurveyMonkey (www.surveymonkey.com) in regard to students' perceptions of Edmodo. The result of the study showed that student-initiated communications via Edmodo were much fewer than teacher-initiated communications.

Keywords: Edmodo, Web 2.0, e-learning, class interaction

1. Introduction

1.1. Historical Background of Web Technology and Education

The invention of the computer transformed almost every aspect of people's lives in a very short time. The first conception of modern computers was the Turing machine, proposed by Alan Turing in 1936 (Kidd, 2010). In the 1940s, the first digital computers began to appear. PLATO was created by Donald Blitzer in 1952 (Kidd, 2010). This system pioneered online forums, message boards, chatrooms, and instant messaging and created the first online communities (Kidd, 2010). Finally, in 1953, the first PC (personal computer) was introduced by IBM (International Business Machines). Since the 1960s, computers and e-learning have evolved in different ways in the field of education; however, in the 1960s there were not enough educational applications of computers in universities, and one of the reasons for this was the high cost (Kidd, 2010, p. 2).

In 1989, the World Wide Web was designed by Tim Berners-Lee at CERN (the European Organization for Nuclear Research) (Berners-Lee et al., 1992). In their own paper, Tim Berners-Lee, Robert Cailliau, and Jean-François Groff declared the two aims of the World Wide Web initiative as "… firstly to make a single, easy user-interface to all types of information so that all may access it, and secondly to make it so easy to add new information that the quantity and quality of online information will both increase" (Berners-Lee et al., 1992, p. 454).

The World Wide Web brought significant developments to the field of education. In 1981, the first completely online educational course was launched which was the first large-scale, online learning institution (Harasim, 2006). The internet removed distance barriers in education, and the electronic campus became the virtual campus (Hope, 2010, p. 11). In the 1990s and 2000s, e-learning continued to grow, and most institutions in the world began to offer online courses to their students. This development brought a new term to education, e-learning.

The term e-learning, also called technology-based learning, covers "… a wide set of applications and processes, including computer-based learning, Web-based learning, virtual classrooms, and digital collaboration" (Urdan & Weggen, 2000, p. 8). E-learning is also related to online learning. "Online learning constitutes just one part of technology-based learning and describes learning via Internet, intranet, and extranet" (Urdan & Weggen, 2000, p. 8). In other words, e-learning includes online learning, and online learning also covers computer-based learning. The historical context of e-learning development has been illustrated as a table, shown below, by Paul Nicholson (Nicholson, 2007, p. 7).

Table 1: The historical context of e-learning development

ERA	FOCUS	EDUCATIONAL CHARACTERISTICS
1975–1985	Programming; drill and practice; computer-assisted learning (CAL)	Behaviourist approaches to learning and instruction; programming to build tools and solve problems; local user–computer interaction.
1983–1990	Computer-Based Training Multimedia	Use of older CAL models with interactive multimedia courseware; passive-learner models dominate; constructivist influences begin to appear in educational software design and use.
1990–1995	Web-Based Training	Internet-based content delivery; active-learner models are developed; constructivist perspectives are common; limited end-user interactions.
1995–2005	E-learning	Internet-based flexible courseware delivery; increased interactivity; online multimedia courseware; distributed constructivist and cognitivist models common; remote user-to-user interactions.

As seen in the Table 1, e-learning began with the invention of computers and grew with the invention of the internet. The second-greatest technological development in e-learning that occurred after 2004 was Web 2.0 technology.

1.2. Web 2.0 and E-Learning 2.0

To define Web 2.0, Web 1.0 should be defined first. According to Kidd and Chen (2009), in the history of the internet's development, Web 1.0 is a retronym that represents most websites between 1994 and 2004. The key characteristic of Web 1.0 was its read-only feature. In other words, users were reading and receiving information from websites, a feature that made Web 1.0 more static. The term Web 2.0 was used by Tim O'Reilly in a conference in 2004. O'Reilly indicated that one of the key lessons of the Web 2.0 era is that users add value. He also declared that Web 2.0 applications are built based on a network of cooperating data services (O'Reilly, 2009). Unlike Web 1.0, Web 2.0 gave users the opportunity to write as well as read. Internet users started to create comments, express

opinions and feelings, and send visual and auditory material using various Web 2.0 tools such as chatrooms, blogs, forums, wiki websites, and social-networking sites like Facebook- in other words, user-generated content (Strobbe et al., 2010). The differences between Web 1.0 and Web 2.0 were explicated in Table 2 by Gwen Solomon and Lynne Schrum (Solomon & Schrum, 2007, p. 23).

Table 2: The differences between Web 1.0 and Web 2.0

WEB 1.0	**WEB 2.0**
Application based	Web based
Isolated	Collaborative
Offline	Online
Licensed or purchased	Free
Single creator	Multiple collaborators
Proprietary code	Open source
Copyrighted content	Shared content

The use of Web 2.0 tools also resulted in e-learning, referred to as e-learning 2.0. "Electronic learning developed from the first distance modalities (video recordings, CDs, DVDs) to e-learning (web technology) and e-learning 2.0 that uses web 2.0 channels" (Patrut & Patrut, 2013, p. 1-2). The difference between them was identified as "the e-learning 1.0 was highly structured, formal, based on a rigid division of the roles among teachers, students and tutors while in the e-learning 2.0, the web becomes a means that increases the participation and co-operation of all subjects" (Patrut & Patrut, 2013, p. 3).

Web 2.0 was also very useful in regard to social aspects. It supported social networking and gave people opportunities to interact and exchange information, ideas, opinions, and more (Patrut & Patrut, 2013, p. 2). Moreover, this social aspect transformed educational methods and techniques as well as communication between teachers and students. According to Monica and Bogdan Patrut (2013), platform 2.0 that is more participative and interactive has encouraged the evolution of e-learning. Young people are interested in technology and are already users of various social-networking platforms. They could adapt online educational platforms easily.

The benefits of using Web 2.0 tools such as blogs, wikis, and podcasts in an educational context were identified by learning specialists Fernette and Brock Eide's research and cited by Will Richardson (Richardson, 2006, p. 20). They include promoting critical thinking and creativity and analogical thinking, increasing access and exposure to quality information, and combining solitary as well as social interaction.

There are numerous educational technology resources available to teachers and students based on Web 2.0. These have been designed for a wide variety of purposes, such as creating infographics, transforming text to speech, creating podcasts, screen capturing, bookmarking, surveys and polls, quizzes and other assessments, authoring, annotating, web conferencing, creating interactive slideshows, digital storytelling, teaching and learning vocabulary, spelling, and other conventions of language, sharing documents, and creating collaborative resources.

1.3. Edmodo as a Web 2.0 Tool

Edmodo is a free learning platform designed in 2008 as a Web 2.0 tool for teachers, students, and parents for educational purposes (Edmodo, n.d.).

There are several ways to communicate using Edmodo, such as sending a post, private message or a *like*. Edmodo also offers a safe communicative environment that prevents content from being searchable on the internet (Carlson & Raphael, 2015, p. 7).

Instructors have the ability to create several groups on Edmodo. When students create personal accounts on Edmodo using their e-mail addresses and passwords, they can join the group by typing in the group code, which is shared by the instructor. After that, they can see the content and communicate with the teacher and other students.

Edmodo is a highly beneficial educational tool for teachers too. It is "a powerful hub for the flipped or blended classroom as well as for a more traditional classroom enhanced with technology use" (Carlson & Raphael, 2015, p. 3). Teachers can create groups, share content and materials related to their courses, and communicate with their students at any time. They can also create quizzes and surveys or ask students to upload their homework before a specific deadline. It also gives teachers an opportunity to send a note on a selected day and time.

Edmodo is available at www.edmodo.com. It also has an application for mobile phones. The Edmodo website has 85 million members from 190 countries and has been used in 400,000 schools. Moreover, 380 million messages have been sent, and 600 million resources were shared via Edmodo (Edmodo, n.d.).

2. Literature Review

A number of recent studies have been conducted in different countries regarding university students' perceptions of Edmodo.

The studies agree that students find using Edmodo as a technological tool to be beneficial. For instance, Manowong's (2016) study focuses on an EFL classroom and aims to determine 94 undergraduate students' perceptions of Edmodo by using a five-point Likert scale questionnaire. Findings show that Edmodo is a useful and effective learning tool that improves the college students' motivation. Al-Said (2015) investigates the students' perceptions of Edmodo. The research sample is 32 university students in Saudi Arabia. Five-point Likert scale analysis shows students think that using Edmodo increases the effectiveness of learning and communicating between teacher and students. It is also motivating and time-saving. Balasubramanian et al. (2014) also conduct a study on Edmodo. The participants include 285-degree students at a private university in Malaysia. Of these students, 249 are selected as samples for a five-point Likert scale questionnaire. The quantitative analysis shows that the students find Edmodo to be user-friendly. They especially like to use forum and group discussions. They agree that Edmodo helps them access the study materials easily and submit assignments fast. In another study (Mokhtar 2018), Malaysian students' perceptions of Edmodo is similar, although the sample is four students. The interviews with students show Edmodo helps them reach the learning materials. Another example (Oyelere et al. 2016) evaluates the learning experiences of students using Edmodo in a Nigerian university. Data is collected from 87 students through questionnaires and interviews. The result shows that Edmodo has a positive pedagogical impact on learning.

Moreover, studies conducted in Turkey also claim the effectiveness of Edmodo. For instance, Hamutoglu and Kıyıcı (2017) perform research on 37 university students. Qualitative data analysis shows that students think Edmodo improves their interaction with the teacher. However, some feel Edmodo should have an online chat facility. As the sample for his study, Uzun (2015) prefers to choose the five least active and the five most active Edmodo users out of 52 college students who take the same course. Uzun interviews these 10

students to review their posts. The qualitative data analysis shows students have positive perceptions of Edmodo. Most state that Edmodo gives them the opportunity to participate and communicate. However, some find Edmodo time-consuming and difficult to use. Teyfur et al. (2017) conduct a study with 41 university students. The data obtained from the surveys shows that students find Edmodo useful for interaction between students, although its mobile application has several problems. Tavukcu's (2018) research is based on a semi-experimental model. In his study there are two groups: one group is experimental and uses Edmodo, and the other group is the control who doesn't use Edmodo. Each group consists of 53 college students. The result shows that the students who use Edmodo get higher scores in the project evaluation achievement. They also interact with the teacher more.

3. Methodology

3.1. Data Collection

Data for this study were collected in connection with the 16th century Turkish literature class, which was taught at Istanbul University in the 2016-2017 academic year, and from Edmodo. The course is compulsory for third-year undergraduate students in the Turkish Language and Literature Department. The content includes the history of 16th century Ottoman-Turkish literature and analysing poetry from the same era. The sample of this study is 163 students.

This course was lectured for both formal and evening classes. In the formal class, there were 128 students, and there were 126 in the evening class; the total number of students was 254. The distribution of the students by gender is shown in Figure 1. A total of 179 (70%) of the students were female and 75 (30%) were male.

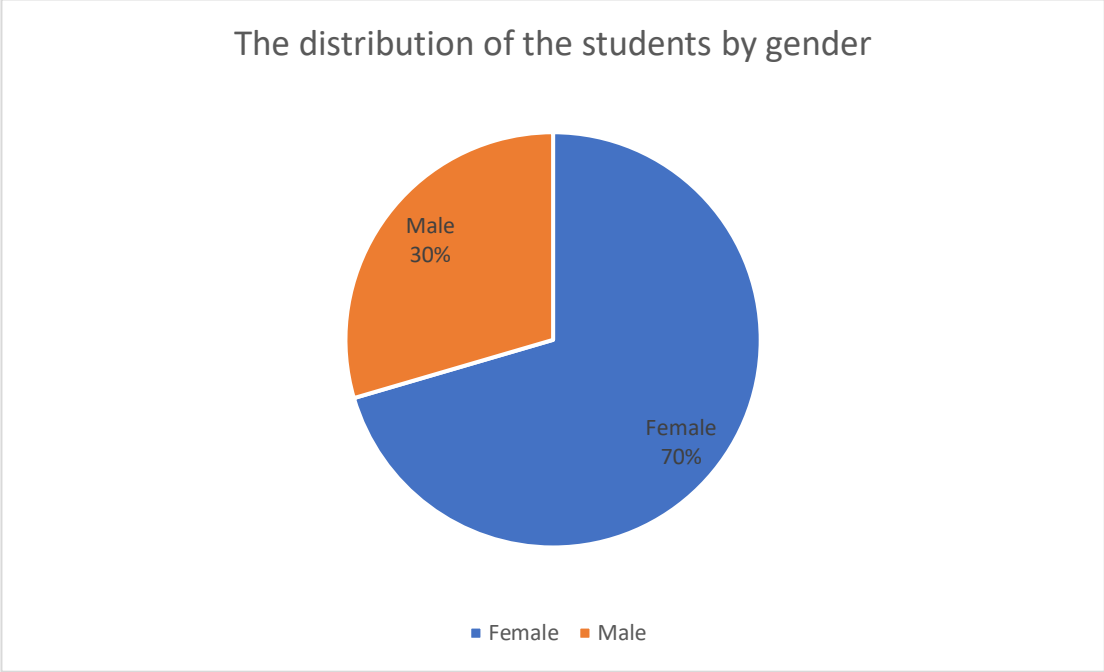


Figure 1: The distribution of the students by gender

After the announcement about Edmodo, 163 of 254 students (64%) have attended the Edmodo class. The distribution of the attendants is shown in Figure 2. A total of 128 (79%) of the attendants were female and 35 (21%) were male.

