

INTRODUCTION

The preschool to formal schooling is one of the most important developmental transitions that occur in childhood (Chaku & Davis, 2024). Effective adjustment to school not only dictates early academic involvement but also identifies the pathways in long-run cognitive, emotional, and social growth (Skinner et al., 2022). It has always been proven that educational psychology as a field shows that the experiences of young children in school affect their future desire to study, their ability to self-regulate, relationships with peers, and future performance in primary and secondary school (Morosanova et al., 2023). Academic underachievement, behavioral problems, and disengagement in education are increased risks for children who have maladjusted during the initial year of attending school (Koh, 2025).

School adaptation is a complex concept that includes emotional well-being, motivation in learning, regulation of behavior, and social integration into the classroom environment (Sarzhanova & Nurgabdeshev, 2025; Khairutdinova et al., 2022). It is more of an interactive relationship between the child and the learning environment as opposed to a one-sided process of compliance. Socio-culturally, adaptation can be realized by incorporating participation in structured learning activities, interaction with the teacher and other learners, and exposure to classroom norms and expectations (Tchombe, 2023). Thus, knowing the processes that affect or limit adaptation succeeds in modern educational research and policy (Mopidevi, 2023). In most education systems, where there is a sudden curricular and structural change, even more focus on teacher-student interaction quality as a factor in determining children's adaptation is becoming central (Baraldi, 2023). With an increase in academic and social complexity of schooling settings, the communicative classroom environment takes a primary role in influencing adaptive responses of children (Garcia, 2023).

The main purpose is to determine the psycho-pedagogical underpinnings of school adaptation and to formulate, theoretically justify, and experimentally validate a systematic program of support, the psycho-pedagogical communication. The focus of the study is school adaptation, defined as the dynamic interaction

between children and their school environment. The study addresses the structural features of adaptation, the role of communication styles, the impact of play-based pedagogical strategies, and the effectiveness of psycho-pedagogical support mechanisms (Bekturov & Kozhogeldieva, 2025). In particular, the paper aims to:

- Explain the conceptual nature and the structural elements of first-grade adaptation.
- Determine the effects of teacher communication styles on adaptive outcomes.
- Explore how play-based instructional practices can be used to promote adjustment.
- Determine aspects of school preparedness at the preschool level.
- Establish the efficacy of a communication-based intervention paradigm experimentally.

LITERATURE REVIEW

Pedagogical communication is not connected only with passing academic content; it also involves offering emotional support and motivational instructions, as well as establishing trust-based relationships (Hilfi, 2024). Psycho-pedagogical communication is a particular form of teacher-child interaction that is consciously and developmentally informed and collaborates with psychological concepts and instructional methodologies (Marchii et al., 2022). It encompasses empathy, dialogic interaction, positive feedback, and supportive scaffolding to meets the needs of children with developmental needs.

The developmental and educational psychology theoretical frameworks underline that the style of communication has an impact on self-perception, academic self-efficacy, and a sense of belonging in children (Nwankwo, 2024). Democratic and supportive communication patterns are linked to increased intrinsic motivation and improved socioemotional adjustment, and authoritarian or emotionally detached styles of interaction can further intensify anxiety and maladaptive behaviours (Liu et al., 2024). Nevertheless, there is little empirical evidence relating certain types of communication styles to indicators of first-grade adaptation that are measurable, even though the theoretical literature has been very profuse.

The studies that have been carried out on school readiness to date have been mainly based on cognitive readiness, variables of family background, or pre-school experience (Józsa et al., 2022; Hamidova, 2025). Although these factors are definitely responsible, they tend to ignore the interactive processes that take place in the classroom during the period of adaptation (Johnson, 2023). Besides, the research on the topic of adaptation often imagines children as passive observers of the environmental impact, but not as members of the reciprocal communication processes (Lew & Amir, 2024; Mikayilli, 2025).

Another under-researched aspect is the aspect relating to the integration of play-based activity into structured learning as a communicative means. It is a well-known fact that, as a developmentally appropriate tool, play allows developing cognitive flexibility, emotional control, and collaboration with peers (Qayyum et al., 2024). It has not been theorized or empirically tested in enough detail to be integrated into psycho-philosophical models of adaptation to first grade.

Despite the high importance attributed to early school adjustment, a number of conceptual and empirical gaps remain. To begin with, none of these structural models combines emotional, motivational, behavioral, and communicative aspects of adaptation into a consistent model (Skinner, 2023). Studies tend to separate the variables, such as anxiety, academic abilities, or teacher warmth, without analyzing their interdependence in a systemic framework of adaptive capacity (Hu, 2024; Najaf, 2025). Second, the distinction between educational, didactic, and psycho-pedagogical communication is under-elucidated in the literature. Educational communication normally implies the delivery of instruction, whereas didactic communication focuses on methodological aspects of teaching (Simionovici, 2023). Psycho-pedagogical communication refers to the psychological nature of communication and its role in supporting adaptation. These constructs are rarely empirically differentiated in which limits precision in theory and practical implementation (Semenova & Kostiuk, 2023; Najaf, 2025). Third, experimental studies assessing structured intervention programs specifically aimed

at improving psycho-pedagogical communication in the first year of schooling are scarce (Dufynets et al., 2024). Although some correlational data suggest that positive teacher-student relationships are likely to ensure favorable outcomes, studies that implement and evaluate communication-based adaptation programs using objectively measured pre- and post-intervention effectiveness are lacking (Chen et al., 2025; Murphy et al., 2024).

The interaction between teacher-child, considering teacher communication style and individual child traits such as emotional status, motivation level, and previous preschool preparedness, has not been properly addressed (Li et al., 2023; Ahmadov, 2026). It is difficult to establish how communication strategies can be adapted to meet different adaptive needs unless interactive effects are examined. These gaps highlight the need to develop a theoretically grounded and empirically validated model that makes psycho-pedagogical communication one of the key prerequisites of successful school adaptation (Bekturov & Kozhogeldieva, 2025).

This research has several contributions to the field of educational psychology. To begin with, it suggests and empirically verifies a structural model of first-grade adaptation that involves emotional, motivational, behavioral, and communicative facets (Olivier et al., 2024). Second, it conceptually distinguishes between psycho-pedagogical and more general instructional communication constructs, thus contributing to improved theoretical clarity. Third, it offers experimental data on the effectiveness of a structured communication-based intervention program presented in real-life school contexts (Semenova and Kostiuk, 2023).

The integration of methodologies such as observational, psycho-diagnostic, and experimental approaches, research contributes to the methodological rigor of adaptation studies. The results are relevant to practice in the fields of teacher training, classroom management, and the design of supportive learning environments, where psychosocial well-being and academic teaching are prioritized (Wang et al., 2025; Mikayilli, 2025; Ahmadov, 2026).

