



Received: 26.09.2018  
Received in revised form: 16.05.2019  
Accepted: 04.06.2019

Deringöl, Y. (2019). The relationship between reflective thinking skills and academic achievement in mathematics in fourth-grade primary school students. *International Online Journal of Education and Teaching (IOJET)*, 6(3). 613-622

<http://iojet.org/index.php/IOJET/article/view/532>

## **THE RELATIONSHIP BETWEEN REFLECTIVE THINKING SKILLS AND ACADEMIC ACHIEVEMENT IN MATHEMATICS IN FOURTH-GRADE PRIMARY SCHOOL STUDENTS**

*Research Article*

Yasemin Deringöl 

İstanbul Üniversitesi-Cerrahpaşa

[yderingl@gmail.com](mailto:yderingl@gmail.com)

Yasemin Deringöl is an Assistant Professor in Department of Elementary Education in Istanbul University-Cerrahpaşa. She is specifically interested learning of mathematics, the teaching of mathematics, creativity in mathematics, approaches and techniques of teaching, and individual differences in learning.

Copyright by Informascope. Material published and so copyrighted may not be published elsewhere without the written permission of IOJET.

# THE RELATIONSHIP BETWEEN REFLECTIVE THINKING SKILLS AND ACADEMIC ACHIEVEMENT IN MATHEMATICS IN FOURTH-GRADE PRIMARY SCHOOL STUDENTS

Yasemin Deringöl

[ydering1@gmail.com](mailto:ydering1@gmail.com)

## Abstract

This study was conducted with the aim of determining the relationship between reflective thinking skills and academic success in mathematics in fourth-grade primary school students. The data were collected using the “Reflective Thinking Skills Scale” developed by Demirbaş (2012), and the “Personal Information Form” developed by the researcher. The data that were collected in this study which was conducted as a screening model were analyzed with SPSS 16. In the study, it was found that the reflective thinking skills of the fourth-grade primary students were high, the female students had higher reflective thinking levels than the male students, and there was a positive relationship between the reflective thinking skills of the students and their success in mathematics and academics.

*Keywords:* Primary School Student, Reflective Thinking Skills, Mathematics Academic Achievement, General Academic Achievement

## 1. Introduction

Thinking is the most different characteristic of people that distinguishes them from other living being. Such that, it may even be argued that a person is a person due to their thinking power and talent. Although it appears that the act of thinking does not have a direct field of knowledge, when observed closely, it may be seen that all fields of education are fundamentally an education of teaching. Thinking education forms the foundation of all other educations with the contribution it makes on skills of making sense of processing, structuring and reproducing information. This way, the act of education and training is no longer a simple process of information transfer, and it is turned into a creative process that activates the skills and potential of the individual and increases their awareness (Curriculum for the Thought Education Course, 2016).

The constructivist education approach also sees having reflective thinking skills in addition to other thinking skills as one of the objectives of education (Baş & Kıvılcım, 2012; Başol & Evin Gencel, 2013). Thinking and inquiry activates the cognitive processes and operations of the individual and improves their problem-solving, decision-making and conceptualization skills. Therefore, higher-level skills like learning to learn, creative thinking, critical thinking and reflective thinking are improved faster. For this reason, developing students’ thinking skills is highly focused on in recent years (Bayrak & Koçak-Usluel, 2011; Beydoğan, 2003; Güneş, 2012; Tok & Sevinç, 2010). The foundation of the concept of reflective thinking, which is among high-level skills as seen here, was set by John Dewey (Alp & Taşkın, 2008, 2012). Reflective thinking is ‘a type of thinking which involves forming various hypotheses, working on and testing these hypotheses, collecting data by induction and reaching results by deduction’ (Güneş, 2012, p.134). It makes it easier for the student to gain knowledge from the education environment that actively participate in with their own experiences, share this knowledge and use it in new situations (Güneş, 2012). Gür (2008) defined reflective thinking as students act

of assessing an implementation, deriving lessons from experiences, solving problems and making one's professional life meaningful by using the present knowledge and experiences that are collected for education in the future.