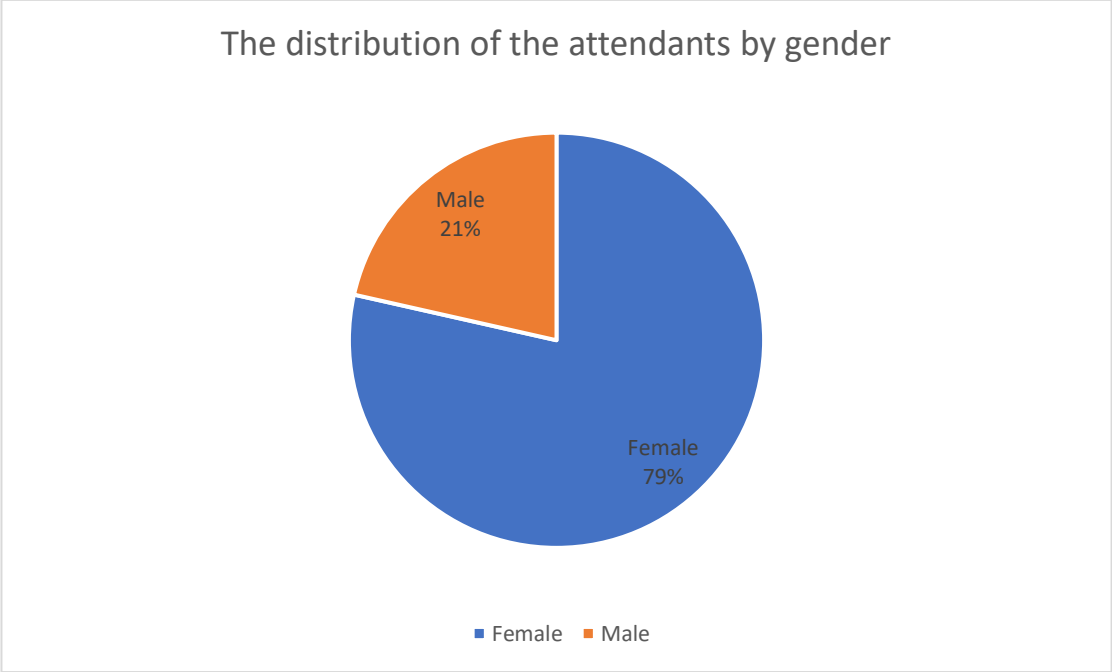


Figure 2: The distribution of the attendants by gender

The data in the "Students' Perceptions of Edmodo" section depend on an open-ended survey that was conducted via SurveyMonkey (www.surveymonkey.com) for the same course, and its link was shared on Edmodo. The question was, "Do you think Edmodo promotes students' engagement in the course?" and it was answered by 37 students out of 163 (23%).

3.2. Data Analysis

A mixed research methodology with a combination of qualitative and quantitative methods was used for this study. Qualitative analysis was used to analyse data on Edmodo and SurveyMonkey. Moreover, the data collected from these platforms were classified by content/theme. A quantitative method was used for coding and reducing qualitative data to numbers.

The collected data were classified as communications initiated by the teacher and by the students. After that, interaction topics between the teacher and students were categorized.

4. Findings

4.1. Teacher-Initiated Communication

Figure 3 below shows the percentages of the types of teacher-initiated communications on Edmodo.

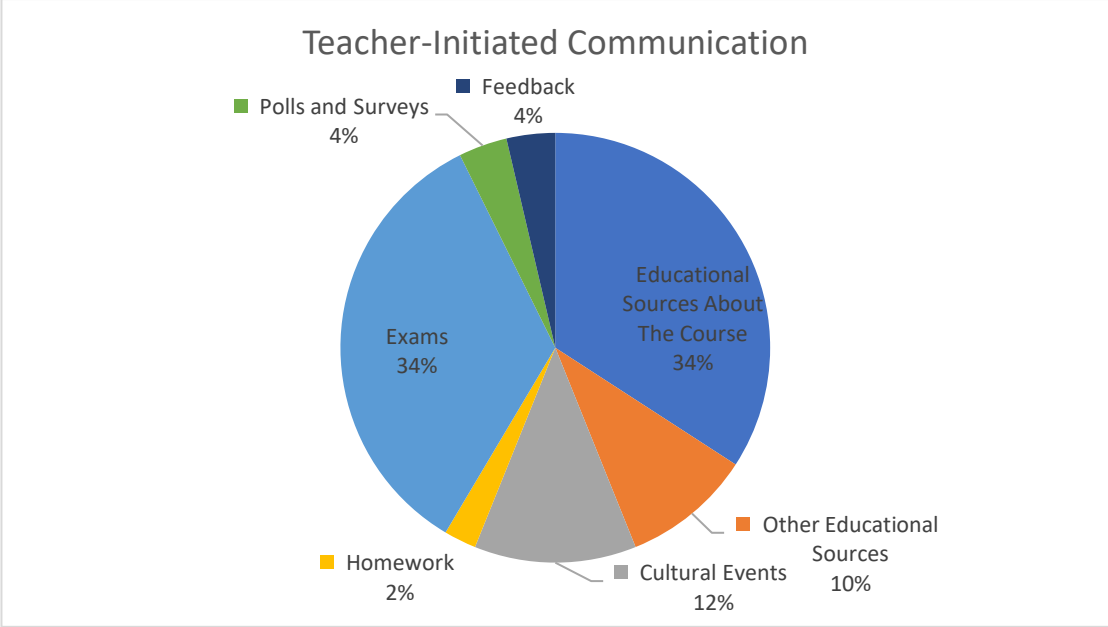


Figure 3: Teacher-initiated communication

As seen, the posts were categorized the themes as educational sources about the course, other educational sources and cultural event announcements, homework announcements, exam announcements, polls and survey and feedback.

The sources about the course were intended as extra reading and visual/auditory material for students who had an interest in the area. They were also aimed at giving students an idea about each week's topic before the class met.

Apart from materials about the course, different educational sources were shared via Edmodo. Most of these were online sources. As a written source, a PhD thesis was shared. The aim was to guide students to conduct research in other areas as well.

In addition to educational posts, current cultural events taking place in Istanbul were announced via Edmodo. These events included book festivals, film festivals, art exhibitions and historical Istanbul tours. Moreover, seminars about Ottoman poetry offered by various scholars were announced. The aim was to encourage students to attend cultural events in Istanbul more often.

During the academic term, two announcements about homework assignments were sent to students via Edmodo. One of these was about a bibliography, and the other was a bibliographical study sample used to give students an idea about the content of the homework.

A topic that students often ask questions about is exams. Details were provided about which topics exams would cover and what kinds of questions students could expect to see in the exams. Moreover, written materials for which they would be responsible on exams were shared with students. The midterm, final and makeup exam results were also shared via Edmodo along with noticeboards in the department. In addition, some feedback about exams was provided on Edmodo.

As learner autonomy plays a significant role in teaching, autonomy-supportive polls and surveys were conducted with students to learn their opinions and to give them options. Two

different polls were created on Edmodo, and one survey was created on SurveyMonkey (https://tr.surveymonkey.com/dashboard/).

4.2. Student-Initiated Communication

Figure 4 illustrates the percentages of student-initiated communication.

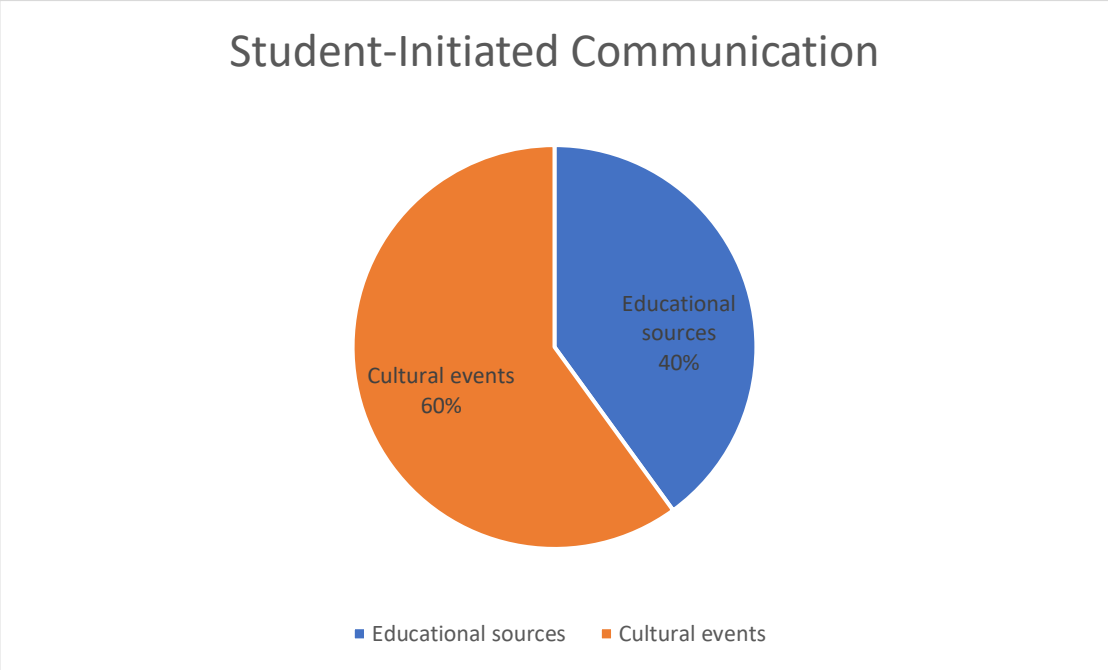


Figure 4: Student-initiated communication

Although students had written their comments or sent *like*s after posts, during the term, only four different students posted notes to the group and they preferred to share several educational sources and cultural event announcements.

One note was posted related to an educational resource that included several miniature paintings depicting Ottoman social life. Another note was shared as a video about Ottoman poetry by a different student.

Moreover, students announced several cultural events via Edmodo during the term. One student shared two symposium announcements about Turkish literature. Another student sent a concert poster to the group. In total, three different posts were sent by students about cultural events.

Students didn't send any posts related to exams or homework because they asked their questions or made their comments after posts as replies.

4.3. Interaction

During the term, there was no interaction between students on Edmodo apart from sending *like*s to each other's posts. However, interaction between students and teacher occurred by using the 'reply' sections after posts and sending *like*s and emoticons.

4.3.1. Replies

Messages can be sent after a post as a reply on Edmodo. Figure 5 below shows the percentages of topics that were covered in the reply section.

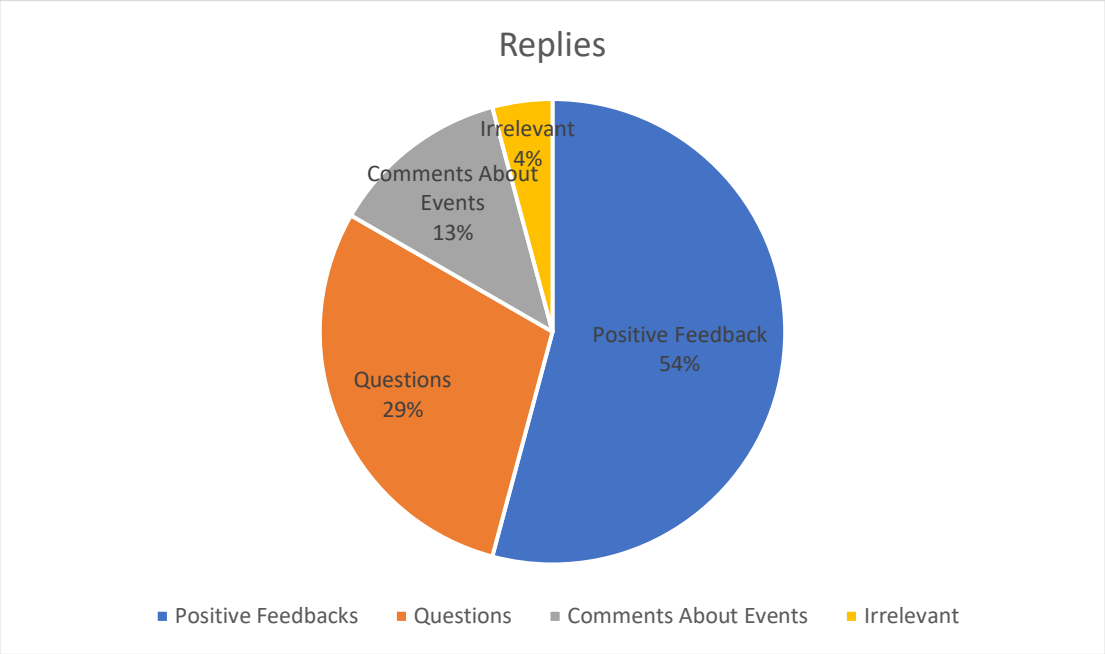


Figure 5: Replies

In the class, most of the messages posted following notes involved positive feedback, for example, saying 'thank you' or complimenting the class and the teacher. Some comments were used to ask questions about the exams, the homework and the course topic. Some of the replies that were sent after cultural event announcements were comments about those events. The remaining two messages were irrelevant to the original post.

4.3.2. Likes

Mark Zuckerberg introduced the 'like button' as a new feature of Facebook in May 2010. "Connecting people, things, and ideas is also the principle behind the much-debated Like button, a feature that lets users express their instant approval of a specific idea or item and share it" (Dijck, 2013, p. 49). However, the like button was not only used by Facebook; "three months after its introduction, more than 350,000 external websites had already installed the feature" (Dijck, 2013, p. 49). Edmodo also has a like button similar to Facebook's, which was designed as a 'thumbs up' icon. In our example, students used this button to express that they liked notes shared by the teacher and other students.

Figure 6 below shows the percentages of likes sent by students in response to the teacher's posts.