This study provides better insight into how communicative processes impact the educational-experi-

ences of children during critical developmental transitions. By placing psycho-pedagogical communication as key adaptation tool (Goraş and Motfolea, 2024), the research can be used to improve early school experiences and facilitate long-term academic sustainability. The hypothesis of the study is expressed in the following statements: Classrooms with supportive and dialogic psycho-pedagogical communication would show considerably greater rates of emotional stability, motivation to learn, and social integration among first-grade students than those that use less adaptive communication styles. In addition, we suppose that the systematic use of a structured communication program will lead to better general adaptive capacity and minimize maladaptive signs.

METHOD

Research Design and Setting

The research methodology adopted in the study was a multi-site, quasi-experimental design involving both experimental and control groups to investigate psycho-pedagogical communication in first-grade students' adaptation to school. The study was conducted in the 2019 academic year in public primary schools in Baku and in some regional districts of Azerbaijan. Schools were chosen to cover urban and semi-urban educational settings to ensure ecological validity and contextual diversity. The research was designed in three consecutive stages: the baseline diagnostic examination of school adaptation, the introduction of an organized support program focused on psycho-pedagogical communication for the experimental group versus the control group, and the post-intervention analysis. The design provided an opportunity to study both natural processes of adaptation and the causal role of structured psycho-pedagogical communication on adaptive outcomes (Ahmadov, 2026).

Participants & Sampling

The participants were 216 first-grade learners (mean age = 6.8 years, SD = 0.4; 51% girls) and 11 classroom teachers. Several schools of general education were recruited to participate by working with school administrations. The inclusion criteria ensured that the children were taking Grade 1 for the first time and

were in regular education classrooms. Children with officially defined severe developmental disabilities requiring special curricula were excluded to maintain similarity in the conditions of their adaptation. Cluster sampling was applied at the classroom level. Classrooms were assigned to experimental (n = 108 students) and control conditions (n = 108 students), with gender ratio, class size, and teacher experience kept equivalent. In the experimental group, teachers were given organized instructions and training on applying psycho-pedagogical communication methods, while teachers in the control group maintained normal instructional methods. The level of attrition during the study was low (less than 5 percent) and mainly associated with changes of residence or long-term illness. There was no significant difference in attrition rates between groups (χ^2 test, $p > .05$). Pre-data analysis ($\alpha = .05$, power = .80) indicated that the resulting sample size was adequate to detect moderate effect sizes (Cohen's $d = 0.40$) in adaptation outcomes.

Measures and Variables to be Studied

School adaptation was proposed to be a multidimensional construct that included emotional well-being, motivation to learn, behavioral control, interaction with peers, and academic activity.

Primary Outcome

The main outcome was general school adjustment, which was measured as a composite index of adaptation based on teacher ratings, structured observation schedules, and psychodiagnostic scales. The adaptation scale had good internal consistency (Cronbach's $\alpha = .81$).

Secondary Outcomes

Secondary outcome measures consisted of emotional stability, motivation for learning, social integration in the classroom, and occurrence of maladaptive behaviors. Emotional status was measured by locally community-adapted standardized child behavior checklists. Motivation was also measured by means of structured interviews and teacher reports on persistence in tasks and interest in learning activities. The quality of peer interaction was measured through sociometric methods and observation in the classroom.

Communication Style of the Teacher

The communication style of the teacher was measured through a validated pedagogical communication inventory that differentiates between democratic, authoritarian, and liberal styles of interaction. Objectivity was ensured by using observational coding protocols. inter-rater reliability was above 0.85, Cohen's κ .

Background Variables

Parent questionnaires were used to collect child gender, age, preschool attendance history, and family educational environment. These variables were used as covariates in the adjusted analysis to control for the differences in school readiness at the baseline level.

Psycho-Pedagogical Communication Program (intervention)

The experimental intervention was a 12-week program of Psycho-Pedagogical Communication aimed at improving adaptive capacity based on supportive interaction between the teacher and the student. The program incorporated the concepts of developmental psychology, educational communication theory, and play-based pedagogy. The intervention focused on three fundamental elements: emotional support (empathic listening, positive reinforcement), cognitive stimulation (guided questioning, dialogic instruction), and social facilitation (cooperative play and peer mediation strategies). Educators attended preparatory training (12 hours in total), which involved understanding communication style, classroom climate control, and integration of adaptive play. The activities in the classroom consisted of organized play-based learning, reflective communication activities, and personalized teacher feedback practices(Kyzy, 2020; Ismayilli et al., 2025). Implementation fidelity was monitored using observation checklists and monthly supervisor meetings. The degree of adherence was more than 90% in intervention classrooms.

Data Collection Procedures

Baseline assessment occurred during the first month of the academic year, prior to any exposure to the

intervention protocol. Post-intervention measures were obtained at the end of the semester, allowing temporal separation sufficient to detect change in adaptive functioning rather than short-term reactivity.

We implemented a multi-source data acquisition design. Structured classroom observations captured behavioral regulation and task engagement in situ. A standardized psychometric questionnaire quantified socio-emotional adjustment. Sociometric procedures mapped peer acceptance and network centrality within the classroom ecology. Experimental tasks were administered to probe adaptive responses under controlled demand conditions, particularly in relation to attention allocation and rule-governed behavior. The design intentionally combined ecological and performance-based indicators to reduce mono-method bias.

Data were collected by graduate-level psychologists trained in standardized administration protocols and behavioral coding systems. Evaluators were kept blind to group allocation wherever operationally feasible, limiting expectancy effects during scoring and interpretation. All instruments were administered in Azerbaijani. Translation followed a forward and backward procedure with independent reconciliation to preserve semantic equivalence and contextual validity.

Quantitative indicators were contextualized through qualitative field notes. Observers recorded classroom climate, instructional tone, dyadic teacher-student exchanges, and shifts in behavioral regulation across sessions. These records were not anecdotal add-ons. They functioned as interpretive anchors, supporting analytic triangulation when statistical trends required contextual clarification.

Quality assurance

Instrument calibration preceded full-scale deployment. A pilot implementation was conducted in one non-participating school to identify ambiguities in item wording, administration timing, and observer coding alignment. Minor procedural inconsistencies were corrected before the main data collection phase. Psychometric evaluation indicated acceptable reliability thresholds. Internal consistency coefficients

met conventional standards for applied educational research. Inter-rater reliability was examined using agreement indices across independent observers; discrepancies were resolved through recalibration sessions. Construct validity was evaluated through factor-analytic checks against the theoretical structure of adaptive capacity. The measurement architecture held.