Reflective thinking is a comprehensive thinking skill which also covers skills of metacognitive thinking, problem-solving, creative thinking and critical thinking. An individual uses critical thinking skills while becoming aware of a problem, and critical thinking, problem-solving and metacognitive thinking skills while becoming aware of learning. As a result of all these processes, they may reveal creative ideas (Tican, 2013). Kızılkaya and Aşkar (2009, p. 90) explained reflective thinking as 'a skill that will help reveal implicit learning habits, develop high-level thinking skills like critical thinking, develop strategies for encountered problems and establish improvement processes for tasks.' According to Epstein (2003), reflective thinking covers problem-solving and encourages students to maintain their attention and check their surroundings at the same time. That is, in short, as problem-solving is also a scientific method, it also requires the use of critical thinking, creative and reflective thinking, and skills of analysis and synthesis (Soylu & Soylu, 2006). Gür and Kandemir (2006) expresses the development of reflective thinking is the centre of Mathematics education. Problem solving and reflective thinking skills are directly related to Mathematics course (Demirel et al., 2015). Therefore, in the mathematical sense, students' effective participation in the problem-solving process from the beginning to the end by thinking on the problems and bringing recommendations for solution may be considered to be a result of reflective thinking (Albayrak, Simsek, & Yazıcı, 2018).

Today's education programs in Turkey also prioritize development of thinking skills and emphasize that the main objective of education is development of analytical, creative, critical and reflective skills in the student. This way, they make the student active in the learning process and assign responsibility. In this context, teachers are expected to create opportunities for their students to express their opinions and enrich the class by their assessments and comments (Curriculum for the Thought Education Course, 2016). Development of reflective thinking skills is important in both increasing the academic achievement of students and achieving their personal development (Şahan & Kalkay, 2014).

When the national and international literature is examined, it is possible to find a lot of research examining the reflective thinking skills of preschool (Grossman & Williston, 2001), primary (Erbil & Kocabaş, 2015; Urhan & Erdem, 2018), secondary (Çakır & Ozan, 2018; Demirel et al., 2015; Erdoğan & Şengül, 2019; Eğmir & Ocak, 2018; Kaplan, Doruk, & Öztürk, 2017; Kahyaoğlu & Elçiçek, 2016; Keskinçiliç-Yumuşak, 2017; Kim, Grabowski, & Priya, 2004; Köseoğlu, et. al., 2017; Pasmaz & Tavşan, 2019; Saritepeci, 2017; Şahan & Kalkay, 2014), high school students (Baş & Kıvılcım, 2013; Rea, 2006, Roberts, Maor, & Herrington, 2016), and prospective teachers (Afshar & Farahani, 2015; Aras, Şiringül, & Park, 2019; Campoy, 2010; Çiftci, Çengel, & Paf, 2018; Elmalı & Kıyıcı, 2018, Griffin, 2003; Gözel & Toptaş, 2017; Kurtuluş & Eryılmaz, 2017; Ng & Tan, 2006; Özbek & Köse, 2019; Schaaf, et al., 2013; Sıvacı, 2017; Rebecca, 2011; Tekkol & Bozdemir, 2018; Yenilmez & Turgut, 2016; Yılmaz & Gökçek, 2016). However, as seen in recent years in research draws attention to the lack of those held at the primary school level. Especially when the studies in mathematics were examined, it was seen that these studies were done with middle school students (Çakır & Ozan, 2018; Demirel et al., 2015; Erdoğan & Şengül, 2019; Kaplan, Doruk, & Öztürk, 2017; Köseoğlu, et. al., 2017; Pasmaz & Tavşan, 2019). This study, which was conducted based on this idea, aimed to investigate the relationship between students' reflective thinking and their achievement in especially mathematics and academic achievement in general. The research questions that were determined based on this objective are the following:

1. What level are students on in terms of reflective thinking skills?
2. Do the reflective thinking skill levels of students vary based on gender?
3. Is there a relationship between students' creative thinking skills and their mathematics academic achievement and academic achievement?

## 2. Method

This is a quantitative study as a screening model towards comparing the reflective thinking skills of fourth-grade primary school students to their achievement in mathematics and academic achievement in general. A screening model, as stated by Karasar (2005), 'aims to describe a phenomenon that existed in the past or still exists as it is.'

### 2.1. Sample

The sample consisted of a total of 197 fourth-grade students who went to school in Istanbul, Turkey and were selected with the method of simple random sampling. The data were collected from eight classes of two public schools. The study group was selected from fourth grade. It is thought that they will be able to express their reflective thinking skills more clearly and clearly due to being the last year of primary school. The distribution of the participants based on their gender is described below.

100 (50.8%) of the participants were female students, while 97 (49.2%) were male students, constituting a total of 197 fourth-grade students.