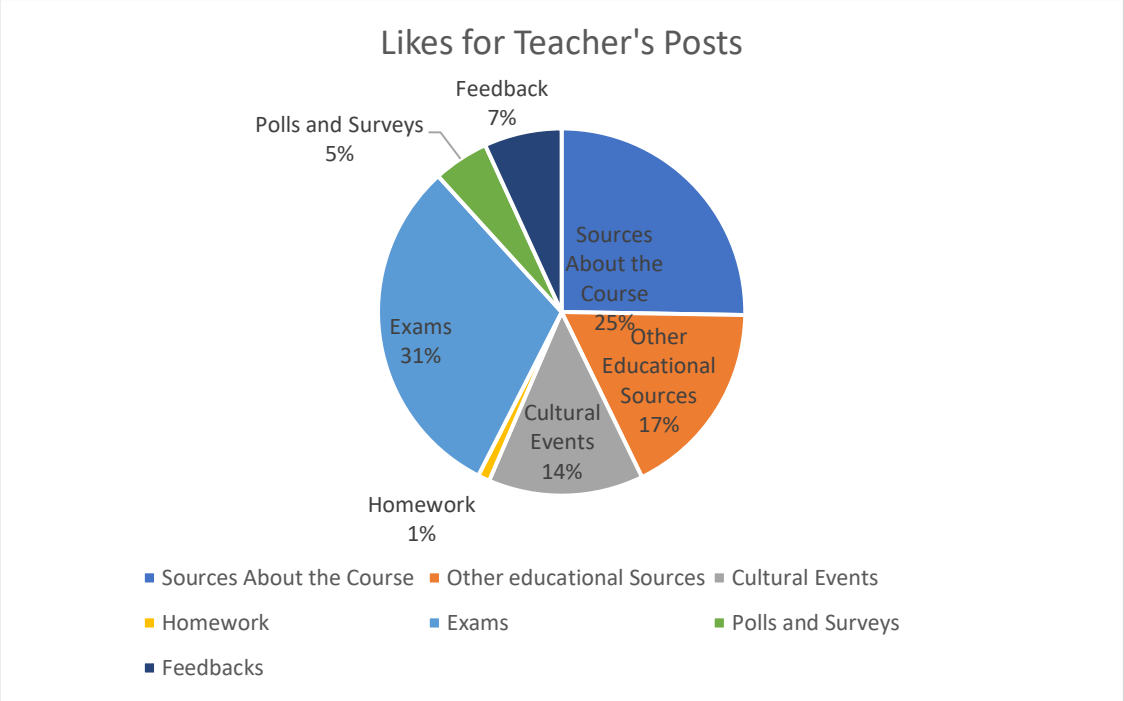


Figure 6: Likes for teacher's posts

As seen, the most liked posts on Edmodo were about exams. Students often liked written, audio and visual sources related to the course. They also sent likes to other educational sources. Cultural events were the third most liked topics after educational sources.

Students also liked the posts that were sent by their classmates. Figure 7 shows the percentages of likes sent by students to the other students' posts.

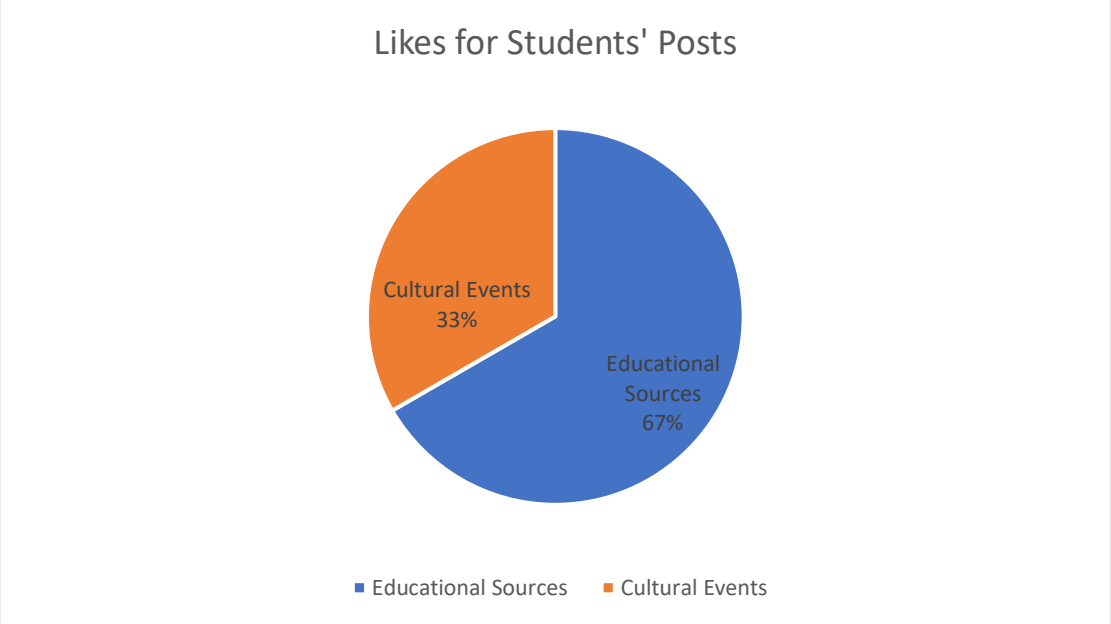


Figure 7: Likes for students' posts

As seen, students liked educational sources that were shared by their classmates students. Additionally, the posts about miniature paintings, television programs on Ottoman poetry, symposium and concert announcements had likes from the other students.

4.3.3. Emoticons

"The term emoticons – a blend of emotion and icons – refers to graphic signs, such as the smiley face, that often accompany textual computer-mediated communication" (Dresner & Herring, 2010). In this section, Yus's categorisation for the taxonomy of the functions of emoticons (Yus, 2014) will be used to classify emoticons.

Figure 8 shows the percentages of emoticons used by students.

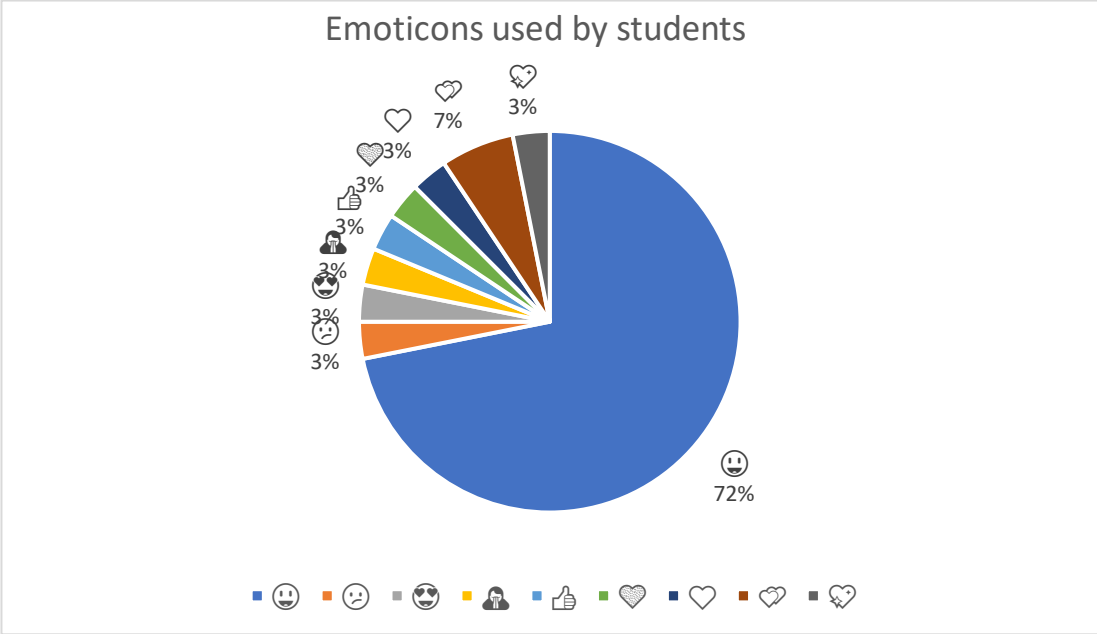


Figure 8: Emoticons used by students

The most-used emoticon by students was the 'smiling face' (😀). Most of them were used after saying 'thank you'. It was used after celebrating 'teacher's day' once. Sometimes it was used after a compliment or wishing someone well. They were used to add a feeling to the propositional content of the utterance. One student used this emoticon after his expression about 'agreeing'. Smiling faces were also used after the question, 'When will you announce the results? 😀', which were meant to soften the illocutionary force of speech acts. They were also used to contradict the explicit content of the utterance as a joke or irony: 'You will nearly make me interested in old literature 😀'.

Moreover, several heart emoticons were used by female students after compliments and 'thank you' messages. These were 'red heart' (❤️), 'blue heart' (💙), 'two pink hearts' (💞) and 'sparkling pink heart' (💖) emoticons. They were used after saying 'thank you' or expressing respect and admiration. A 'smiling face with heart-eyes' (😍) was also used for the same reason, which can categorise them as emoticons for enhancing the intensity of a feeling. Only once was one red heart emoticon used alone, without a comment, again, to express thankfulness. Another emoticon was the 'thumbs up' (👍) emoticon, which was used by a student to convey agreement. A 'confused face' (😕) emoticon was used only once to convey being disappointed about an event the student was unable to attend. The 'folded hands' (🙏) emoticon was used only once for saying 'thank you.' All had been coded in writing beforehand.

4.4. Students' Perceptions of Edmodo

Students also gave positive feedback about Edmodo. An open-ended survey question which asked "Do you think Edmodo promotes students' engagement in the course?" was answered by 37 students out of 163 (23%). Figure 9 shows the students' opinions about Edmodo in percentages.

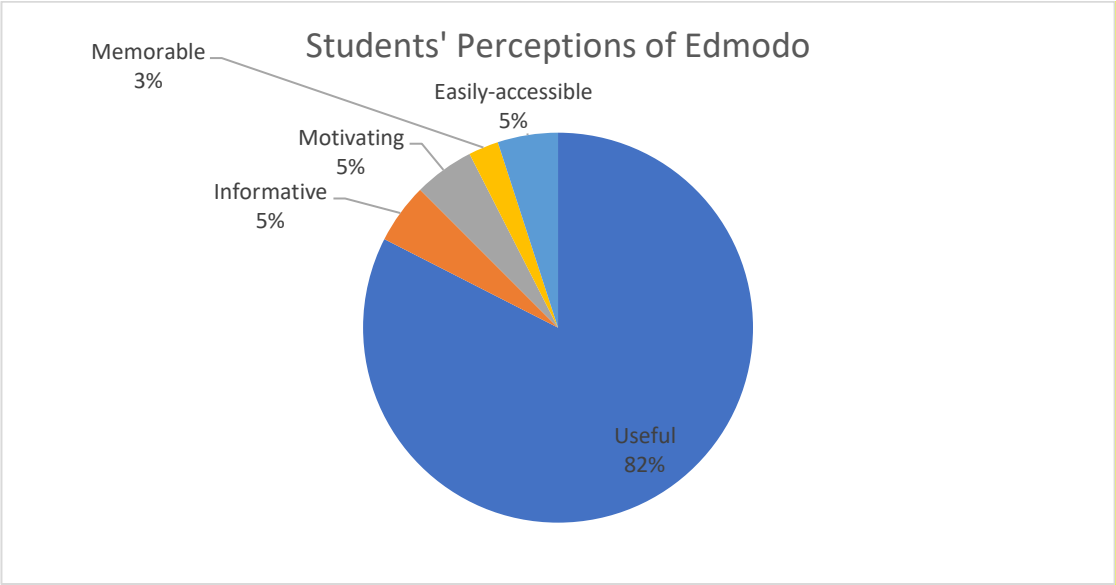


Figure 9: Students' perceptions of Edmodo

It can be seen that answers were positive about using Edmodo in the course, with 33 students (82%) reporting that Edmodo is very "useful." One student said that, even though s/he is not interested in Ottoman literature, sources shared on Edmodo can be useful for students who are interested. They also thought it should be used by other teachers. Three students said, "I wish other teachers in the department used Edmodo too." Another student considered Edmodo a social media tool and said, "It is my new social platform." Students also thought Edmodo was very "informative." A student said that with this tool, s/he "explored new things."

Another aspect of Edmodo is being "motivating." A student said, "Even though I don't want to read articles, when I see them on Edmodo, I would like to read [them]." Another student wrote that a poetry anthology shared on Edmodo caught his/her interest and s/he bought it. Edmodo also helped them remember content about the course. A student wrote, "Sharing photographs on Edmodo related to poems made the poems more memorable."

Furthermore, students found Edmodo very accessible. One student noted that the Edmodo application on her/his mobile phone "makes her/his travel to school more productive." Another student said, "We can access the documents about the class very easily on Edmodo."

To summarize, according to the survey, students agreed on the positive effects of Edmodo.

5. Discussion and Conclusion

Crowded classroom environments can cause a lack of communication between teachers and students in the university setting. Following specific curricula and having tight schedules can also negatively affect teachers. Moreover, a strict academic hierarchy and shyness or low self-confidence can discourage students from communicating with the teacher inside or outside of the classroom. In this situation, using Web 2.0 tools can be very beneficial for teachers and students. Edmodo is a highly convenient educational instrument when considered from this point of view.

In this case study, similar to the existing studies (Manowong 2016, Al-Said 2015, Balasubramanian et al. 2014, Mokhtar 2018), Edmodo helped the teacher to communicate with students and learn their thoughts, opinions, and expectations about the class. As undergraduate classes are very crowded at Istanbul University, teachers are not able to give students feedback about their exam results individually. However, this sometimes leads to incorrect learning or repeating the same mistakes. Giving feedback in the classroom is impossible because of the tight schedule, and it also embarrasses students. Edmodo was the perfect tool for handling such problems.

Moreover, Edmodo was very helpful for students who wanted to ask questions about the course or the exams. They also continued to learn after the class. It gave them an opportunity to obtain a certain number of educational sources, and it made them aware of current cultural events in their city. Moreover, they became involved in the decision-making process in regard to homework and exams through the polls on Edmodo.

However, when the posts, which were sent by the teacher and by the students were compared, it was seen that students were not eager to send a post. Based on these data, it can be considered that Edmodo reduced academic hierarchy and shyness among students in respect to communication with the teacher, but it didn't remove these factors completely. Students still didn't feel confident enough to send a new post, and they preferred replying to notes. Moreover, most students chose to express their opinions or thoughts with likes. The reason for this could be that pressing the like button is easier than sending a new post or replying to a post, especially for shy students.

In conclusion, the main contribution of this study is that communication through Edmodo was categorized as teacher- and student-initiated to show the differences. Interaction was also classified and analysed under the titles of replies, likes, and emoticons.

However, there were some limitations to this study. One is that the practice was carried out over one term. Further studies can be executed for longer periods. Another is this study was limited to one course at the Turkish Language and Literature Department in Istanbul University. Future research can focus on additional classes from various departments to compare findings.

6. Conflict of Interest

The author declares that there is no conflict of interest.

7. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Al-Said, Khalel M. (2015). Students' Perceptions of Edmodo and Mobile Learning and Their Real Barriers Towards Them, *The Turkish Online Journal of Educational Technology*, 14 (2): 167-180.

Balasubramanian, K., Jaykumar V., Fukey, L. (2014). A Study on "Student preference towards the use of Edmodo as a learning platform to create responsible learning environment", *Procedia-Social and Behavioral Sciences*, 144 :416-422.