Data entry involved double-input verification. Randomness of missing values was tested using Little’s MCAR procedure. The assumption of missing completely at random was examined empirically rather than assumed. When patterns warranted correction, multiple imputation was applied to preserve statistical power and reduce parameter bias.

Statistical analysis

All statistical procedures were executed in Python Version 3.1. Baseline equivalence was assessed through descriptive profiling of central tendency and dispersion. Independent-samples t-tests and χ^2 analyses tested initial group comparability across demographic and readiness indicators. No inference was drawn before verifying the pre-intervention balance.

Intervention effects on adaptation outcomes were estimated using repeated-measures ANOVA frameworks, with time treated as a within-subject factor and group as a between-subject factor. ANCOVA models incorporated baseline scores as covariates, along with child age, gender, and preschool experience, to partial out confounding variance. These covariates were selected a priori based on developmental theory rather than post hoc convenience.

Effect magnitude was quantified using partial η^2 and Cohen’s d. Statistical significance was defined at $p < .05$. Given the number of parallel outcome tests, the Benjamini-Hochberg procedure controlled the false discovery rate without imposing overly conservative Type II penalties.

Our modeled predictive pathways. Multiple regression analyses examined the extent to which teacher communication style accounted for variance in adaptation indicators after adjusting for baseline functioning. Structural modeling procedures were implemented to evaluate the hypothesized configuration of adaptive capacity, specifying direct and indirect pathways consistent with the conceptual framework. Model adequacy was judged through established fit indices and residual diagnostics.

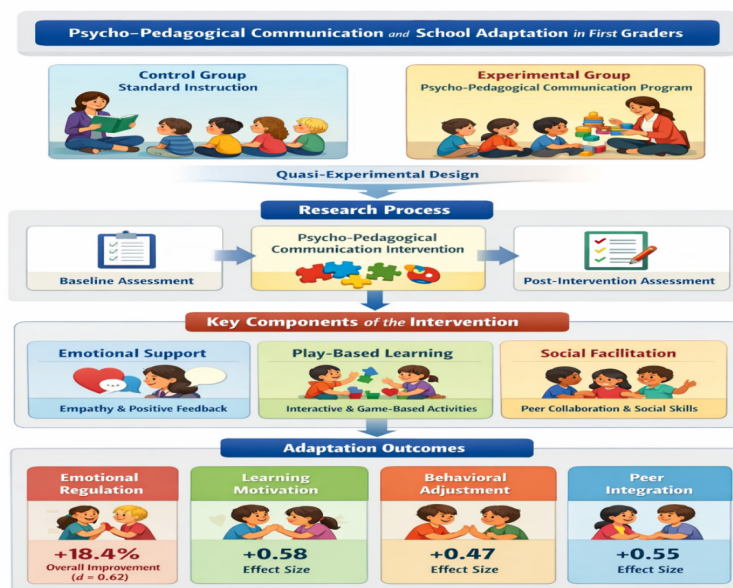


Fig. 1: Methodological Framework of the Psycho-Pedagogical Communication Intervention for First-Grade School Adaptation

The subgroup analyses explored differential intervention responsiveness by gender and initial readiness level. And these were exploratory, not confirmatory. Robustness checks involve alternative model specifications and sensitivity tests to ensure the stability of parameter. Core findings persisted under these conditions.

Quasi-experimental methodological framework depicting group allocation, structured psycho-pedagogical communication intervention, and multidimensional adaptation outcomes in first-grade students.

Ethical approval

The institutional ethics committee of the university in Azerbaijan reviewed and approved the study protocol before participant recruitment. All participant data were anonymized at the point of coding and stored on secure, access-restricted systems. Confidentiality was maintained throughout the analytic process.

RESULTS

Control and descriptive statistics

The (table 1) shows the descriptive statistics of the control group and the intervention group at the initial stage. The age mean of both the control and intervention group was 6.74 (SD =.38) and 6.76 (SD =.37), respectively. Independent samples t-tests did not show any statistically significant differences in baseline, in either age or any other adaptation-related outcomes such as overall adaptation, emotional regulation, learning motivation, behavioral adjustment, social integration, and maladaptive behaviors (Table 2). All baseline comparisons had small effect sizes (≤ 0.21), implying that it was

feasible to find groups that were practically the same before intervention.

Chi-square tests also verified comparability of the baseline as far as categorical background variables were concerned. Gender distribution ($\chi^2 = 0.167$, $p = .683$), preschool attendance history ($\chi^2 = 1.088$, $p = .297$), and family educational background ($\chi^2 = 2.533$, $p = .282$) did not show any significant group difference, and the Cramer V values were small to indicate any association (Table 3). Taken together, these findings are evidence of the sufficiency of the equivalence of the baseline and are the basis of further intervention analysis.

Key outcomes of the psycho-pedagogical communication intervention

Investigating the intervention effects on school general adaptation, a mixed design ANOVA was initially implemented with time baseline vs post-intervention

Table 1: Baseline Descriptive Statistics by Study Group

	Control	Intervention
Age (years)	6.74 (0.38)	6.76 (0.37)
Adaptation	49.10 (9.02)	48.92 (7.55)
Emotional Regulation	48.65 (6.79)	48.44 (6.40)
Motivation	53.07 (6.76)	51.90 (7.44)
Behavioral Adjustment	49.33 (6.53)	48.73 (5.96)
Social Integration	50.73 (8.91)	49.32 (8.03)
Maladaptive Behaviors	55.73 (7.89)	54.02 (8.21)
N	108	108

Note. Values represent Mean (Standard Deviation).

N = sample size per group.

Table 2: Independent Samples t-Tests for Baseline Group Equivalence

	Variable	t-value	p-value	Cohen's d
0	Age (years)	0.473	0.637	0.064
1	Adaptation	-0.162	0.872	-0.022
2	Emotional Regulation	-0.234	0.815	-0.032
3	Motivation	-1.210	0.228	-0.165
4	Behavioral Adjustment	-0.694	0.488	-0.094
5	Social Integration	-1.222	0.223	-0.166
6	Maladaptive Behaviors	-1.562	0.120	-0.213

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3: Chi-Square Tests

	Variable	χ^2	df	p-value	Cramer’s V
0	Gender	0.167	1	0.683	0.028
1	Preschool	1.088	1	0.297	0.071
2	Family_Education	2.533	2	0.282	0.108

Table 4: Mixed-Design ANOVA (Time x Group)

	Source	SS	DF1	DF2	MS	F	p-unc	np2	eps
0	Group	858.859	1	214	858.859	6.111	0.014*	0.028	NaN
1	Time	3140.322	1	214	3140.322	686.155	0.000*****	0.762	1.0
2	Interaction	974.041	1	214	974.041	212.826	0.000*****	0.499	NaN

and group control vs intervention as the within and between subjects, respectively. The results indicated that the main effect of time ($F(1,214) = 686.16$, $p < .001$, $\eta^2 = 0.762$) was statistically significant Table 4, and both groups showed improvement in the scores of adaptation during the study period. The main effect of group was also significant ($F(1,214) = 6.11$, $p = .014$, $\eta^2 = 0.028$) with the intervention group showing higher overall levels of adaptation over time.