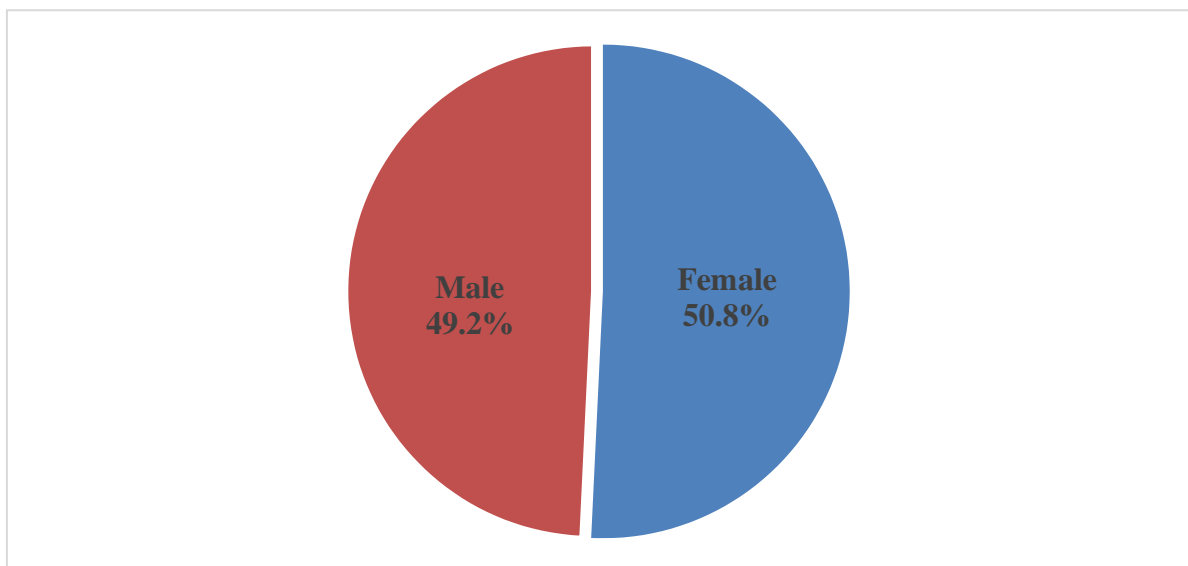


Figure 1. Graphical representation of students according to their gender distribution (%)

### 2.2. Data Collection Tools

The data were collected using the "Reflective Thinking Skills Scale" and the "Personal Information Form" developed by the researcher.

*Personal Information Form:* The first of the data collection tools was the "Personal Information Form" that was developed by the researcher. This form includes questions on the demographic information of the students, as well as questions on their mathematics academic achievement and general achievement statuses. The students were asked about the grades of mathematics and also the grades at the end of the semester.

*Reflective Thinking Skills Scale*: This scale, which was developed by Demirbaş (2012), consists of 20 items. Based on expert opinions, the scale was created as a 3-point Likert-type scale. It was thought that a 3-point Likert-type scoring would provide more valid and reliable results in comparison to other types of scoring in terms of reflecting the true state of 4<sup>th</sup> and 5<sup>th</sup> grade students. The scale is scored as “always (3)”, “sometimes (2)” and “never (1)”. The positive items in the scale are scored as 3-2-1, while the negative items are scored as 1-2-3. This is how reflective thinking levels are calculated for each sub-scale. While the minimum score that can be obtained in the final form of the scale is 20, the maximum possible score is 60. High scores indicate high reflective thinking skill levels. The Cronbach’s alpha reliability coefficient of the scale was found as .76 in this study.

### 2.3. Data Analysis

Statistical solutions of measurement tools were conducted using SPSS 16.0. Before starting analyses, Kolmogorov-Smirnov test was conducted in normality testing of data distributions, at the same time, Skewness-Kurtosis values of scores were evaluated. Since significance value was found lower than .05 according to Kolmogorov-Smirnov test results, and skewness coefficient was between +2.0 and -2.0 according to George and Mallery (2010), it was observed that data showed normal distribution, and parametric tests were used. Accordingly, in data analysis, Independent Sample t-test, and Pearson Moment Correlation technique was applied and calculated.

### 3. Findings

The findings on the reflective thinking skills of fourth-grade primary school students based on the variables are presented below. The findings on the first research question are shown in Table 1.