Berners-Lee, T.J., Cailliau R., Groff J.F. (1992). The World Wide Web. Computer Networks and ISDN Systems, 25: 454-459.

Carlson, G. & Raphael R., (2015). *Let's Get Social: The Educator's Guide to Edmodo*. Eugene: International Society for Technology in Education.

Dijck, Jose Van (2013). *The Culture of Connectivity: A Critical History of Social Media*. Oxford: Oxford University Press.

Dresner, E., Herring S. C. (2010), Functions of the Nonverbal in CMC: Emoticons and Illocutionary Force. *Communication Theory*, 20: 249-268.

Edmodo website (n.d) https://www.edmodo.com/ Accessed 25.11.2018

Hamutoğlu Nazire Burcin and Mübin Kıyıcı (2017). Bir Eğitsel Sosyal Ağ Olarak Edmodo'nun Yükseköğretimde Kullanımına Yönelik Öğrenci Görüşlerinin İncelenmesi, *Trakya Üniversitesi Eğitim Fakültesi Dergisi*, 7 (2): 322-343.

Harasim, Linda (2006). A History of E-Learning: Shift Happened. In J. Weiss, J. Nolan, J. Hunsinger & P. Trifonas (Eds.), *The International Handbook of Virtual Learning Environments*, 59-94. Dordrecht: Springer.

Hope, John K. (2010). Technological Trends in Adult Education: Past, Present and in the Future. In Khosrow-Pour (Ed), *Web-based Education: Concepts, Methodologies, Tools and Applications*, 1: 9-27. Hershey: Information Science Reference.

Kidd, T., Chen I. (2009). *Wired for Learning: An Educators Guide to Web 2.0*. Charlotte: Information Age Publication.

Kidd, Terry T. (2010). A Brief History of eLearning. In Khosrow-Pour (Ed), *Web-based Education: Concepts, Methodologies, Tools and Applications*, 1: 1-8. Hershey: Information Science Reference.

Manowong, Supaporn. (2016). Undergraduate Students' Perceptions of Edmodo as a Supplementary Learning Tool in an EFL Classroom, *Silpakorn University Journal of Social Sciences, Humanities and Art*, 16 (2): 73-92.

Mokhtar, F. A. (2018). Breaking Barriers Through Edmodo: A Qualitative Approach on the Perceptions of University of Malaya Undergraduates. *Online Learning*, 22 (1): 61-80.

Nicholson Paul. (2007). A History of E-Learning. In Fernandez-Manjon, Sanchez-Perez, Gomez-Pulido, Vega-Rodriguez, Bravo-Rodriguez (eds.), *Computers and Education: E-Learning from Theory to Practice*, 1-12. Dortrecht: Springer.

O'Reilly, Tim. (2009). *What is Web 2.0? Design Patterns and Business Models for the next Generation of Software*. Available at https://www.oreilly.com/pub/a/web2/archive/what-is-web-20.html Accessed 1.12.2018

Oyelere, S., Palikztzoglou V., Suhonen J. (2016). M-learning in Nigerian Higher Education: An Experimental Study with Edmodo. *International Journal of Social Media and Interactive Learning Environments*, 4 (1): 43-62.

Patrut M. & Patrut B. (2013). *Social Media in Higher Education: Teaching in Web 2.0*. Hershey: IGI Global.

Richardson, Will. (2006). *Blogs, Wikis, Podcasts and Other Powerful Web Tools for Classrooms*. California: Corwin.

Solomon, G. & Schrum L. (2007). *Web 2.0. New Tools, New Schools*. Eugene: International Society for Technology in Education.

Strobbe, M., Van Laere, O., Dauwe, S., Dhoedt, B., De Turck, F., Demeester P. (2010). Internet based selection of user generated content for rich communication services. *Journal of Network and Computer Applications*, 33(2): 84-97.

SurveyMonkey website (n.d) https://www.surveymonkey.com/ Accessed 25.11.2018

Tavukcu, Tahir (2018). The Impact of Edmodo Assisted Education on Project Evaluation Achievement Scores and Determination of Opinions for Use in Education. *TEM Journal*, 7 (3): 651-657.

Teyfur, E., Ozkan, A., Teyfur, M. (2017). An Analysis on the Use of Educational Social Networking Sites in the Course Activities of Geography Department Students: Edmodo Sample. *Universal Journal of Educational Research*, 5 (12): 2341-2348.

Urdan, T. A. & Weggen C. C. (2000). *Corporate E-Learning: Exploring A New Frontier*. San Francisco: WR Hambrecht Co.

Uzun, Erman (2015). Students' Attitude Towards Edmodo as a Supplementary Tool for Higher Education. *Participatory Educational Research*, Special Issue II: 78-83.

Yus, Francisco (2014). Not All Emoticons Are Created Equal. *Linguagen en (Dis)curso*, 14 (3): 511-529.

Kazaz, İ. (2020). Alternative vocabulary assessment: Using concordance line activities for testing lexical knowledge. *International Online Journal of Education and Teaching (IOJET), 7*(3).1221-1237. https://iojet.org/index.php/IOJET/article/view/944

Received: 04.06.2020
Received in revised form: 11.06.2020
Accepted: 19.06.2020

ALTERNATIVE VOCABULARY ASSESSMENT: USING CONCORDANCE LINE ACTIVITIES FOR TESTING LEXICAL KNOWLEDGE

Research Article

Ilknur Kazaz

Karadeniz Technical University

ilknurkazaz@ktu.edu.tr

Ilknur Kazaz currently works at at Karadeniz Technical University as a lecturer. She holds MA in TEFL at Bilkent University. She pursues her doctoral study at Hacettepe University ELT Department and does research in Educational Assessment, Computational Linguistics, and Teacher Training.

ALTERNATIVE VOCABULARY ASSESSMENT: USING CONCORDANCE LINE ACTIVITIES FOR TESTING LEXICAL KNOWLEDGE

İlknur Kazaz
ilknurkazaz@ktu.edu.tr

Abstract
The last decade has witnessed a strong impact of emerging technologies on language pedagogy due to the developments in the computer technologies. The use of authentic linguistic examples through corpora and concordance based activities is defined as data-driven learning and it exposes the students to examples of more realistic language than invented or artificial examples. Therefore, this experimental study aimed to investigate the effectiveness of the use of a concordance software and concordance lines as a pedagogical tool in vocabulary assessment at a state university in Turkey in 2015 academic year. The materials used in the study were specialized corpora, a concordance software and treatment handouts. The corpora were analyzed by means of AntConc 3.2.4w. An independent samples T-test, was conducted over the students' GPAs, MANOVA and Standard Multiple Regression Analysis were conducted to see whether experimental and control groups were equivalent in terms of the knowledge of target vocabulary items. Thirdly, Independent Samples T-test for the three semi-controlled paragraph writing assessment and lastly descriptive statistics of the student questionnaire were administered. By the use of computer-generated concordances in the classroom, students explored regularities of patterning in L2. Corpus-based DDL is a great alternative since it emphasizes the exploration and discovery of learning process. By integrating technology into curricular programs, the lust of digital natives for hands-on learning is satisfied as well.

Key words*:* corpus-based approach; concordance lines; vocabulary instruction; data-driven learning.

1. Introduction

During the process of acquiring a foreign language learners are exposed to substantial vocabulary instruction. Since mistakes, misjudgments, miscalculations and erroneous assumptions form an important aspect of vocabulary learning on behalf of students, instructors tend to use traditional methodologies to convey meaning correctly and to teach vocabulary more efficiently. And this, in turn, indicates boredom and low motivation in terms of learners. Because of the popularization of computers, corpus-based research has become prevalent in recent years. With current advance merits in computers used in linguistics, the powerful ability of storage and processing offers a new way of language pedagogy, which gives language researchers the rare opportunity to further contemplate those linguistic meanings in an authentic environment. Students can easily gain access to a huge number of authentic and sorted language examples through concordances. However, the inadequacy of solid and empirical data undermines the argument that DDL has positive effects on language teaching and learning.

Apart from being employed in the compilation of corpus-based dictionaries, books and syllabuses, concordances can also be utilized directly in the classroom. Therefore, this study aimed to investigate the effectiveness of the use of a concordance software and concordance lines as a pedagogical tool to learn the target vocabulary of a text book. The purpose of the study was to compare the effects of corpus-aided vocabulary instruction with traditional vocabulary teaching methods. This study also examined the extent to which students used the target vocabulary in paragraph writing exercises. Hence, this study reports on a two-way assessment alternative to traditional classroom assessment. By integrating technology into curricular programs, the lust of digital natives for hands-on learning can be satisfied as well.

2. Research Questions

1) To what extent does the use of concordance lines to teach vocabulary improve students' performance on vocabulary tests using controlled exercises compared to the performance of students who have been taught these vocabulary items in class using text book materials?
2) To what extent does the use of concordance lines to teach vocabulary lead to students' greater use of these vocabulary items in less controlled paragraph writing exercises?
3) How do the students in the experimental group perceive the use of concordance lines as a tool for learning vocabulary?

3. Literature Review

There are two common pedagogical applications of corpora in EFL teaching and learning: indirect and direct applications. Indirect applications include researchers and teachers consulting corpora to inform curriculum and materials development, and may lead to authentic examples of language for textbooks rather than invented examples. Direct applications of corpora in language teaching and learning, on the other hand, typically involve learners accessing a corpus directly (Römer, 2011). Whatever definition is given the novel corpus technology presents many opportunities to find innovative ways in the teaching and learning of languages. Different kinds of corpora help enhance the teaching of languages by means of representative examples from the realistic content. While in traditional teaching fashion a rule is formulated, in the light of the new evidence exceptions to the rule can be formulated. Representative corpora which can be considered as an out-runner of extensive reading offer intensive exposure to language patterns. Through corpora learners experience various types of texts that they might not prefer to read outside class. This data-driven and awareness-raising approach is a good source for variety in the language classroom. It compensates for the intuition that non-native speakers do lack. It is a useful tool for learners to discern the subtleties of language and detect the nuances of language items. By allowing learners to understand how native speakers use the language, it helps them develop inductive reasoning skills. It is also possible for teachers and learners to have access to corpora by themselves. It helps students to become better language learners outside the classroom (Johns, 1991a, p. 31) by encouraging noticing and consciousness-raising, leading to greater autonomy and better language learning skills in the long term. When provided with plenty of examples and good models in the corpus as shown in many scholarly articles, students learn to take responsibility of their learning. Moreover, this hands-on learning opportunity has the potential to help learners in Vygotsky's terms (1978) develop their zone of proximal development. Johns (1991a) himself defines data-driven learning (DDL) as "the attempt to cut out the middleman as far as possible and to give the learner direct access to the data" (p. 30). DDL is the application of concordancing in language learning, and learners exploit corpora by using concordancing while dealing with a

language phenomenon (Payne, 2008). In other words, learners are not taught overt rules, but they explore corpora to detect patterns among multiple language samples (Boulton, 2010). This type of analysis represents a far more "natural" approach, as learners are using adaptive behavior in detecting regular patterns in the data that are meaningful to them, rather than attempting to learn and apply rules they are given, a more "artificial" intellectual activity (Gaskell & Cobb, 2004, p. 304; Scott & Tribble, 2006, p. 6). The combination of corpora and concordancers shows that a promising future in the field of language teaching and learning is offered to language teachers and researchers by letting learners discover specific patterns and change their minds by observing extensive naturally occurring examples in real texts (Hill, 2000). Under the light of these findings, this study tried to create an incidental learning environment in a DDL design through direct access to the implementation of concordancing by students.

4. Methodology

Eighty-two students from four intermediate level EFL classes at a Turkish state university preparatory school (Karadeniz Technical University) participated in the study in the 2014-2015 academic year. The data were collected through the administration of a pre-test, an immediate post-test, a delayed post-test, and a student questionnaire. The testing instruments and the questionnaire were created by the researcher. Since the questionnaire was designed to explore how the experimental group student perceive the use of concordance lines as a tool for learning vocabulary, no reliability test was conducted on the questionnaire. The materials used in the study were specialized corpora, a concordance software and treatment handouts. The corpora and treatment handouts were created by the researcher as well. The corpora were analyzed by means of AntConc 3.2.4w concordance software during the treatment (Anthony, 2014). In this quasi-experimental study, the regular activities in the text book were replaced with corpus-aided activities for the experimental group. The specialized pedagogical corpora created by the researcher were used as a resource by the students via AntConc 3.2.4w concordance software in the computer laboratory for three-weeks long with an aim of learning the target vocabulary items. After the creation of the specialized corpora, three different handouts were created by the researcher to be used during the treatment in the computer laboratory for the study. With the help of the handouts students were asked to analyze the concordance lines using the software. After the students in the experimental group analyzed the concordance lines on the screen, they were asked to do vocabulary practice exercises on the handouts which required them to demonstrate their knowledge of meaning, form and use of the vocabulary items as well as different parts of speech and grammar structures such as modals, verb tenses or relative clauses. Three different writing assignments were prepared by the researcher. The assignments required students to use the target vocabulary in a written context with an aim to understand whether the students can transfer their lexical knowledge to writing as a productive skill. After the students received instruction, the students in both groups were asked to write paragraphs which included the vocabulary they learned that week. The writing topics were adapted from the text book with minor changes to make them more appropriate to the students' interests. In an attempt to investigate the third research question, the students in the experimental group were asked to complete a questionnaire after the three-week treatment with an aim to explore the perception of the students in the experimental group towards the utility of concordance lines in vocabulary learning. The questionnaire was given to the students immediately after they took the immediate post-test in order to gather the data when the students' minds were still fresh. The questionnaire was in a 5-point Likert Scale format and consisted of 12 items.