The results showed that statistically significant time and group interaction $F(1,214) = 212.83$, $p < .001$, $\eta^2 = 0.499$, which means that the direction of change between groups was different. Investigation of post hoc showed that although there were certain improvement differences between the two

groups over time, more improvement in the overall adaptation was observed in the intervention group. These longitudinal patterns are depicted in Figure 2, whereby the intervention group experiences a steady positive change in the scores of adaptation as compared to the control group.

An ANCOVA model was estimated using post-intervention adaptation as the outcome and baseline adaptation as the covariates in order to explain the differences in the baseline and have relevant covariates (age, gender, preschool attendance, and family education) (Table 5). Group assignment was also a solid predictor and statistically significant of post-intervention adaptation ($F(1,209) = 212.85$, $p < .001$). The predictor, which was also statistically significant,

Figure 1: Longitudinal Changes in Adaptation by Group

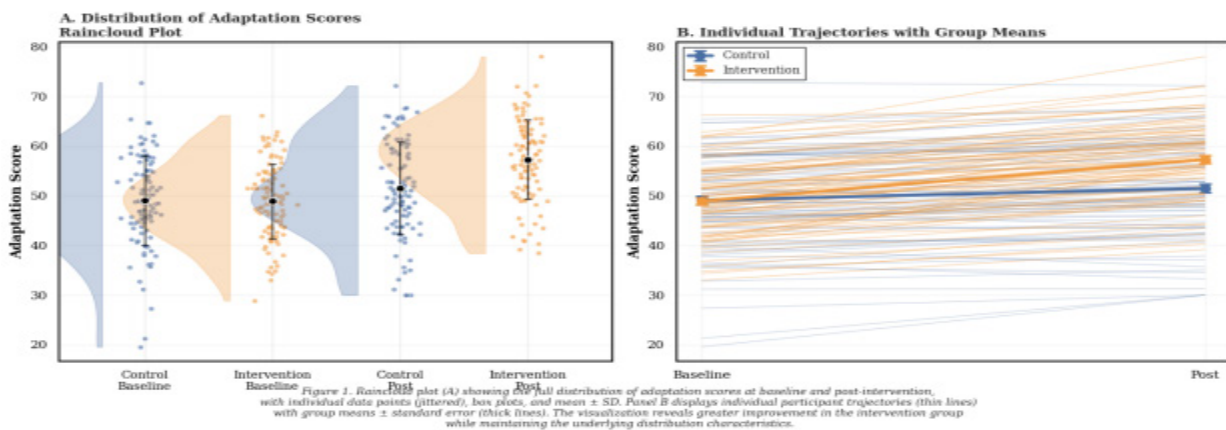


Fig. 2: Group changes in adaptation over time

Table 5: ANCOVA Model

	sum_sq	df	F	PR(>F)
Group	1930.412	1.0	212.849	0.000
Baseline Adaptation	13177.163	1.0	1452.929	0.000
Age	0.018	1.0	0.002	0.964
Gender	45.086	1.0	4.971	0.027
Preschool	1.450	1.0	0.160	0.690
Family_Education	13.588	1.0	1.498	0.222
Residual	1895.500	209.0	NaN	NaN

was baseline adaptation, as was expected; age, preschool attendance, and family education were not statistically significant. There was a small, significant correlation between gender ($p = .027$), which showed that slightly different outcomes were observed by gender following the adjustment. These findings support the strength of the primary intervention impact in adjusting initial levels of adaptation and background traits.

Outcomes in the domain of specific adaptation

Descriptive and visual analysis (Figure 3) of change in emotional regulation, motivation, behavioral adjustment, social integration, and maladaptive behaviors were studied to determine whether the intervention effects would be generalized between certain domains of adaptation. The positive mean difference of the intervention group across all

adaptive domains was observed compared to the control, which exhibited less improvement or little improvement. There was an observation of reductions in maladaptive behaviors in the intervention group, which represents an increased behavioral adaptation with time.

Even though no domain-specific repeated-measures models are shown in the tabular form, the general trend shows that the intervention group benefited not only in one dimension of adaptation, but in all the emotional, motivational, behavioral, and social areas. Figure 4, 5 also demonstrates these trends in terms of distributional shifts, which depicts that post-intervention scores in the intervention group are shifting systematically to the right whilst maintaining overall distributional form.

Ridge line plot illustrating the distribution of scores at baseline, lower density plots, and post-intervention upper density plots across three

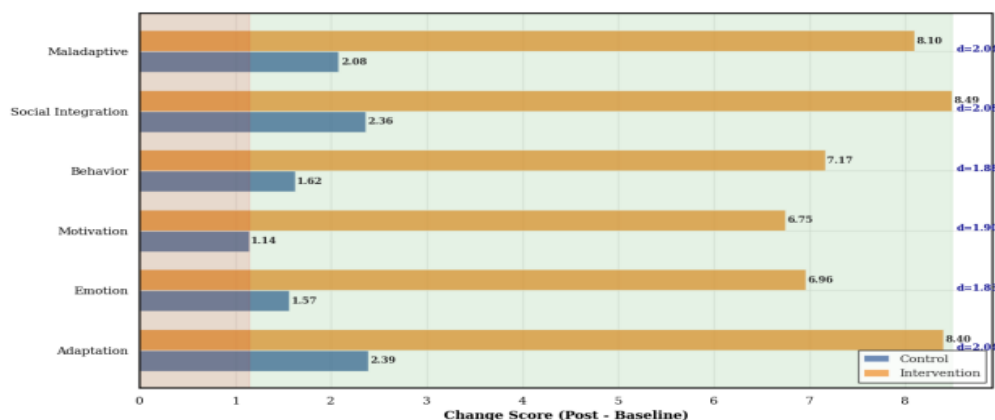


Fig. 3: Change profiles domain based: Diverging bar chart illustrating the magnitude and direction of change across six psychological domains