Table 1. *The Mean Reflective Thinking Skill Scores of The Sample*

Scale	N	Mean	Sd
Reflective Thinking Skills Scale	197	2.65	.24

In order to determine the levels of the students based on their score in the scale, the ranges in the scores were calculated with the formula: “series range / number of groups” ( $2/3 = 0.66$ ) (Tekin, 1993). The arithmetic mean ranges of the scale were determined as 0.33-0.99 ‘Very Low’, 1.00-1.66 ‘Low’, 1.67-2.33 ‘Medium’ and 2.34-3.00 ‘High’. Accordingly, as seen in Table 2, the students had high levels of reflective thinking.

The findings on the second research question are shown in Table 2.

Table 2. *Results of the Independent-Samples t-Test for Reflective Thinking Skill Levels Based on Gender*

Scale	Gender	N	Mean	Sd	t	p
Reflective Thinking Skills Scale	Girl	100	2.71	.22	3.977	.000
	Boy	97	2.58	.24		

“There was a significant difference in the mean “Reflective Thinking Skills Scale” scores based on the students’ gender ( $t=3.977$ ;  $p<.01$ ). Accordingly, the reflective thinking skills of the female students were higher than those of the male students (Table 2).

The finding on the third research question are shown in Table 3.

Table 3. Results of the Pearson Product-Moment Correlation Test for Reflective Thinking Skill Levels Based on Mathematics Academic Achievement and General Academic Grades

	N	r	p
Reflective Thinking Skill Mathematics Academic Achievement	197	.299	.000
Reflective Thinking Skill General Academic Achievement	197	.405	.000

As seen in Table 4, there were significant and positive relationships between the reflective thinking skills of the students and their mathematics academic achievement ( $r=.299$ ;  $p<.01$ ) and their general academic achievement at the end of the year ( $r=.405$ ;  $p<.01$ ). According to this, it can be said that if students' reflective thinking skills are high, their mathematics achievement and year-end grades may be high.

#### 4. Discussion and Conclusion

In this study, which was conducted based on the idea that problem-solving skills are among important skills that should be in every individual and reflection is observed best in problem-solving processes (Kızılkaya & Aşkar, 2009), it was concluded that the reflective thinking skills of the fourth-grade primary school students were high. We can think that classroom teachers' development of students' reflective thinking skills is provided by both mathematics and other lessons. Saygılı and Atahan (2014), Kaplan, Doruk and Öztürk (2016), Güneş (2015) and Gözetin (2017) conducted studies to determine the problem-solving skill levels of highly intelligent children and found that highly intelligent or gifted children had high levels of reflective thinking towards solving problems.

Another result of the study was that the reflective thinking skill levels of the students differed based on their gender. The reflective thinking skills of the female students were higher than those of the male students. Other studies on reflective thinking skills also reached results that were in favor of girls (Bilgiç, 2017; Gözetin, 2017; Kızılkaya & Aşkar, 2009; Şen, 2013).

Being successful in problem-solving means critical thinking, decision-making, reflective thinking, asking questions and being able to conduct analyses-syntheses at the same time (Hacısalihlioğlu, Mirasyedioğlu, & Akpınar, 2003). It is known that reflective thinking skills towards problem-solving are a variable that explains achievement in mathematics (Albayrak, Simsek, & Yazıcı, 2018). This study also found significant and positive relationships between the reflective thinking skills of the students and their mathematics academic achievement and their general academic achievement at the end of the year. As seen here, it may be argued that the higher the reflective thinking skills of students are, the higher their achievement in mathematics and general academic achievement will be. Studies by Baş (2013) and Şen (2013) also found significant relationships between skill of primary and secondary school students in reflective thinking towards problem-solving and their academic achievement in mathematics. Several similar studies reached the conclusion that reflective thinking skills towards problem-solving explained achievement in mathematics (Aydın, 2015; Baş & Kuvılcım, 2013; King, 1991; Kızılkaya & Aşkar, 2009; Mason, 2003).

Reflective thinking is a cognitive characteristic that is developed, it is learned deliberately, and it is important to gain it in the school environment (Wilson & Jan, 1993, cited in Baş & Kuvılcım, 2013). Consequently, in reflective instruction, there is positive and effective communication between the student and the teacher. Lee (2005) emphasized that, in order to provide teachers with skills on how reflective thinking may be developed and how it may be measured, curricula should be prepared with these issues in mind. As a result, it can be said that it is beneficial to develop and implement activities aimed at developing students' reflective

thinking skills. It is considered useful to integrate the developed activities not only in mathematics courses but also in other lessons.