5. Data Analysis

The study consisted of a 4-step quantitative data analysis. In the analysis of the tests, SPSS was used. Before the treatment began, as the first step of the data analysis, 1st term grade point averages of four intermediate classes were analyzed. An independent samples T-test, was conducted over the students' GPAs in order to make sure that the students in the experimental group and the control group were at the same English proficiency level when the treatment began. After it was set clear that both groups were at the same level, the treatment began and the vocabulary tests were implemented successfully. The second step of the data analysis was a quantitative analysis of the test scores of the students. MANOVA was conducted for the pretest, post-test, and delayed post-test scores of the students in the experimental group and the control group. This test sought to determine whether the experimental group and control group act differently in their pre, post and delayed post-test English scores and whether the students' performance increased with the treatment or not and also whether they retained their knowledge. And Regresion was conducted to reveal the relationship between the 1st term English scores of the participants and vocabulary scores to test whether their previous knowledge can predict their knowledge of target vocabulary items. Thirdly, the paragraph writing achievement of the students in both groups were compared with T-test statistics. The fourth and last step of the data analysis was the analysis of the student questionnaire. In order to answer the third research question, the frequencies of the items and the perception of the students as to the use of concordance lines in vocabulary learning were explored.

Comparison of 1st Term Grade Point Averages between Experimental and Control Group

In the experimental and control group, the 1st term GPA scores of 82 students in total were calculated.

Table 1. *1st Term GPA Descriptives, All Groups*

groups	Valid	Missing	Mean	Minimum	Maximum
experimental	41	0	78.24	40.00	95.00
control	41	0	80.34	68.00	93.00

According to Table 1, in the experimental group the highest score is 95, the lowest score is 40, and the mean is 78.24. In the control group the highest score is 93, the lowest score is 68, and the mean is 80.34. When the scores of the students in both groups are considered, it can be stated that the scores' values are not particularly different from each other. The control group has only 2 points more average when compared to the experimental group.

Table 2. *1st Term GPA Independent Samples T-test, All Groups*

	Levene's Test for Equality of Variances		T-test for Equality of Means				
	F	Sig.	t	df	Sig.	Mean Dif.	Std. Error Dif.

Equal variances assumed	2.31	.13	-1.07	80	.28	-2.09	1.94

An independent samples T-test was conducted in order to measure whether there was a difference between both groups in terms of GPA scores. As could be understood from the significance value in Table 2 (p = .28), there is no difference between the experimental group and the control group in terms of their first term test scores.

MANOVA: Comparison of Vocabulary Knowledge between Experimental and Control Group

Table 3. *MANOVA (Pre-test, Post-Test and Delayed Post-Test Scores) in Control and Experimental Groups*

	Control Group			Experimental Group		
	Mean	SD	N	Mean	SD	N
Pre-test	43.85	13.98	41	32.92	12.14	41
Post-test	57.26	17.47	41	87.41	9.48	41
Delayed Post-test	60.68	17.70	41	86.07	6.83	41

A multivariate analysis of variance (MANOVA) identified a significant treatment effect on the achievement of the participants' in their pre-test, post-test and delayed post-test scores. Using Wilk`s Lambda statistics, a significant main effect of treatment was found (Λ = 1.000, F= 1384.435, p < .000), with a large effect size (partial eta squared = .996).

Group differences on treatment factor had statistical significance (in order of size of F values): Pre-test (Experimental = 43.85; Control = 32.92; F = 403.055; p = .000; eta squared = .883); Post-test (Experimental = 87.41; Control = 57.26; F = 440.149; p = .000; eta squared = .989); Delayed Post-test (Experimental = 86.07; Control = 60.68; F = 481.482; p = .000; eta squared = .994)

It was found that using concordance lines in learning the target vocabulary produced higher achievement when compared to using a text book in vocabulary learning.

REGRESSION

Table 4. *Correlations between the participants' 1st term English scores and their achivement in vocabulary tests*

	1	2	3	4	5	6	7	8	9	10
1st term English Score	1									
Pre-test	.102	1								
Post-test	.116	.133	1							
Delayed Post-test	.186	.312	.435	1						

Standard multiple regression was performed on 1st term English scores to predict the relationship to achievement in vocabulary tests. Preliminary analyses were conducted not to violate the assumptions of normality, linearity, multicolinearity and homosedasticity.

Table 5. *Participants' achievement in English*

Model	Standardized Coefficients			Correlations		
	Beta	t	Sig.	Zero-order	Partial	Part
Pre-test	-.245	-2.195	.031	-.249	-.243	-.239
Post-test	.220	1.404	.164	.145	.158	.153
Delayed Post-test	-.164	-1.045	.299	.044	-.118	-.114

(R_2=.086, Predictor: Pre-test)

Nevertheless, over the partial correlation between the independent variables; pre-test, post-test and delayed post-test only the pre-test (beta = -.245, p = .031) came about as significant predictor.

The Comparison of Corpus-Aided Vocabulary Instruction to Vocabulary Instruction with the Text Book in Less Controlled Paragraph Writing Exercises

Independent Samples T-test analysis was conducted for each writing exercise separately.

Table 6. *First Writing Assignment Group Statistics*

groups	N	Mean	Standard Deviation	Standard Error Mean
control	41	2.61	2.74	.42
experimental	41	6.46	.97	.15

The mean scores in Table 6 show that the control group's success average is 2.61 while experimental group's success average is 6.46 out of 8.

Table 7. *First Writing Assignment Independent Samples T-test*

	Levene's Test for Equality of Variances		T-test for Equality of Means				
	F	Sig.	t	df	Sig.	Mean Dif.	Std. Error Dif.
Equal variances assumed	47.20	.00	-8.46	80	.00	-3.85	.45

Table 7 demonstrates that (p = .00) there is a difference between both groups in terms of the first writing assignment scores. So, the experimental group is more successful than the control group in terms of the first writing assignment scores.

Table 8. *Second Writing Assignment Group Statistics*

groups	N	Mean	Standard Deviation	Standard Error Mean
control	41	3.10	2.39	.37
experimental	41	6.32	1.29	.20

The mean scores in Table 8 show that the control group's success average is 3.10 while experimental group's success average is 6.32.

Table 9. *Second Writing Assignment Independent Samples T-test*

	Levene's Test for Equality of Variances		T-test for Equalityof Means				
	F	Sig.	t	df	Sig.	Mean Dif.	Std. Error Dif.
Equal variances assumed	30.20	.00	-7.57	80	.00	-3.22	.42

Table 9 demonstrates that (p = .00) that there is a difference between both groups in terms of the second writing assignment scores. The experimental group is more successful than the control group in terms of the second writing assignment scores.

Table 10. *Third Writing Assignment Group Statistics*

groups	N	Mean	Standard Deviation	Standard Error Mean
control	41	3.68	2.46	.38
experimental	41	6.88	1.02	.16

The mean scores in Table 10 show that the control group's success average is 3.68 while experimental group's success average is 6.88.

Table 11. *Third Writing Assignment Independent Samples T-test*

	Levene's Test for Equality of Variances		T-test for Equality of Means				
	F	Sig.	t	df	Sig.	Mean Dif.	Std. Error Dif.
Equal variances assumed	40.40	.00	-7.66	80	.00	-3.19	.41

Table 11 demonstrates that (p = .00) that there is a difference between both groups in terms of the third writing assignment scores Again, the experimental group is more successful than the control group in terms of the third writing assignment scores.

Table 12. *All Writing Assignments Group Statistics*

groups	N	Mean	Standard Deviation	Standard Error Mean
control	123	3.13	2.55	.23
experimental	123	6.55	1.12	.10

The control group's general success average is 3.13 out of 8 and the experimental group's success average is 6.55 out of 8.

Table 13. *All Writing Assignments Independent Samples T-test*

	Levene's Test for Equality of Variances		T-test for Equality of Means				
	F	Sig.	t	df	Sig.	Mean Dif.	Std. Error Dif.
Equal variances assumed	129.10	.00	-13.58	244	.00	-3.42	.25

Table 13 demonstrates that the significance value (p = .00) is lower than the error margin (p < .05). So, the hypothesis is rejected. There is a difference in terms of success between both groups. The experimental group is more successful in transferring their lexical knowledge into written competence.

QUESTIONNAIRE

Table 14. *Descriptive Measures for the Student Questionnaire*

		Strongly Disagree	**Disagree**	**Not Sure**	**Agree**	**Strongly Agree**	**Total**
Q1 I think using concordance lines to do vocabulary practice exercises is **easy.**	f	-	1	3	19	18	41
	%	-	2.4	7.3	46.3	43.9	100
Q2 I think using concordance lines to do vocabulary practice exercises is **fun.**	f	1	1	9	16	14	41
	%	2.4	2.4	22.0	39.0	34.1	100
Q3 I think using concordance lines to do vocabulary practice exercises is an **effective way** to learn vocabulary.	f	10	6	5	18	2	41
	%	24.4	14.6	12.2	43.9	49	100

Q4 I think using concordance lines to do vocabulary practice exercises is **more difficult** than learning vocabulary by using a text book.	f	14	10	5	12	-	41
	%	34.1	24.4	12.2	29.3	-	100
Q5 I think using concordance lines to do vocabulary practice exercises is **more boring** than learning vocabulary by using a text book.	f	14	12	5	10	-	41
	%	34.1	29.3	12.2	24.4	-	100
Q6 I think using concordance lines to do vocabulary practice exercises has increased my **confidence** about learning English vocabulary.	f	-	3	11	19	8	41
	%	-	7.3	26.8	46.3	19.5	100
Q7 I think concordance lines based vocabulary practice exercises can be used **instead of** exercises in the book to learn vocabulary.	f	-	4	7	21	9	41
	%	-	9.8	17.1	51.2	22.0	100
Q8 I think concordance lines based vocabulary practice exercises can be used to **supplement** exercises in the book to learn vocabulary.	f	-	1	4	23	13	41
	%	-	2.4	9.8	56.1	31.7	100
Q9 I recommend that teachers should use concordance lines so as to teach vocabulary items in **beginner level** EFL classes.	f	1	4	7	18	11	41
	%	2.4	9.8	17.1	43.9	26.8	100
Q10 I recommend that teachers should use concordance lines so as to teach vocabulary items in **intermediate level** EFL classes.	f	-	3	4	19	15	41
	%	-	7.3	9.8	46.3	36.6	100
Q11 I recommend that teachers should use concordance lines so as to teach vocabulary items in **advanced level** EFL classes.	f	-	3	7	10	21	41
	%	-	7.3	17.1	24.4	51.2	100

Q12 I want to do some **more exercises** to learn English vocabulary items by using concordance lines.	f	1	4	5	14	17	41
	%	2.4	9.8	12.2	34.1	41.5	100

The first two items required the students to directly specify their opinions regarding to what extent they found these concordance line activities for learning vocabulary easy and fun. The third item required the students to evaluate how effective they found using concordance lines in the learning of English vocabulary. Items 4 and 5 required the students to compare the use of concordance line activities with the use of text book in vocabulary learning in terms of their difficulty and boringness. Since these two items indicated negative opinions, the descriptive scores of the students were calculated by reversing these two items in SPSS analysis. Item 6 required the students to directly specify their opinions about whether using concordance lines to do vocabulary practice exercises increased their confidence in English vocabulary learning. Items 7 and 8 investigated whether the students' would prefer to use concordance lines based vocabulary practice exercises instead of the text book or to supplement the text book. Items 9, 10, 11 were constructed in order to tap into the students' recommendations about at which proficiency level (beginner-intermediate-advanced) the concordance line approach would be more appropriate to use in English vocabulary learning. The last and 12th item tried to figure out the eagerness of the students to do more exercises with the concordance lines.

6. Findings and Discussion

The findings of the current study confirm to the findings of the previous studies in the literature. The corpus-based activities in the present study which led the students to derive the lexical structures of target vocabulary items out of the examples in the concordance lines, it is never wrong to say that the present study has used an inductive approach in language instruction, similar to that of Chan & Liou (2005) in vocabulary and Weber (2001) in writing. In the current study, the students learned the target vocabulary items by means of a genuine teacher and a text book. The statistical analysis of the test results revealed that although the students in the control group had higher grade point averages before the study was initiated, experimental group students who were able to use the concordance line activities effectively in learning English vocabulary items were more successful and so was corpus-aided instruction compared to traditional vocabulary instruction method. The analysis of the student questionnaire showed that the students had positive perception about using concordance lines in learning English vocabulary. These findings have shown that there is a positive correlation between corpus consultation and achievement in vocabulary learning. As a matter of fact, this study via corpus consultation is essentially an updated version of "structured input" as stated by Van Patten (2007). The present study aims particularly to help learners develop "input processing" strategies that go beyond content lexis and attend to forms within a meaningful context. In line with Björkenstam (2013), corpus analysis presents quantitative and reusable data, and provides the opportunity to test and challenge language related ideas and intuitions. Hence, corpora plays an essential role in language learning. The students who get exposed to a pedagogical corpus by exemplifying the different parts of speech of the target vocabulary items through the concordance lines had the chance to discover specific patterns and in turn understand the descriptions of a language.

7. Conclusion

In this study by the use of computer-generated concordances in the classroom students explore regularities of patterning in the target language and the development of activities and exercises based on concordance output an alternative assessment method is suggested. Today, concordancers are invaluable learning tools and used increasingly in the language classroom owing to the emerging notion of data-driven learning. Since the concordance line activities in the handouts of the present study included different parts of speech exercises and sentence production activities besides understanding the meaning of the target vocabulary items, the students were provided with the opportunity for a guided-discovery learning atmosphere. More precisely, different vocabulary structures for the same vocabulary items facilitate students' creativity and self-discovery learning by exposing them to various contexts via corpora. Students learn through problem solving activities rather than being instructed directly by the teacher. They come into contact with a large amount of authentic language data, but not prescriptive grammatical rules. Corpus-based data-driven learning is a great alternative since it emphasizes the exploration and discovery of learning process.

8. Conflict of interests

The author declares that there is no conflict of interest.

9. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

References

Anthony, L. (2014). AntConc (Version 3.2.4w) [Computer Software]. Tokyo, Japan: Waseda University. Retrieved from http://www.laurenceanthony.net/

Björkenstam, K. N. (2013). *What is a corpus and why are corpora important tools?* Paper presented at the Nordic seminar, How can we use sign language corpora?, 12–13 December, 2013. Copenhagen, Denmark.

Boulton, A. (2010). Data-driven learning: Taking the computer out of the equation. Language Learning, 60(3), 534-572.

Chan, T., & Liou, H. (2005). Effects of web-based concordancing instruction on EFL students' learning of verb-noun collocations. *Computer Assisted Language Learning, 18*(3), 231-250.

Gaskell, D., & Cobb, T. (2004). Can learners use concordance feedback for writing errors? System, 32, 301-319.