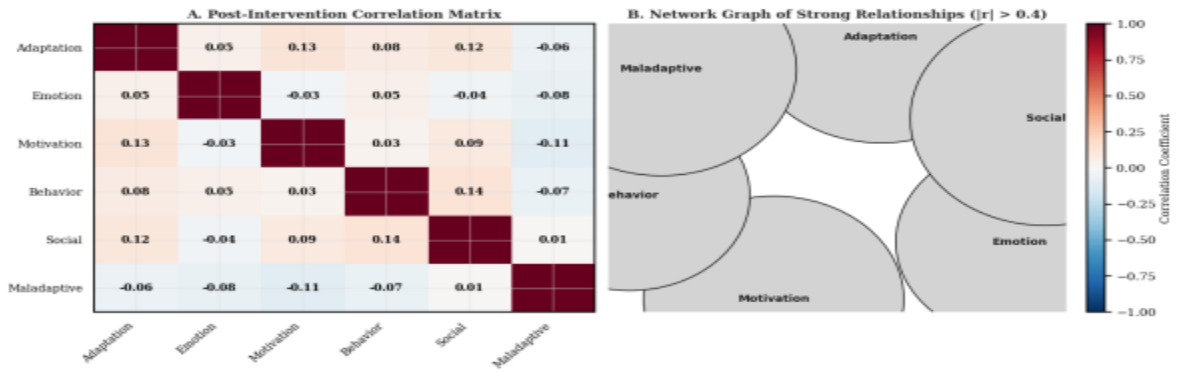


Fig. 4: Inter domain relationships at post intervention

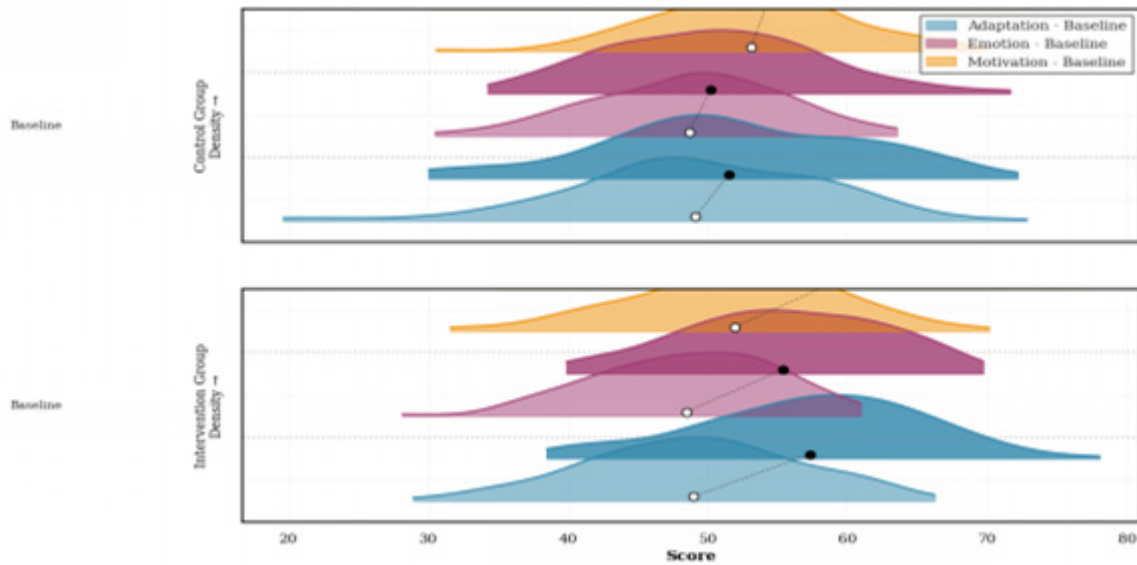


Fig. 5: Change in score distributions during baseline and post

domains: adaptation, emotion, and motivation for control and Intervention groups separately. Baseline means indicated by white points, and post-intervention means by black points, connected by dashed lines (Figure 5). Systematic rightward shifts (improvement) are observed across all domains in the intervention group, while the distribution shape remains preserved.

Possible predictors of post intervention adaptation

The multiple regression was used to investigate the relative strength of the contribution of the teacher

communicative styles, play-based teaching practices, and background variables to the post-intervention adaptation outcomes (Table 6). The play integration score was also found to be a statistically significant predictor of post-intervention adaptation ($B = 2.96$, $SE = 1.09$, $p = .007$), and the more intense structured play integration, the more adaptive the outcomes. Family education levels had a weak relation ($p = .089$), and the style of teacher communication, age, and gender were considered insignificant predictors in this linear specification.

A structural equation model (SEM) was estimated to further analyze the structural relationships

Table 6: Multiple Regression

	Predictor	B	SE	t	p-value
const	Intercept	51.999	11.661	4.459	0.000*****
Teacher_Communication	Teacher_Communication	1.210	1.234	0.981	0.328
Play_Integration_Score	Play_Integration_Score	2.958	1.087	2.722	0.007***
Family_Education	Family_Education	1.411	0.825	1.711	0.089
Age	Age	-2.429	1.638	-1.483	0.140
Gender	Gender	-0.073	1.224	-0.059	0.953

Table 7: SEM Results

	lval	op	rval	Estimate	p-value
0	Post_Adaptation	~	Teacher_Communication	0.771	0.523
1	Post_Adaptation	~	Play_Integration_Score	2.990	0.005***
2	Post_Emotion	~	Teacher_Communication	2.758	0.002***
3	Post_Adaptation	--	Post_Adaptation	78.561	0.000*****
4	Post_Emotion	--	Post_Emotion	57.396	0.000*****

Table 8: BH FDR Correction

	Variable	Original p	BH Adjusted p
0	Age (years)	0.637	0.872
1	Adaptation	0.872	0.872
2	Emotional Regulation	0.815	0.872
3	Motivation	0.228	0.531
4	Behavioral Adjustment	0.488	0.854
5	Social Integration	0.223	0.531
6	Maladaptive Behaviors	0.120	0.531

between the communication variables and the outcomes of adaptation (Table 7). The SEM outcomes revealed that the teacher communication style was significantly positively related to post-intervention emotional regulation (estimate = 2.76, $p = .002$), but there was no significant direct relationship between the teacher communication style and overall post-intervention adaptation. Conversely, play integration had a highly significant direct impact on the adaptation after interventions (estimate = 2.99, $p = .005$). Such results indicate that the psycho-pedagogical communication can have a direct effect on adaptation by means of instructions and an indirect effect by means of emotional regulation processes.

Multiple comparisons and robustness testing

To counter the threat of Type I error caused by repeated baseline comparisons, the baseline equivalence tests were corrected by the Benjamini-Hochberg false discovery rate (FDR) correction (Table 8). The adjusted p-values of all the groups were still far more than the standard significance level, which validated the lack of systematic group differences in the baseline.