## References

- Afshar, H. S. & Farahani, M. (2015). Reflective thinking and reflective teaching among Iranian EFL teachers: Do gender and teaching experience make a difference? *Procedia-Social and Behavioral Sciences*, 192, 615- 620.
- Albayrak, M., Simsek, M., & Yazıcı, N. (2018). The predictive power to mathematical success of belief and reflective thinking for problem solving. *Journal of Human Sciences*, 15(2), 807-815. doi: 10.14687/jhs.v15i2.5141
- Alp, S. & Taşkın, Ş. Ç. (2008). The Importance of reflective thinking in education and developing reflective thinking. *National Education*, 178, 311-320.
- Alp, S. & Taşkın, Ş. Ç. (2012). Critical thinking and problem solving: Teachers' use of reflective thinking. *Buca Faculty of Education Journal*, 33, 134-147.
- Aras, B., Şiringül İ., & Park, F. (2019). Investigating reflective thinking levels of prospective teachers according to some variables. *International Journal of Science and Education*, 1(2), 119-130.
- Aydın, B. B. (2015). *The relationship between math achievement motivation and reflective thinking skills towards problem solving of the 8<sup>th</sup> grade student* (Master's Thesis). Yeditepe University, Istanbul, Turkey.
- Baş, G. & Kılıncım, Z. S. (2013). The correlation between reflective thinking skills towards problem solving and academic success in mathematics and geometry courses of high school students. *Journal of Kırşehir Education Faculty*, 14(3), 1-17.
- Başol, G. & Evin Gencil, İ. (2013). Reflective thinking scale: A validity and reliability study. *Educational Sciences: Theory & Practice*, 13(2), 929-946.
- Bilgiç, C. (2017). *Reflective thinking skills of elementary school students to solve problems, social studies and academic achievement* (Master's Thesis). Uşak University, Uşak, Turkey.
- Bayrak, F. & Koçak-Usluel, Y. (2011). The effect of blogging on reflective thinking skill. *H. U. Journal of Education*, 40, 93-104.
- Beydoğan, H. Ö. (2003). The development of thinking skills in the teaching process. *Journal of Kırşehir Education Faculty*, 4(1), 159-167.
- Campoy, R. (2010). Reflective thinking and educational solutions: Clarifying what teacher educators are attempting to accomplish. *SRATE Journal*, Vol. 19, Number 2, 15-22.
- Curriculum for the thought education course, (2016). Ministry of Education. Ankara.
- Çakır, R. & Ozan, C. E. (2018). The effect of STEM applications on 7<sup>th</sup> Grade students' academic achievement, reflective thinking skills and motivations. *GUJGEF*, 38(3), 1077-1100.
- Çiftci, S., Çengel, M., & Paf, M. (2018). Computational thinking and problem as a predictor of computer self-efficacy reflective thinking skills. *Journal of Kırşehir Education Faculty*, 19, 1, 321-334.
- Demirbaş, B. (2012). *Studying of the relationship between the reflective thinking skills of the 4<sup>th</sup> and the 5<sup>th</sup> grade students and their teachers' frequency of knowing and using the assessment and evaluation techniques* (Master's Thesis). Marmara University, Istanbul, Turkey.
- Demirel, M., Derman, İ., & Karagedik, E. (2015). A study on the relationship between reflective thinking skills towards problem solving and attitudes towards mathematics. *Procedia-Social and Behavioral Sciences*, 197, 2086-2096.