Hill, J. (2000). Revising priorities: From grammatical failure to collocational success. In M. Lewis (Ed.), Teaching collocation: Further developments in the lexical approach (pp. 47-69). London: Language Teaching Publications.

Johns, T. (1991a). Should you be persuaded: Two examples of data driven learning. In T. Johns, & P. King (Eds.), Classroom concordancing. ELR Journal 4 (pp. 1-16). Birmingham: University of Birmingham.

Payne, J. S. 2008. Data-driven South Asian language learning. Retrieved from http://salrc.uchicago.edu/workshops/sponsored/061005/DDL.ppt

Römer, U. (2011). Corpus research applications in second language teaching. Annual Review of Applied Linguistics, 31, 205-225.

Weber, J. (2001). A concordance and genre informed approach to ESP essay writing. *ELT Journal, 55*(1), 14-20.

VanPatten, B. (2007). *Input processing in adult second language acquisition.* In B. VanPatten & J. Williams (Eds.), *Theories in second language acquisition: An introduction* (p. 115–135). Lawrence Erlbaum Associates Publishers.

Vygotsky, L. (1978). Interaction between learning and development (M. Lopez Morillas, Trans.). In M. Cole, V. John-Steiner, S. Scribner, & E. Souberman (Eds.), Mind in society: The development of higher psychological processes (pp. 79-91). Cambridge, MA: Harvard University Press.

APPENDIX A: Vocabulary Test

Time: 25 Mins

Name, Surname	**Student Number**	**Signature**

PART A: Please complete the sentences with the correct vocabulary. (8x5=40 pts)

1. Our schools must continue to offer excellence in education and embrace new **……** to enhance teaching and learning.
- **a)** documents
- **b)** technologies
- **c)** possibilities
- **d)** instructors
- **e)** references

2. Heisenberg, head of the Nazi nuclear reactor **……,** went to Copenhagen in 1941 to meet with Bohr.
- **a)** manager
- **b)** producer
- **c)** vendor
- **d)** program
- **e)** supervisor

3. The new air conditioner is helping to improve air **……**with a cleaner, quieter engine.
- **a)** weather
- **b)** quality
- **c)** smell
- **d)** condition
- **e)** type

4. The floors throughout are the **……** oak, sanded and stained a dark chocolate brown to hide their imperfections.
- **a)** unique
- **b)** earliest
- **c)** original
- **d)** magnificent
- **e)** new

5. After a long illness, getting fit again was a difficult**……..……**with ups and downs.
- **a)** development
- **b)** method
- **c)** progress
- **d)** activity
- **e)** process

6. To start with, the first grade students seemed more **……**with these plants than I would have expected.
- **a)** popular
- **b)** familiar
- **c)** interested
- **d)** outstanding
- **e)** lazy

7. The restoration will **……**less than 24 hours and will involve less than 10 workers.
- **a)** last
- **b)** find
- **c)** taken
- **d)** during
- **e)** go

8. Research reveals that ……which have a strong emotional content are more likely to succeed in convincing consumers to buy the product.
- **a)** advertisements
- **b)** statements
- **c)** notices
- **d)** announcements
- **e)** programs

PART B: Please match the beginning of the sentences on the left with the endings on the right. (5x3=15 pts)

1. The fire spread	**a)**that might be a result of the festival.
2. It turned out well in the end	**b)**in order to be noticed.
3. He complained about the noise	**c)**since she started on this new diet.
4. True art tries not to attract attention	**d)**although it looked as if we were going to fail.
5. Her health has improved dramatically	**e)**all around the neighborhood.

PART C: Please complete the sentences with the correct vocabulary from the box. Two of them are extras. (6x5=30)

lonely	experts	tradition	estimate
message	composition	characteristics	communication

1. Did you know that the more text in an e-mail _____, the more likely it is filtered by spam trigger software?
2. Passionate words, lively tunes and complex rhythms reflect the richness of Nicaraguan folk _____.
3. The courses are taught by leading _____in their fields.
4. Mobile phones provide the voice and data _____and modem functionality for portable computers as required.
5. When I visited Germany, I felt I was like a fish out of water and was desperately _____.
6. The company classifies products based on the physical_____.

PART D: Please fill in the blanks with the correct vocabulary. (5x3=15 pts)

İpek woke up very early that morning! Her heart was beating with excitement when the alarm clock started ringing at 6 a.m. The big day had come at last! She told herself that it would be a tiring day because she had lots of things to do. How was she going to **1)** …….. all the preparations by herself? She should have asked for help from her best friend. But, it was too late now. She was giving a party for her husband's promotion that evening. It would be a surprise for Furkan when he came back from work. She knew that he was **2)** …… this celebration. She had **3)** …… all of his close friends to the party. She had even hired a clown to **4)** …….. the guests. 'Let's start with the cleaning first'' she told to herself. **5)** ……..… she was going to make some baklava.

1)	**a)** deal with	**b)** care for	**c)** design	**d)** make up	**e)** give up
2)	**a)** searching for	**b)** looking forward to	**c)** insisting on	**d)** calling for	**e)** standing by
3)	**a)** wished	**b)** invited	**c)** expected	**d)** requested	**e)** wanted
4)	**a)** scare	**b)** interest	**c)** entertain	**d)** enjoy	**e)** experience
5)	**a)** every day	**b)** one more night	**c)** yesterday	**d)** afterwards	**e)** next year

GOOD LUCK □

APPENDIX B: Handout

HANDOUT I

Concordance Lines (Target Vocabulary of Chapter 9)

Task 1: Analyze the concordance lines and answer the questions.

1) Search for *Techno**

* Find two different concordance lines in which the word is used in a different part of speech (e.g., as a noun and as an adjective).
- Write down the phrases in which the words appear.

_____

_____

* Identify the part of speech in each concordance line.
- In the 1st concordance line, the word _____ is a/an _____
- In the 2nd concordance line the word_____ is a/an _____

2) Search for *Communi**

* Find two different concordance lines in which the word is used in a different part of speech (e.g., as a noun and as a verb).
- Write down the phrases in which the words appear.

_____

_____

- What preposition does the word *communication* take?_____

After looking at the examples in the concordance lines, you now write a sentence using 'communication' and the preposition. The sentences should be about something in your life at home or at university.

_____

3) Search for *Message**

* Find two different concordance lines which use different verbs with the word *message*.
- Write down the phrases in which the words appear.

_____

_____

- Can you think of other verbs that can be used with *message*? Write them down.

_____

After looking at the examples in the concordance lines, you now write a sentence using 'message' with a verb. The sentences should be about something in your life at home or at university.

_____

4) Search for *Advertis**

* Find two different concordance lines which use the word *advertisement* in singular and plural.
- Write them down.

_____

_____

* Find a concordance line in which a verb form for the word *advertisement* is used. Write it down.

_____

After looking at the examples in the concordance lines, you now write a sentence using 'advertisement' as a noun or a verb. The sentences should be about something in your life at home or at university.

_____

5) Search for *Program**

* Find a concordance line in which a different noun form for the word *program* is used. Write it down and explain its meaning.

_____

_____

* Find a concordance line in which an adjective form for the word *program* is used. Write it down.

_____

* Find a concordance line in which a verb form for the word *program* is used. Write it down.

_____

After looking at the examples in the concordance lines, you now write a sentence using 'program' as a noun or a verb. The sentences should be about something in your life at home or at university.

_____

_____

6) Search for *Spread**

* Find two different concordance lines in which the word is used in a different part of speech (e.g., as a noun and as an verb).

- Write down the phrases in which the words appear.

_____

_____

* Identify the part of speech in each concordance line.

- In the 1st concordance line, the word _____ is a/an _____
- In the 2nd concordance line the word_____ is a/an _____

After looking at the examples in the concordance lines, you now write a sentence using 'spread'. The sentences should be about something in your life at home or at university.

_____

7) Search for *Familiar**

* Find two different concordance lines with the word *familiar.*

- Write down the phrases in which the words appear.

_____

_____

- Generally, the word *familiar* takes the preposition: _____
- In the _____concordance line, the word *familiar* takes_____ preposition because_____

After looking at the examples in the concordance lines, you now write a sentence using 'familiar' with a preposition (make sure you choose the right one!). The sentences should be about something in your life at home or at university.

_____

8) Search for *Deal with**

* Find a concordance line with *deal with* which uses a modal verb. Write it down.

_____

* Circle the correct choice.

Look at the examples how deal with is used. If you say you need to deal with something, is this usually a positive or a negative thing?

- Generally, *deal with* is used to refer to positive / negative things.

* Find a concordance line that supports your answer. Write it down. Circle the positive/negative thing that deal with refers to.

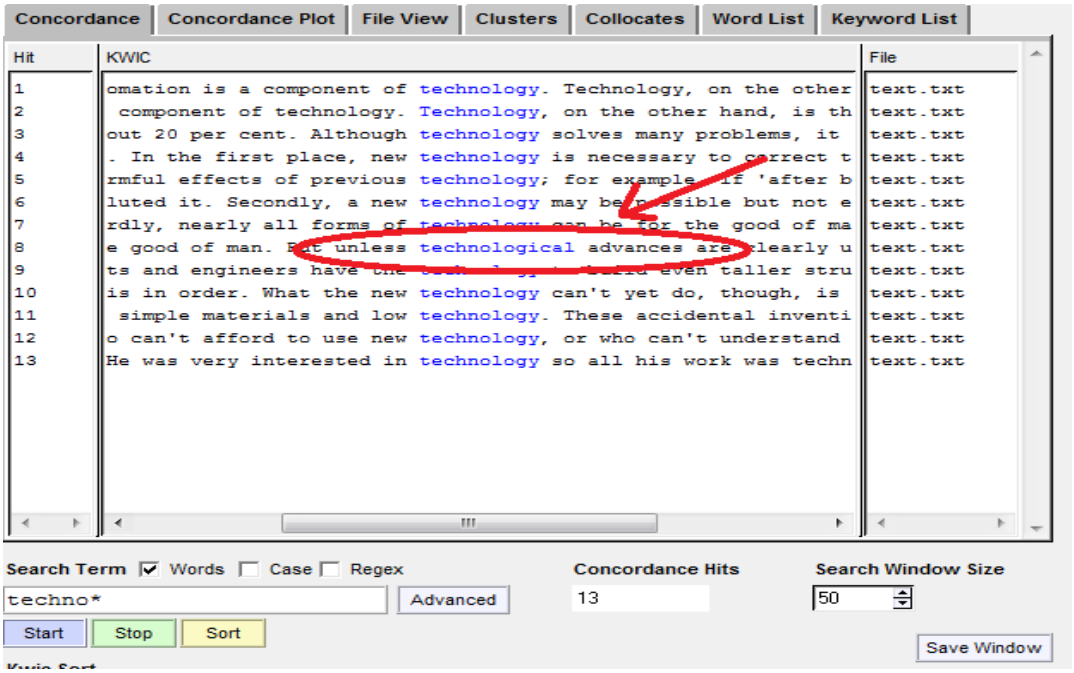
_____

After looking at the examples in the concordance lines, you now write a sentence using 'deal with'. The sentences should be about something in your life at home or at university.

_____

APPENDIX C: Treatment

Appendix D: AntConc Software Screenshot


Concordance
Concordance Plot
File View
Clusters
Collocates
Word List
Keyword List
Hit
KWIC
File
1 omation is a component of technology. Technology, on the other text.txt
2 component of technology. Technology, on the other hand, is th text.txt
3 out 20 per cent. Although technology solves many problems, it text.txt
4 . In the first place, new technology is necessary to correct t text.txt
5 rmful effects of previous technology; for example, if 'after b text.txt
6 luted it. Secondly, a new technology may be possible but not e text.txt
7 rdly, nearly all forms of technology can be for the good of ma text.txt
8 e good of man. But unless technological advances are clearly u text.txt
9 ts and engineers have the technology to build even taller stru text.txt
10 is in order. What the new technology can't yet do, though, is text.txt
11 simple materials and low technology. These accidental inventi text.txt
12 o can't afford to use new technology, or who can't understand text.txt
13 He was very interested in technology so all his work was techn text.txt
Search Term
Words
Case
Regex
techno*
Advanced
Concordance Hits
13
Search Window Size
50
Start
Stop
Sort
Save Window

Güneş, P. (2020). Teachers' perceptions of competence related to rubrics and the problems they confront. *International Online Journal of Education and Teaching (IOJET), 7*(3). 1239-1250. https://iojet.org/index.php/IOJET/article/view/849

Received: 18.03.2020
Received in revised form: 20.05.2020
Accepted: 26.05.2020

TEACHERS' PERCEPTIONS OF COMPETENCE RELATED TO RUBRICS AND THE PROBLEMS THEY CONFRONT

Research Article

Perihan Güneş

Aksaray University

perihanguness@gmail.com

Perihan Güneş currently works as an assistant professor at the Department of Science Education, Aksaray University, Aksaray, Turkey.

TEACHERS' PERCEPTIONS OF COMPETENCE RELATED TO RUBRICS AND THE PROBLEMS THEY CONFRONT

Perihan Güneş

perihanguness@gmail.com

Abstract

The purpose of this research is to determine the competencies and difficulties experienced by science teachers in developing, using, and scoring rubrics. For this purpose, the descriptive survey model was used in the research. This study was conducted with 71 science teachers working in 12 different provinces of Turkey. The availability sampling method was used to determine the sample of the study. A survey of 17 items developed by researchers was used to determine teachers' views on the rubric. Personal information and Likert-type questions in the survey were analyzed with descriptive statistics. As a result, it was found that the teachers felt partially adequate in preparing and applying rubric and scoring, and faced some difficulties in these processes. It was determined that most science teachers had difficulty in understanding explanations, deciding on the appropriate subject, deciding on the type of rubric to be used, and the criteria of performance to be measured when preparing the rubric. It was also revealed that the limited level of knowledge of most teachers about rubrics partly affected their practice with these tools. Finally, it was found that the teachers were always objective and tolerant when scoring with rubrics, never giving close scores without looking at performance, sometimes affecting the student's overall success in class and disciplinary behavior.

Keywords: Performance evaluation, rubric, science teacher, teacher efficacy.