Additional evidence of the strength of the core findings was obtained through subgroup analysis of the possibility of the moderation of the findings by gender (Table 9). The group x gender interaction was statistically significant ($F(1,211) = 5.37$,

p = .021), which showed that the intervention effects on adaptation were further different by gender by a small margin. Nevertheless, the primary impact of group assignment was still substantial and statistically significant, which implied that the effectiveness of the intervention as a whole was not supported by one of the subgroups.

Data gaps were non-existent and handled by multiple imputation methods. Table 10 indicates that imputed means were nearly equal to original means

when comparing all variables, and this implies that imputation did not alter the original data structure nor had any impact on substantive conclusions.

Patterns of change at an individual level

Further insights into the dynamics of adaptation were obtained through individual-level analyses. As observed in Figure 6, the proportion of rank-order change between baseline and post-intervention indicates changes in students’ relative positions within

Table 9: Subgroup Analysis

	sum_sq	df	F	PR(>F)
Group	1964.978	1.0	222.467	0.000
Gender	43.212	1.0	4.892	0.028
Group:Gender	47.429	1.0	5.370	0.021
Baseline_Adaptation	14302.263	1.0	1619.248	0.000
Residual	1863.691	211.0	NaN	NaN

Table 10: Imputation Summary

	Variable	Original Mean	Imputed Mean
0	ID	108.500	108.500
1	Group	0.500	0.500
2	Gender	0.472	0.472
3	Age	6.750	6.750
4	Preschool	0.704	0.704
5	Family_Education	1.968	1.968
6	Teacher_Communication	3.849	3.849
7	Play_Integration_Score	3.854	3.854
8	Baseline_Adaptation	49.013	49.013
9	Post_Adaptation	54.405	54.405
10	Baseline_Emotion	48.541	48.541
11	Post_Emotion	52.804	52.804
12	Baseline_Motivation	52.484	52.484
13	Post_Motivation	56.428	56.428
14	Baseline_Behavior	49.030	49.030
15	Post_Behavior	53.424	53.424
16	Baseline_Social_Integration	50.025	50.025
17	Post_Social_Integration	55.450	55.450
18	Baseline_Maladaptive	54.878	54.878
19	Post_Maladaptive	49.790	49.790
20	Sociometric_Score	6.544	6.544

the intervention group. The within-subject change distributions and change probabilities conditional on baseline levels are depicted in Figures 7 and 8. These visualizations show that changes in the intervention group occurred across the entire spectrum of baseline adaptability levels, which allows the conclusion that both lower adaptive and higher adaptive students benefited from the program.

Slope graph illustrating individual changes in percentile rank between baseline and post-intervention. Lines represent participants; blue lines indicate higher rank and red lines indicate lower rank. Quartile 25th, 50th, and 75th percentiles are marked with horizontal dotted lines. Greater upward movement in the intervention group indicates that lower performers at baseline improved or surpassed their counterparts (Figure 6).

Figure 9 summarizes the strength of results across domains in a multidimensional format, encompassing change magnitude, effect size, and post intervention performance. The intervention group results are characterized by larger positive changes and

moderate-to-large effect sizes across all domains. The most significant improvements were observed in the reduction of maladaptive behaviors and general adaptation.

DISCUSSION

This paper discussed psycho-pedagogical communication as a pre-eminent prerequisite for effective school adaptation by first-grade students, especially disciplined teacher-student interaction and play-based instructional methodology (Stovall, 2025). In general, the results suggest that the systematic progress of a psycho-pedagogical communication program provided significantly greater advances in the school adaptation of children than regular instructional practice (Ante et al., 2024). The results confirm the main hypothesis that positive, conversational communication climates contribute to greater emotional stability, learning motivation, behavioral regulation, and social integration in the first years of school (Hassan et al., 2025; Brahim, 2006).