- Eğmir, E. & Ocak, G. (2018). The effect of curriculum design of critical thinking on students' reflective thinking skills. *Journal of Theoretical Educational Science*, 11(3), 431-456. Doi: 10.30831/akukeg.335388
- Elmalı, Ş. & Kıyıcı, F. B. (2018). Prospective science teachers' tendencies of reflective thinking and views about reflective thinking. *Elementary Education Online*, 17(3), 1706-1718. Doi: 10.17051/ilkonline.2018.466423
- Epstein, A. S. (2003). *How planning and reflection develop young children's thinking skills young children*.  
<https://www.brandeis.edu/leberg/employees/pdf/planningandreflection.pdf>
- Erbil, D. G. & Kocabaş, A. (2015). Cooperative learning method in the third grade life studies course and students' reflective thinking skills. *International Journal of Education Programs and Teaching Studies*, 5(9), 63-79.
- Erdoğan, F. & Şengül, S. (2019). The effect of reflective thinking activities on sixth grade students' attitude towards mathematics. *Kastamonu Education Journal*, 27(1), 247-260. doi:10.24106/kefdergi.2503
- George, D. & Mallery, M. (2010). *Spss for Windows Step by Step: A simple guide and reference*. 17.0 update, Boston: Pearson.
- Gözel, E. & Toptaş, V. (2017). The relationship between mathematical teaching efficacy beliefs and reflective thinking skills of pre-service primary school teachers. *Cumhuriyet International Journal of Education*, 6(4), 412-425. Doi: 10.30703/cije.327172
- Gözeten, İ. (2017). *Reflective thinking skill grades for problem solving by students at science and art centers*. Master's Thesis, Pamukkale University, Denizli, Turkey.
- Griffin, M. L. (2003). Using critical incidents to promote and assess reflective thinking in preservice teachers. *Reflective Practice*, 4, 2, 207-220. Doi: 10.1080/14623940308274
- Grossman, S. & Williston, J. (2001). Teaching strategies: Strategies for teaching early childhood students to connect reflective thinking to practice. *Childhood Education*, 77, 4, 236-240, Doi: 10.1080/00094056.2001.10522175
- Güneş, F. (2012). Improving the thinking skills of students. *Turkish Science Research*, 32, 127-146.
- Güneş, K. (2015). *Analysing the science and art students' reflective thinking skills aimed at solving problem, mathematics successes and attitudes to mathematics lesson* (Master's Thesis). Çukurova University, Adana, Turkey.
- Gür, H. & Kandemir, M. A. (2006). Creativity and mathematics education. *Elementary Education Online*, 5(1), 65-72.
- Gür, H. (2008). *Reflective thinking in teacher education. School experience and teacher application for candidate teachers*. (Ed: İ. H. Demircioğlu), Ankara: Anı Publishing.
- Hacısalihlioğlu, H. H., Mirasyedioğlu, Ş., & Akpınar, A. (2003). *Mathematics teaching*. Ankara: Asil Publishing.
- Kahyaoğlu, M. & Elçiçek, M. (2016). The effects of educational computer supported science lesson on motivation and reflective thinking skills. *International Periodical for the Languages, Literature and History of Turkish or Turkic*, Volume 11/14, 349-360.
- Kaplan, A., Doruk, M., & Öztürk, M. (2017). Examine of reflective thinking skill toward problem solving of talent students: A sample of gümüşhane. *Journal of Bayburt Education Faculty*, Vol. 12, No. 23, 415-435.
- Karasar, N. (2005). *Scientific research methodology*. 13. Edition. Ankara: Nobel Publications.

- Keskinkılıç-Yumuşak, G. (2017). The effects of reflective thinking activities on science process skills. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education*, 11, 1, 222-251.
- Kızılkaya, G. & Aşkar, P. (2009). The development of a reflective thinking skill scale towards problem solving. *Education and Science*, 34(154), 82-92.
- Kim, K., Grabowski, B. L., & Priya, S. (2004). Designing a classroom as a learner-centered learning environment prompting students' reflective thinking in K-12. *Association for Educational Communications and Technology*, 27<sup>th</sup>, Chicago, IL, October 19-23, 339-347.
- King, A. (1991). Effects of Training in Strategic Questioning on children's problem-solving performance. *Journal of Educational Psychology*, 83(3), 307-317.
- Köseoğlu, E., Demirci, F. Demir, B. & Özyürek, C. (2017). The examination of 7<sup>th</sup> grade students' reflective thinking skills towards problem solving: A sample of Ordu City. *International e-Journal of Educational Studies*, 1(1), 60-68.
- Kurtuluş, A. & Eryılmaz, A. (2017). The relationship between reflective thinking skills based on problem solving and flow experiences in mathematics. *Journal of Theoretical Educational Science*, 10(3), 349-365. Doi: 10.5578/keg.54122
- Lee, H. J. (2005). Understanding and assessing preservice teachers reflective thinking. *Teaching and Teacher Education*, 21, 699-715.
- Mason, L. (2003). High school students beliefs about maths, mathematical problem solving and their achievement in maths: A cross sectional study. *Educational Psychology*, 23(1), 73-85.
- Ng, C. S. L. & Tan, C. (2006). Investigating Singapore pre-service teachers' ill-structured problem-solving processes in an asynchronous online environment: Implications for reflective thinking. *New Horizons in Education*, 54, 1-15.
- Özbek, G., & Köse, E. (2019). Reflective thinking skills of pre-service teachers and factors that enhance the reflective thinking. *Kastamonu Education Journal*, 27(2), 537-554. Doi:10.24106/kefdergi.2577
- Pusmaz, A., & Tavşan, S. (2019). The examination of reflective thinking skill toward problem solving of students with successful at solving problem. *Kastamonu Education Journal*, 27(2), 837-852. Doi:10.24106/kefdergi.2887
- Rea, T. (2006). "It's not as if we've been teaching them..." reflective thinking in the outdoor classroom. *Journal of Adventure Education and Outdoor Learning*, 6, 2, 121-134. Doi: 10.1080/14729670685200801
- Rebecca, P. (2011). Reflective thinking in elementary preservice teacher portfolios: Can it be measured and taught? *Journal of Educational Research and Practice*, 1(1), 37-49. Doi:10.5590/JERAP.2011.01.1.03
- Roberts, P., Maor, D., & Herrington, J. (2016). eportfolio-based learning environments: recommendations for effective scaffolding of reflective thinking in higher education. *Journal of Educational Technology & Society*, Vol. 19, No. 4, 22-33.
- Saritepeci, M. (2017). An experimental study on the investigation of the effect of digital storytelling on reflective thinking ability at middle school level. *Bartın University Journal of Faculty of Education*, Volume 6, Issue 3, 1367-1384. Doi: 10.14686/buefad.337772
- Saygılı, G. & Atahan, R. (2014). Analyzing reflective thinking skills towards problem solving of gifted children in terms of various variables. *SDU Faculty of Arts and Sciences Journal of Social Sciences*, 31, 181-192.