1. Introduction

In today's world, rapid changes and transformations in technological, economic, social and cultural areas have caused the needs of societies to change. As a result of these changes and transformations, individuals are expected to have knowledge and skills in many fields. Therefore, the importance of education is increasing and education understanding is changing in parallel with the changing needs of society. Through education, the knowledge and skills needed by societies are transferred to individuals and it is aimed that individuals adapt to changing social dynamics.

It is aimed to educate individuals who can think critically and creatively, transfer the information they learn to daily life, make rational decisions and communicate effectively with their environment in today's educational understanding. To achieve this goal, countries regularly revise or modify their training programs. As a result of the changing understanding of education, education programs are organized in assessment and evaluation approaches as well as learning-teaching approaches. Because developments in the world show that traditional methods of assessment and evaluation are not sufficient to educate individuals in today's society and to determine their level of skills such as problem-solving, critical thinking, and creative thinking (Özenç & Çakır, 2015). Student-centered and performance-based assessments, which include products that reveal how students use their knowledge and skills, as well as the emergence processes of their product, reflect a new understanding. Rubrics are one of the most common measurement tools used for this purpose (Parlak & Doğan, 2014).

Rubrics are tools that contain criteria for performance to be measured and detailed descriptions of the quality of each criterion from good to bad (Goodrich, 1997; Andrea&Du, 2005). The performance observed with rubrics is recorded to the appropriate size among the criteria previously defined. Rubrics are extremely useful and practical tools that support learning and evaluation that reflect students' effort, knowledge, and skill, working habits and values in relation to constructivist performance (Brualdi, 1998). Rubrics, which can be found in many different forms and levels, can be used to evaluate many senior skills based on performance. It has found a use for itself due to dissatisfaction with performance-based assessments, especially teachers' projects, oral presentations (Reddy, 2007).

In changing assessment approaches, explicit articulation of assessment criteria is emphasized (O'Donovan, Price & Rust, 2004; Wingins, 1998). Rubrics, which offer clear criteria, help students learn about the standards they strive to achieve (McCollister, 2002). Learning goals with rubrics are presented openly to students and allow teachers to give detailed feedback to students. Thus, they serve as both a teaching and an assessment tool for the new understanding of assessment (Andrade, Du, &Wang, 2008). Rubrics, which provide detailed feedback, help students see weaknesses and strengths related to their performance by providing active participation in the evaluation process (Andrade, 2005). The use of these tools when evaluating fellow students from the other party promotes the development of peer evaluation skills (Panadero, Jonsson & Strijbos, 2016). Furthermore, the fact that the criteria are clear and well defined ensures that the performance evaluation process is transparent (Jonsson, 2014; Reddy, 2007; Venning and Buisman-Pijlman, 2013). At this point, these rubrics have a positive effect about the performance on both evaluator's being objective (Moskol, 2000; Moskal and Leydens, 2000; Reynolds, Smith, Moskovitz & Sayle, 2009) and consistent with each other (Venning and Buisman-Pijlman, 2013; Jonsson, 2014). In addition to all these, rubrics contribute to the development of self-efficacy (Andrade, Wang, Du, & Akawi, 2009; Panadero & Jonsson, 2013) and self-regulation (Panadero and Jonsson, 2013; Saddler & Andrade, 2004) skills that positively affect learning.

Teachers are expected to pay attention to measurement and evaluation methods that will provide performance-based assessments, to have knowledge of these methods, and to be willing to use these tools in and out of the classroom. However, studies show that teachers feel inadequate about the use of alternative assessment and evaluation tools (Bayat & Şentürk, 2015; Demir, 2015, Duran, Mıhladız & Ballıel, 2013; Güneş, Şener-Dilek, Hoplan, Celikoglu, and Demir, 2010; Özenç and Çakır, 2015). Besides, teachers' preparation of these tools (Metin and Özmen, 2010), implementation (Demir, 2015; Duban and Kucukyilmaz, 2008; Gomleksiz, Yıldırım, & Yetkiner, 2011; Tatar and Ören, 2009) and evaluation (Çetin, 2011; Gömleksiz et al., 2011) it was revealed that the subjects were being asked and wanted to be informed on these subjects (Metin and Özmen, 2010; Metin 2013). When the literature examined, it was observed that the studies in this subject were related to alternative assessment and evaluation techniques in general, the studies in which each instrument evaluated separately was limited. In particular, there have been very few studies on the level of knowledge of teachers about rubrics (Özdemir, 2010; Şenel, Pekdağ, Günaydin, 2018), their competence to prepare and implement these tools (Metin, 2010) and the difficulties they had in these processes. Therefore, it is deduced that determining the qualifications of teachers related to the rubric and the difficulties they had will contribute to the literature. Therefore, this study aims to determine the competencies and difficulties experienced by teachers in dealing with rubrics.

2. Method

2.1. Research Model

The descriptive survey model was used in this research as the research aims to determine the competencies and difficulties experienced by science teachers in developing, using, and scoring rubrics skills.

2.2. Sampling

This study took place in the 2016-2017 academic year. In 12 different provinces of Turkey (Aksaray, Ankara, Eskisehir, Karaman, Konya, Bilecik, Kocaeli, Şırnak, Van, Afyon, Isparta, Zonguldak), the study was conducted with 71 science teachers who had prior knowledge about rubrics. The availability sampling method was used to determine the sample. The demographic characteristics of the participants were presented in Table 1.

Table 1. *Demographics of participants*

Gender	n	%	Education status	n	%
Woman	37	52	Undergraduate Education	57	80
Man	34	48	Postgraduate	14	20
Total	71	100	Total	71	100
Year of service	n	%	School type of graduation		
0-5	22	31	Faculty of Education	66	93
6-10	16	22	Faculty of Science and Letters	4	6
11-15	12	17	Other	1	1
16-20	12	17	Total	71	100
Above 20	7	10			
Those who didn't respond	2	3			
Total	71	100			

When Table 1 was examined, it was observed that 37 (52%) of the participants were female and 34 (48%) were male teachers. Most of the participants (31%) have 0-5 years of service.

2.3. Data Collection Tool

The survey, developed by researchers, was used to determine teachers' views on the rubric.

Teachers' opinion survey on the rubric: A survey of 17 questions was developed to determine teachers' views on the rubric as a result of the literature survey. The first 9 questions of the survey were about teachers' demographic information (gender, years of service, field, education, getting lesson previously on assessment and evaluation, attending a training or a seminar about assessment and evaluation, type of the alma mater, etc.). Also in the survey, preparation of teacher rubrics, application and scoring to determine the views of 3 Likert type questions (12, 14, 15, 16), 2 questions that have multiple answers (11, 13), and 2 yes or no questions and in total there are 7 questions. Likert-type articles are rated as a triplet (12) and quintet (14, 15, 16). The survey was primarily applied to 94 science teachers. 23 of these teachers were excluded from the study because they stated that they did not have information about rubrics. The research was continued with 71 science teachers with knowledge of rubrics.

2. 4. Analysis of the Data

Personal information and Likert-type questions in the survey were analyzed with descriptive statistics.

3. Findings

This section includes findings on the competence of science teachers to develop, use and score rubric skills and the difficulties they experienced in these processes. In the study, the sources that science teachers were first informed of rubrics were presented (Table 2).

Table 2. *The resources that teachers are informed about rubric*

Items	n	%	Items	n	%
From Curriculum	33	46	From Undergraduate education	54	76
From In-service training	13	18	From Seminars, conferences, etc.	5	7
From the internet	16	22	From pedagogical formation courses	6	9
From colleagues	17	24	Other	4	6
From textbooks	24	39			

When Table 2 was examined, it was revealed that 76% of science teachers heard about rubric in undergraduate education for the first time. The qualifications of science teachers related to rubric were presented in Table 3.

Table 3. *Competencies of teachers on rubrics*

Items		n	%			n	%
Level of theoretical knowledge about rubrics	None	0	0	Level of preparation for rubric	None	4	6
	Lower	6	8		Lower	14	20
	Average	31	44		Average	34	48
	Good	29	41		Good	18	25
	Very good	5	7		Very good	1	1
	Total	71	Total		Total		100
Level of application with rubrics	None	2	3	Level of scoring with rubrics	None	4	6
	Lower	10	14		Lower	8	11
	Average	29	41		Average	32	45
	Good	25	35		Good	19	27
	Very good	4	6		Very good	8	11
	Those who did not respond	1	1		Total	71	100
	Total	71	100				
Level of interpretation of scores obtained after rubric scoring	None	2	3				
	Lower	7	10				
	Average	27	38				
	Good	27	38				
	Very good	7	10				
	Those who did not respond	1	1				
	Total	71	100				

Table 3 shows that most teachers have moderate knowledge of rubric. Besides, it was determined that the majority of teachers had a moderate level of proficiency in preparing rubric, applying, scoring and interpreting the scores obtained from the rubric. The studies evaluated by the teachers with rubric were presented in Table 4.

Table 4. *Studies of teachers evaluated with a rubric*

Items	**n**	**%**
Products: composition, article writing, graphic drawing, experiment setting, etc.	34	48
High-level thinking skills: acquiring knowledge, organizing, using, etc.	24	34
Observable performances: experimenting, sketching, drawing pictures, making a tool, etc.	40	56
Social skills: predisposition to group work, giving importance to others' ideas, expressing oneself, making presentations, etc.	25	35
Other	4	6

When Table 4 was examined, it was found that science teachers often used rubrics to evaluate observable performances such as experimenting, sketching, drawing pictures, making a tool.

50 (70%) of science teachers stated that they had previously prepared rubric, while 21 (30%) stated that they had not prepared rubric before. The difficulties experienced by teachers who previously prepared rubric in this process were shown in Table 5.

Table 5. *Frequency of problems teachers face when preparing rubric*

Items	Never n (%)	Sometimes n (%)	Always n (%)	Those who didn't respond n (%)	Total n (%)
Understanding the explanations related to rubric	12 (17%)	35 (50%)	1(%1)	23 (32%)	71 (100%)
Deciding the appropriate topic	19 (27%)	28 (39%)	2 (3%)	22 (31%)	71 (100%)
Deciding the type of rubric	5 (7%)	35 (49%)	9 (13%)	22 (31%)	71 (100%)
Deciding criteria	15 (21%)	27 (38%)	7 (10%)	22 (31%)	71 (100%)
Making appropriate definitions of target behaviors	10 (14%)	35 (49%)	4 (6%)	22 (31%)	71 (100%)
Using understandable expressions	18 (25%)	26 (37%)	4 (6%)	23 (32%)	71 (100%)
Deciding the level of scoring	15 (21%)	29 (41%)	5 (7%)	22 (31%)	71 (100%)
Making it suitable for student level	15 (21%)	33 (47%)	1(%1)	22 (31%)	71 (100%)

When examining Table 5, it was determined that the majority of science teachers sometimes had difficulty in understanding explanations, deciding on the appropriate subject, deciding on the type of rubric to use and deciding criteria for the performance to be measured.

It was also found that teachers sometimes had difficulty making definitions that fit the criteria to be included in the rubric, making clear statements, deciding the level of scoring, and making the rubric appropriate to the level of students.

51 (72%) of science teachers stated that they had previously practiced with the rubric. The situations that prevent teachers from practicing with rubric were presented in Table 6.

Table 6. *Situations that prevent teachers from practicing with rubric*

Items	None n (%)	Average n (%)	Many n (%)	Those who didn't respond n (%)	Total n (%)
Limited knowledge of rubric	7 (10%)	39 (55%)	5 (7%)	20 (28%)	71 (100%)
Lack of knowledge about students' use	4 (6%)	34 (49%)	13 (18%)	20 (28%)	71 (100%)
Crowded classroom	6 (8%)	29 (41%)	16 (23%)	20 (28%)	71 (100%)
Students' indifference to the course	7 (10%)	29 (41%)	15 (21%)	20 (28%)	71 (100%)
Absenteeism of students	16 (23%)	20 (28%)	15 (21%)	20 (28%)	71 (100%)
Negative attitude of students towards rubric	12 (17%)	27 (38%)	12 (17%)	20 (28%)	71 (100%)
Ineligibility to class level	18 (25%)	26 (37%)	7 (10%)	20 (28%)	71 (100%)
Difficulties in classroom management	16 (22%)	29 (41%)	6 (9%)	20 (28%)	71 (100%)
Being time consuming	5 (7%)	26 (37%)	20 (28%)	20 (28%)	71 (100%)

Table 6 shows that the fact that most teachers have a limited level of knowledge about rubrics moderately affects their practice with these tools. In addition to this, children's lack of knowledge about the use of a rubric, the overcrowding of the classroom, the lack of interest in the classroom, and difficulties in classroom management affect the teachers' use of these tools in the classroom at a moderate level.

56 (79%) of the teachers with prior knowledge had previously scored with the rubric, while 15 (21%) had not previously scored with a rubric. The frequency of teachers' behavior when scoring with rubric was shown in Table 7.

Table 7. *Frequency of behaviors that teachers demonstrate when scoring with rubric*

	Never n (%)	Sometimes n (%)	Always n (%)	Those who didn't respond n (%)	Total n (%)
I'm being objective.	0 (0%)	6 (8%)	50 (70%)	15 (21%)	71 (100%)
I'm being lenient.	5 (7%)	18 (25%)	33 (47%)	15 (21%)	71 (100%)
I give each student close scores regardless of performance	41 (58%)	11 (15%)	3 (4%)	15 (21%)	71 (100%)
The student's overall success in the class affects my scoring.	23 (33%)	30 (42%)	3 (4%)	15 (21%)	71 (100%)
The student's disciplinary behavior in the classroom environment affects my scoring.	19 (27%)	30 (42%)	7 (10%)	15 (21%)	71 (100%)

Looking at Table 7, teachers stated that they were always objective and tolerant, never giving close scores without looking at performance, sometimes affecting the student's overall success in the classroom and their disciplinary behavior.

4. Discussion and Conclusion

This study aims to determine the proficiency of science teachers in developing, using, and scoring rubrics skills and the difficulties they experienced in these processes. In this study, it was revealed that teachers felt partially adequate in preparing rubric, applying rubric and scoring, and faced some difficulties in these processes.