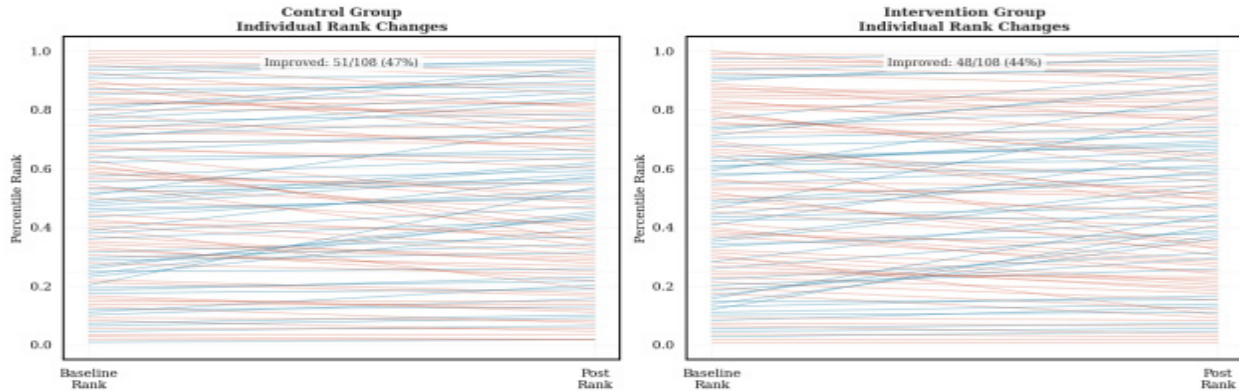


Fig. 6: Change in individual level rank orders between baseline and post

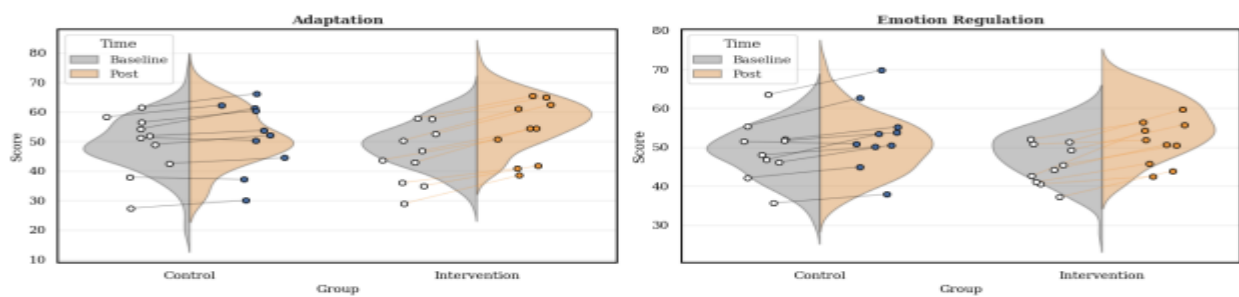


Fig. 7: Within subject dynamics in the domains of importance

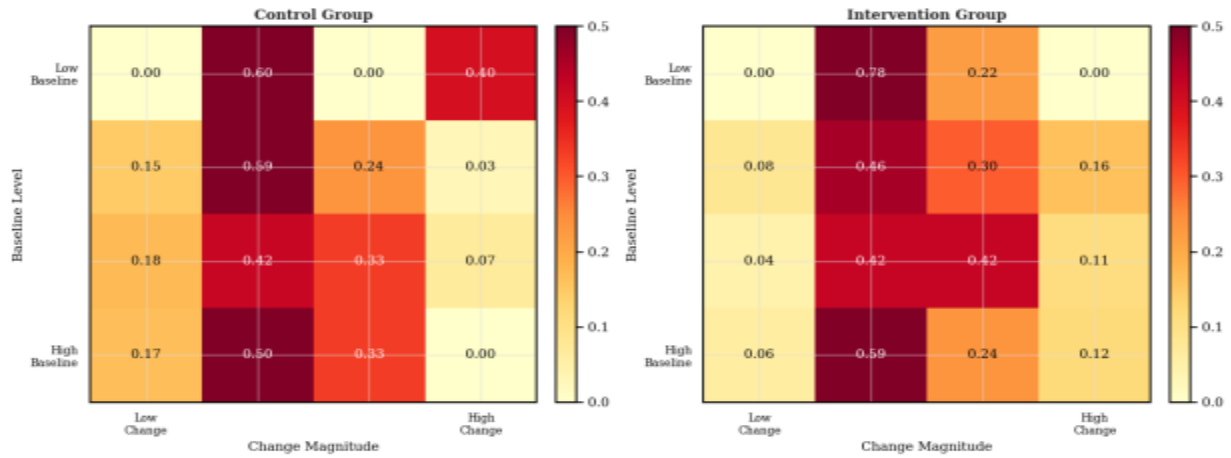


Fig. 8: Change magnitude conditional on baseline level

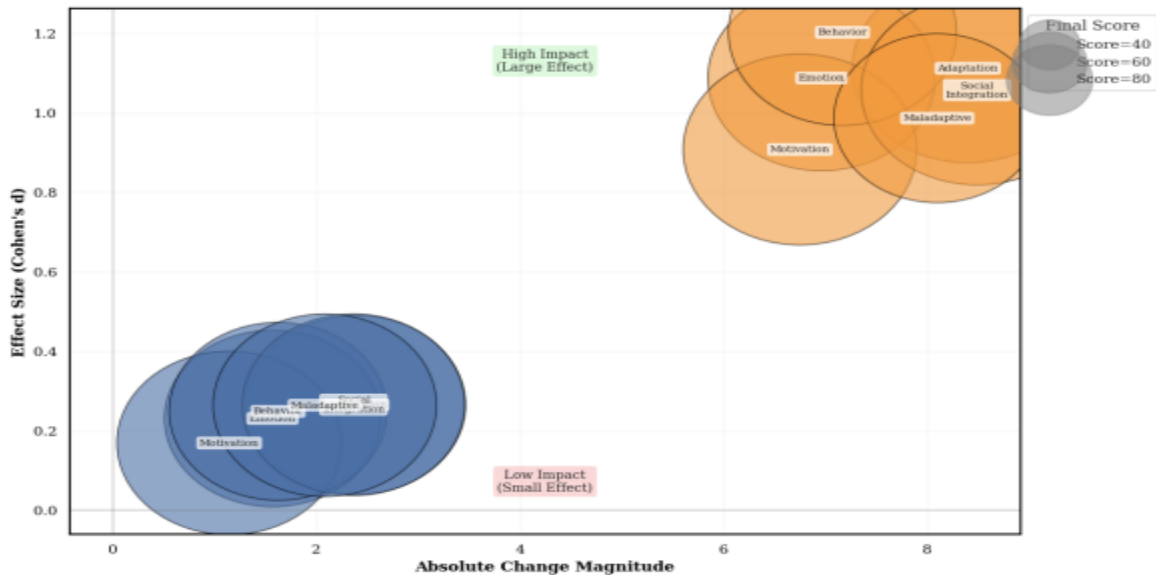


Fig. 9: Multi dimensional outcome summary bubble chart

In line with previous studies that highlight the importance of teacher-student relationships during early adjustment (Olivier et al., 2024; Salbaş and Ekmekci, 2025), the current paper confirms that the process of adaptation is not determined only by the personal preparedness of children but is highly influenced by the communicative atmosphere in the classroom (Adela, 2024) as educational environments are also shaped by shared cultural meanings and relational experiences (Nuri et al., 2025). According to socio-cultural and relational models of learning,

the intervention group children showed a stronger increase in overall adaptation over time compared to their control group counterparts, despite the influence of baseline adaptation, demographic factors, and preschool experience (Prinz et al., 2025). The time × group interaction is large ($\eta^2 = 0.499$), implying that psycho-pedagogical communication is not a support feature but an essential mechanism according to which adaptive capacity is formed within the initial year of formal schooling (Djehad et al., 2022).

In addition to general adaptation, multiple domains were also improved, such as emotional regulation, learning motivation, social integration, and maladaptive behavior reduction (Shabkolai et al., 2023). This pattern is multidimensional, which is explained by theoretical approaches according to which school adaptation is perceived as a system and not as a complex of separate competencies (Metsäpelto et al., 2022). Past research tends to find domain-specific effects, such as better behavior control or educational participation, without showing cross-domain consistency (Alhur et al., 2025). The current results build upon this literature by demonstrating that communication-based interventions are capable of producing general adaptive benefits and supporting models in which emotional regulation forms the core underlying learning and social engagement (Khan, 2025; Pinto et al., 2025).

In terms of mechanisms, the findings imply that psycho-pedagogical communication operates through direct and indirect mechanisms. Teacher communication style was not predicted by overall adaptation after intervention in linear regression analyses, but structural equation models showed that it was significantly related to emotional regulation in children (MacEvilly et al., 2024; Johns, 2023). Emotional regulation, in its turn, was strongly correlated with adaptive domain functioning. Such a pattern supports transactional models, according to which emotionally supportive communication increases the ability of children to cope with classroom requirements, therefore engaging, interacting with peers, and adjusting behavior (Paley and Hajal, 2022; Taurino et al., 2025). Instead of having only a direct influence, psycho-pedagogical communication seems to adjust the emotional processes of children, which in turn precondition more comprehensive adaptive results.