- Schaaf, M. V., Baartman, L., Prins, F., Oosterbaan, A., & Schaap, H. (2013). Feedback dialogues that stimulate students' reflective thinking. *Scandinavian Journal of Educational Research*, 57, 3, 227-245. Doi: 10.1080/00313831.2011.628693
- Sıvacı, S. Y. (2017). Relationship between reflective thinking skills and intelligence field profiles of classroom teacher candidates. *Mehmet Akif Ersoy University Journal of the Faculty of Education*, 42, 254-271. Doi: 10.21764/efd.47863
- Soylu, Y. & Soylu, C. (2006). The role of problem solving in mathematics lessons for success. *Inonu University Journal of the Faculty of Education*, 7(11), 97-111.
- Şahan, H. H. & Kalkay, İ. (2014). Teacher opinions the level of gaining reflective thinking skills through 6.-7. and 8. class curriculum. *Literature and History of Turkish or Turkic*, 9(8), 775-79.
- Şen, H. Ş. (2013). Primary school students problem solving based reflective thinking Skills. *International Journal of Academic Research*, 5(5), 41-48.
- Tekin, H. (1993). *Measurement and evaluation in education*. Ankara: Yargı Publications.
- Tekkol, İ. A. & Bozdemir, H. (2018). An investigation of reflective thinking tendencies and critical thinking skills of teacher candidates. *Kastamonu Education Journal*, 26(6), 1897-1907. doi: 10.24106/kefdergi.2211
- Tican, C. (2013). *The effects of reflective thinking-based teaching activities on pre-service teachers' reflective thinking skills, critical thinking skills, democratic attitudes and academic achievement* (Unpublished doctoral dissertation). Gazi University Institute of Educational Sciences, Ankara, Turkey.
- Tok, E. & Sevinç, M. (2010). The effects of thinking skills education on the critical thinking and problem solving skills of preschool teacher candidates. *Pamukkale University Journal of the Faculty of Education*, 27, 67-82.
- Urhan, N. & Erdem, M. (2018). Contributions on reflective thinking of digital documentary production in collaborative project based learning process. *Ankara University Journal of Faculty of Educational Sciences*, 51(1), 27-53. Doi: 10.30964/auebfd.40623
- Yenilmez, K. & Turgut, M. (2016). Relationship between prospective middle school mathematics teachers' logical and reflective thinking skills. *Journal of Educational and Instructional Studies in The World*, 6(4), 2146-7463.
- Yılmaz, N. & Gökçek, T. (2016). The effectiveness of in-service training for the development of reflective thinking skills among mathematics teachers. *Journal of Theoretical Educational Science*, 9(4), 606-641. Doi: <http://dx.doi.org/10.5578/keg.14916>