First of all, in this study, it was determined that science teachers had intermediate-level knowledge about the rubric. When we look at this conclusion of the research, it is seen that it parallels the results of the previous studies (Duran, Mıhladız, Ballıel, 2013; Özdemir, 2010). There are also studies in the literature that determine teachers have insufficient knowledge about rubric (Özdemir, 2010; Şenel, Pekdağ, Günaydin, 2018). It is also remarkable that many of the teachers who knew about the rubric in the study had little years of seniority and heard the rubric for the first time in undergraduate education. This shows that new teachers have an awareness of rubric, but not an adequate level of knowledge, especially with the inclusion of alternative assessment methods in the programs. Similarly, Watt (2005) found that although teachers with little teaching experience had more positive attitudes towards alternative assessment methods, they did not choose to use them. Researchers have expressed satisfaction with the traditional exams that teachers use to determine student abilities.

In the study, the difficulties encountered in preparing rubrics were examined, and it was found that teachers sometimes had difficulty deciding the appropriate subject, the type of rubric to be used (analytical or holistic) and the appropriate criteria, understanding the explanations related to the rubric, making the appropriate definitions related to target behaviors, using understandable expressions, deciding the level of scoring, making it suitable for the student level. Although it has been determined that half of the teachers who participated in the study had previously prepared rubric, we can attribute the difficulty that they experienced to various

reasons in the situations mentioned above. The first of the reasons can be cited as teachers' lack of knowledge about rubrics. The other reason may be that teachers take advantage of the rubrics that are readily available instead of preparing rubrics. In the studies, it is stated that the teachers did not prepare the rubrics themselves and often used ready templates (Algan, 2008; Adanalı, 2008). It has also been stated that teachers have difficulty in evaluating due to their inability to find sample rubrics from textbooks and the internet (Metin, 2013). Another reason can be thought of as teachers not using rubric-like tools in evaluating performance-oriented studies. Şenel, Pekdağ, and Günaydın (2018) found that teachers did not consider scoring as necessary in their work to create products or solutions such as tasks, portfolios, projects. Besides, the researchers determined that in scoring open-ended questions, teachers followed rubric-like approaches but carried it out with their techniques. There are studies in the literature that support the conclusion that teachers have difficulty deciding the appropriate criteria when developing rubrics (Metin and Özmen, 2010; Akbaş and Gençtürk, 2013). This suggests that teachers do not know the basic elements that constitute skills such as critical thinking, problem-solving, creative thinking, and do not set standards for evaluating them. Failure to set assessment criteria can result in teachers not being able to set relevant targets for what they are going to teach students, so evaluations are mostly based on opinion. The fact that the evaluation criteria are based on belief makes it clear that each student can be evaluated with different criteria. This may result in performance-based assessments not being measured validly and reliably. In his study Metin (2010), he determined that teachers needed training at the point of preparing rubric. The study focuses on the general characteristics of rubrics and how to determine the criteria to be included in rubrics.

The study found that most of the teachers had previously practiced with the rubric. Also, it was revealed that teachers used the rubrics to evaluate the products (composition, writing articles, drawing charts, creating experimental apparatus and social skills, etc.) and observable performances (making experiments, sketching, drawing pictures, making a tool, etc.). It was revealed that the teachers were partially affected by the difficulties such as the limited level of knowledge about rubric while practicing with the rubric, the lack of knowledge about the use of rubric by the students, the overcrowding of the class, the indifference of the students to the class, the absences of the students to the class, the negative attitudes of the students towards rubric, the teachers' having little practice with rubrics can cause these problems. Upon examination of the literature, it was determined that the rubric is an assessment and evaluation tool used by teachers with little frequency (Acar and Anıl, 2009; Akbaş, Gençtürk, 2013). Besides, teachers' lack of knowledge about how to use rubrics can be cited as another reason for the difficulty that they experienced. Metin (2010) determined in his study that teachers needed training on how to apply the rubric. When the literature was scanned, there were no studies on the difficulties experienced by teachers in using the rubric, and the studies were mostly directed at alternative methods of assessment and evaluation. The teachers obtained in these studies have insufficient knowledge (Duran et al., 2013; Özenç and Çakır, 2015; Demir, 2015), crowded classes, lack of time (Çetin, 2011; Demir, 2015; Okur and Azar, 2011) and negative attitudes of students towards these practices (Duban and Küçükyılmaz 2008; Tatar and Ören 2009) were found to have parallels with our research results.

Finally, the study determined that most teachers had previously scored with a rubric. It has been revealed that teachers who score with rubric are always objective and tolerant, that they do not give close scores to each student without looking at performance, and that sometimes the student's overall success in class and disciplinary behavior affect their scoring. When the literature is examined, it is noted that rubrics with clear and well-defined criteria make positive contributions to the objectivity of the performance evaluation process (Venning and Buisman-Pijlman 2013, Jonsson, 2014; Reynolds et al, 2009). When the answers given by the teachers

were examined, a contradictory situation was revealed that the teachers displayed both partial and objective behaviors in their rubric assessment. This suggests that teachers do not make much assessment with the rubric. Besides, high-grade expectations of students and parents in performance-based evaluations can be cited as the reason why teachers are not objectivity in using these tools. In his study, Metin (2010), stated that teachers felt inadequate about how to convert rubrics into notes and they needed in-service training.

Based on these results, the following suggestions can be made for future studies:

- Teachers should be given in-service training on the importance of assessing and evaluating high-level thinking skills. In this context, in addition to theoretical information about the development, implementation, and evaluation of rubrics, sample applications should be presented.
- Valid and reliable rubrics for evaluating high-level thinking skills in various subjects should be developed and made available to teachers.
- The education courses taken at the undergraduate level of the teacher candidates should be given rubrics and the teacher candidates should be trained better in the subject.
- Doing this kind of work on larger scale groups will ensure that more healthy information is obtained.

5. Conflict of Interest

The author declares that there is no conflict of interest.

6. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

Acknowledgement

This study was produced from the project numbered 2015-096 supported by Aksaray University Scientific Research Projects Coordination Unit.

References

Acar, M. & Anıl, D. (2009). Sınıf öğretmenlerinin performans değerlendirme sürecindeki değerlendirme yöntemlerini kullanabilme yeterlikleri, karşılaştıkları sorunlar ve çözüm önerileri. *TUBAV Bilim Dergisi, 2*(3), 354-3.

Adanalı, K. (2008). *Sosyal bilgiler eğitiminde alternatif değerlendirme: 5. sınıf sosyal bilgiler eğitiminin alternatif değerlendirme etkinlikleri açısından değerlendirilmesi.* Yüksek Lisans Tezi, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Adana.

Akbaş, Y. & Gençtürk, E. (2013). Coğrafya öğretmenlerinin alternatif ölçme-değerlendirme teknikleri ile ilgili görüşleri: kullanma düzeyleri, sorunlar ve sınırlılıklar. *Doğu Coğrafya Dergisi, 18*(30), 331-335.

Algan, S. (2008). *İlköğretim 6. ve 7. sınıf sosyal bilgiler dersi öğretim programının ölçme ve değerlendirme öğesinin öğretmen görüşleri açısından incelenmesi*. Yüksek Lisans Tezi, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Adana.

Andrade, H. G. (2005). Teaching with rubrics: The good, the bad, and theugly. *College Teaching, 53*(1), 27-31.

Andrade, H. G. & Du, Y. (2005). Student perspectives on rubric-referenced assessment. *Practical Assessment, Research & Evaluation*, *10*(3).

Andrade, H. G., Du, Y., & Wang, X. (2008). Putting rubrics to the test: The effect of a model, criteria generation, and rubric-referenced self-assessment on elementary school students' writing. *Educational Measurement, 27*(2), 3–13.

Andrade, H. G., Wang, X., Du, Y., & Akawi, R. L. (2009). Rubric-referenced self-assessment and self efficacy for writing, *The Journal of Educational Research, 102*(4), 287-302.

Bayat, S. & Şentürk, Ş. (2015). Fizik, kimya, biyoloji ortaöğretim alan öğretmenlerinin alternatif ölçme değerlendirme tekniklerine ilişkin görüşleri. *Amasya Üniversitesi Eğitim Fakültesi Dergisi, 4*(1), 118-135.

Brualdi, A. (1998). Performans assessment in the classroom. (ERIC Research Report: ED423312).

Çetin, L. M. B. (2011). *An investigation into the implementation of alternative assessment in the young learner classroom.* Yayımlanmamış doktora tezi, Ortadoğu Teknik Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.

Demir, M. (2015). *Türkiye ve ABD'de ilkokul 4. sınıf matematik dersi öğretim programında kullanılan alternatif değerlendirme yöntemlerinin karşılaştırmalı olarak incelenmesi.* Yayımlanmamış doktora tezi, İnönü Üniversitesi, Eğitim Bilimleri Enstitüsü, Malatya, Türkiye.

Duban, N. & Küçükyılmaz, E. A. (2008). Sınıf öğretmeni adaylarının alternatif ölçme değerlendirme yöntem ve tekniklerinin uygulama okullarında kullanımına ilişkin görüşleri. *İlköğretim Online, 7*(3), 769-784.

Duran, M., Mıhladız, G. & Ballıel, B. (2013). İlköğretim öğretmenlerinin alternatif değerlendirme yöntemlerine yönelik yeterlik düzeyleri. *Mehmet Akif Ersoy Üniversitesi Eğitim Bilimleri Enstitüsü Dergisi, 2,*26-37.

Goodrich, H. G. (1997). Understanding rubrics. *Educational Leadership, 54*(4).

Gömleksiz, M. N., Yıldırım, F. & Yetkiner, A. (2011). Hayat bilgisi dersinde alternatif ölçme değerlendirme tekniklerinin kullanımına ilişkin öğretmen görüşleri. *e-Journal of New World Sciences Academy, 6(*1), 823-840.

Güneş, T., Dilek, N. Ş., Hoplan, M., Çelikoğlu, M. ve Demir, E. S. (2010). *Öğretmenlerin alternatif değerlendirme konusundaki görüşleri ve yaptıkları uygulamalar.* International Conference on New Trends in Education and Their Implications etkinliğinde sunulmuş bildiri, Antalya.

Jonsson, A. (2014). Rubrics as a way of providing transparency in assessment. *Assessment & Evaluation in Higher Education,* 39 (7), 840-852. doi:10.1080/02602938.2013.875117.

McCollister, S. (2002). Developing criteria rubrics in the art classroom. *Art Education, 55*(4), 46-52.

Metin, M. (2013). Öğretmenlerin performans görevlerini hazırlarken ve uygularken karşılaştığı sorunlar. *Kuram ve Uygulamada Eğitim Bilimleri, 13*(3), 1645-1673.

Metin M, & Özmen H. (2010). Fen ve teknoloji öğretmenlerinin performans değerlendirmeye yönelik hizmet içi eğitim (HİE) ihtiyaçlarının belirlenmesi. *Kastamonu Eğitim Dergisi 18(3), 819-838.*

Moskal, B. M. (2000). Scoring rubrics: What, when and how? *Practical Assesment, Research & Evaluation,7*,3.

Moskal, B. M., & Leydens, J., A. (2000). Scoring rubric development: validity and reliability. *Practical Assessment, Research & Evaluation, 7*(10).

O'Donovan, B., Price, M., & Rust, C. (2004). Know what I mean? Enhancing student understanding of assessment standards and criteria. *Teaching in Higher Education, 9(3),* 325–335. doi:10.1080/1356251042000216642.

Okur, M. & Azar, A. (2011). Fen ve teknoloji dersinde kullanılan alternatif ölçme ve değerlendirme tekniklerine ilişkin öğretmen görüşleri. *Kastamonu Eğitim Dergisi*, *19*(2), 387-400.

Özdemir, S. M. (2010). İlköğretim öğretmenlerinin alternatif ölçme ve değerlendirme araçlarına ilişkin yeterlikleri ve hizmet içi eğitim ihtiyaçlar. *Türk Eğitim Bilimleri Dergisi Güz 8*(4), 787-816.

Özenç, M. & Çakır, M. (2015). Exploring primary school teachers' competencies of alternative assessment and evaluation. *Elementary Education Online, 14*(3), 914-933.

Panadero, E., & Jonsson, A. (2013). The use of scoring rubrics for formative assessment purposes revisited: A review. *Educational Research Review, 9,* 129–144. doi:10,1016/j.edurev.2013.01.002.

Panadero, E., Jonsson, A., & Strijbos, J. W. (2016). *Scaffolding self-regulated learning through selfassessment and peer assessment: Guidelines for classroom implementation*. In D. Laveault & L. Allal (Eds.), Assessment for learning: Meeting the challenge of implementation (pp. 311–326). Cham: Springer International Publishing.

Parlak, B. & Doğan N. (2014). Dereceli puanlama anahtarı ve puanlama anahtarından elde edilen puanların uyum düzeyleri. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi (H. U. Journal of Education) 29*(2), 189-197.

Reddy, M. (2007). Effect of rubrics on enhancement of student learning. *Educate, 7*(1), 3-17.

Reynolds, J., Smith, R., Moskovitz, C., & Sayle, A. (2009). BioTAP: A systematic approach to teaching scientific writing and evaluating undergraduate theses. *BioScience,* 59(10), 896–903. doi:10.1025/bio.2009.59.10.11.

Saddler, B. & Andrade, H. G. (2004). The writing rubric. *Educational Leadership, 62*(2), 48-52.

Şenel, S., Pekdağ, B. & Günaydın, S. (2018). Kimya öğretmenlerinin eğitimde ölçme ve değerlendirme süreçlerinde yaşadıkları problemler ve yetersizlikler. *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi, 12*(1), 419-441. DOI: 10,17522/balikesirnef.437824.

Tatar, N. ve Ören, F. Ş. (2009). İlköğretim sınıf öğretmenlerinin alternatif değerlendirme yaklaşımlarına ilişkin görüşleri-II. *Kastamonu Eğitim Dergisi, 17*(3), 781-798.

Venning, J., & F. Buisman-Pijlman (2013). Integrating assessment matrices in feedback loops to promote research skill development in postgraduate research projects. *Assessment and Evaluation in Higher Education, 38*(5), 567–579.

Watt H. M.G. (2005). Attitudes to the use of alternative assessment methods in mathematics: a study with secondary mathematics teachers in Sydney, Australia. *Educational Studies in Mathematics, 58,* 21–44.

Wiggins, G. (1991). Standart, not standardization: Evoking quality student work. *Educational Leadership. 48*(5), 18-25.