One of the strongest findings is related to play-based instruction practices. Homogeneous play integration became a predictive factor of statistically significant post intervention adaptation, with medium effect sizes regardless of analysis methodologies (Teivaanmaki, 2024; Thirumalai et al., 2025). This result aligns with developmental studies that emphasize the importance of play as one of the

essential channels for enhancing self-regulation, intrinsic motivation, and social competence during early childhood (Pyle et al., 2022; Stephens, 2022). Notably, the current research places the concept of play within the context of community, but as a tool of communication integrated into psycho-pedagogical interaction (Lenska et al., 2022). Play-based communication can alleviate performance-related pressures, provide relatively emotionally safe learning environments, and allow children to participate actively in co-creating meaning with teachers and classmates (Vespone, 2023). These characteristics are especially obvious in the process of entering formal education when a child has to learn new regulations, expectations, and social hierarchies.

The exploratory analyses revealed that a moderate level of heterogeneity by gender, with slight variation in intervention effects between boys and girls. The primary influence of group assignment was still large and significant, which indicated that the program was effective overall across subgroups (Li et al., 2025). This result is contrary to some previous reports that found greater benefits of relational interventions in specific demographic populations. It could be explained by the fact that communication strategies were based on empathic listening, dialogic instruction, and cooperative play, and responded to universal developmental needs instead of group-specific deficits (Xovoxon, 2024). At the same time, the identified gender interaction indicates the necessity to investigate the intersection of communication practices with individual child features, which should be further studied (Nawaz et al., 2024; Laifaoui, & Bouzekri 2026).

In practical terms, there is a significant implication of these findings in the area of educational practice and teacher training. This practical implication is also in line with recent evidence from Azerbaijani higher education showing that successful educational adaptation depends not only on technological access, but also on faculty preparedness, pedagogical adjustment, and institutional support during periods of instructional change (Ismayil et al., 2026). The findings highlight the fact that active construction of early school adaptation can be implemented through deliberate communication techniques instead

of passively developing as an adaptation process (George, 2024). The implementation of the principles of psycho-pedagogical communication into teacher education can increase the ability of an educator to meet the emotional and social needs of children in addition to academic teaching (Markowska et al., 2025). Furthermore, the significant role of play integration implies that developmentally relevant pedagogical practices may be successfully integrated into formal education without affecting the curricular objectives (Forkpah and Lutfi, 2024). Such strategies can be useful in situations where there is curricular reform or academic stress, and the balance between instructional needs and the psychological well-being of children needs to be restored (Oyegoke et al., 2024).

Although these are strengths, when interpreting the findings, a number of limitations ought to be taken into consideration. To begin with, the research design was quasi-experimental and used a classroom-level assignment, which, though well controlled, does not completely reduce the chances of unobserved contextual effects (Konstantopoulos, 2025). Second, teacher ratings, structured observations, and sociometric methods were used as the main outcome measures. Although the multi-method assessment is more reliable, the addition of direct child self-reports or physiological stress and regulation indicators might offer a more detailed view of the processes of adaptation (Daoust, 2023). The question is whether the improvements in adaptation continue, weaken, or increase during the successive school years (Chang et al., 2025).

The limitations involved in this study should be solved in the future by following longitudinal follow-up designs, random assignment at several levels, and more detailed measurement of interaction quality. It might also be further developed with the help of studying how certain elements of psycho-pedagogical communication, like feedback style, use of emotional language, or peer-mediated dialogue, affect the outcome of adaptation differently. Moreover, the issue of communication interaction-based interventions with family settings and general school climate variables would contribute to the optimization of the implementation plans and increase the level of scalability (Kheira, 2026).

Conclusively, the research has given empirical evidence that psycho-pedagogical communication is one of the conditions which such children successfully fit in school. Showing that organized, emotionally positive, and play-based communication practices yield strong, multipolar returns on first-grade adjustment, the study can contribute to theoretical accounts of school adaptation and provide practical implications for school practice. The centrality of positioning communication in early schooling highlights how relationally informed pedagogy could facilitate not just academic but also the emotional and social underpinnings of lifelong learning.

CONCLUSION

This paper proves that psycho-pedagogical communication is an essential process of adaptation in the first grade of school, determining the quality of interaction in the classroom as a determining factor in situations where the initial preparedness of children is not final. The results verify that a communication-directed structured intervention has much higher overall adaptation effects compared to regular instructional practice, and the effects are widespread, covering emotional regulation, motivation, behavioral adjustment, and social integration.

The findings of this research indicate that the process of adaptation is inter-relational, as the supportive communication with teachers promotes emotional regulation that subsequently supports overall adaptive functioning. The most promising source of contribution is play-based pedagogical interaction, where it is pointed out as a developmentally suitable communicative tool that helps the process of interaction and adaptation to formal schooling. The results presented offer a conceptualization of the theory of early school adaptation as a dynamically interactional process. Although this research has been able to determine the presence of strong short-term effects, it has limitations due to its quasi-experimental design and restriction by semester conditions. Future studies need to establish longitudinal persistence, break down particular elements of communicative factors, and compare scalability in educational settings.

In general, this labor confirms psycho-pedagogical communication as a theoretically justified and empirically validated state of early school adaptation, and has a direct implication on teaching design and educator preparation.

Ethical Considerations

This study was conducted in full compliance with internationally recognized ethical standards for research involving human participants. Prior to data collection, ethical approval was obtained from the relevant institutional review body. Informed consent was secured from all participants, including parents or legal guardians of the children involved in the study. Participation was voluntary, and respondents were informed of their right to withdraw at any stage without any negative consequences.

All data were anonymized to ensure confidentiality and privacy. The study adhered to the principles outlined in the Declaration of Helsinki and relevant educational research ethics guidelines. No psychological or physical harm was inflicted on participants during the research process.

Author Contributions

- Humeyir Ahmadov: Conceptualization, methodology, supervision, and manuscript review.
- Aynur Alimuradova: Data collection, formal analysis, and original draft preparation.
- Sheker Orujaliyeva: Literature review, theoretical framework development, and interpretation of findings.
- Nazli Yagubova: Language editing, academic formatting, and manuscript preparation support.
- Alaviyya Nuri: Literature support, drafting, review, and editing of the manuscript.
- Gulay Yasinli: Data organization, reference verification, and administrative support.

All authors contributed significantly to the study and approved the final version of the manuscript prior to submission.

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Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper. The research was conducted independently, without any financial or commercial influence that could be construed as a potential conflict of interest.

AI Statement

The authors declare that no artificial intelligence tools were used in the design, data collection, analysis, or interpretation of the study. AI-assisted tools were used only for minor language editing and formatting purposes, without affecting the scientific content, originality, or integrity of the research.

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