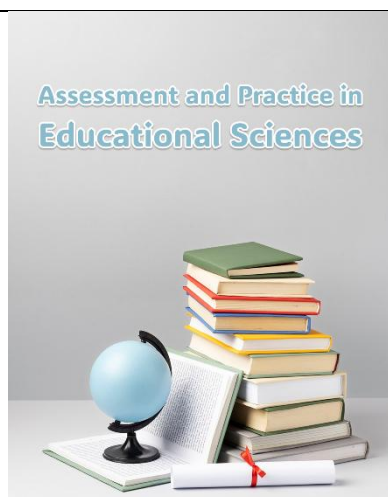




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Design and Validation of an Integrated Resilience and Play Therapy Training Model and Its Effect on Problem-Solving Skills and Mathematical Performance of Students

ABSTRACT

The present study was conducted with the aim of designing and validating an integrated resilience and play therapy training model and examining its effect on problem-solving skills and mathematical performance among elementary school students. This research employed an exploratory mixed-methods design. In the qualitative phase, through thematic analysis and a review of theoretical foundations and prior studies, the components and content of the integrated training package were extracted. In the quantitative phase, a quasi-experimental design with pretest–posttest–follow-up and a control group was applied. The statistical population consisted of all fourth-grade female elementary students in Tehran during the 2024–2025 academic year. A total of 30 students from two schools were selected and randomly assigned to the groups. The experimental group received 10 sessions of integrated training, while the control group remained on the waiting list. The data collection instruments included the Problem-Solving Inventory by Heppner and Petersen (1982) and the TIMSS Mathematics Performance Test. Findings from the qualitative phase indicated that the extracted themes comprised personal resilience resources, emotional resilience skills, cognitive resilience skills, social resilience skills, environmental factors of resilience, principles of play therapy, emotional functions of play therapy, cognitive functions of play therapy, social functions of play therapy, humanistic principles of play therapy, cognitive-developmental principles of play therapy, and cognitive-emotional functions of play therapy. Findings from the quantitative phase revealed that the integrated resilience and play therapy training significantly and positively affected students' problem-solving skills and mathematical performance. Moreover, these effects persisted not only in the posttest but also at the follow-up stage. Based on the results, it can be concluded that the integrated resilience and play therapy training package serves as an effective model for enhancing students' cognitive and academic competencies.

Keywords: resilience, play therapy, problem-solving skills, mathematical performance, integrated training

Introduction

Resilience has emerged as a vital construct in educational and psychological research, representing individuals' ability to adapt positively to adversity and maintain effective functioning despite challenges. Within the developmental context, resilience serves as a protective mechanism that enables children to cope with stressors, maintain emotional balance, and continue progressing academically and socially (1-3). Conceptualized as both a dynamic process and a set of personal resources,

resilience encompasses emotional regulation, cognitive flexibility, and social competence, which together facilitate adaptive coping and problem-solving in demanding contexts (4-6). In school environments, these capacities not only support emotional adjustment but also enhance learning engagement, persistence, and academic achievement (7, 8).

The development of resilience during childhood is crucial because it lays the foundation for adaptive functioning and lifelong well-being (9, 10). Resilience in educational settings has been linked to students' ability to regulate emotions, maintain motivation, and apply strategic approaches to learning tasks (11, 12). Students with higher levels of resilience display greater self-efficacy, perseverance, and cognitive engagement, leading to stronger performance in academic domains, including mathematics and problem-solving tasks (6, 13). The application of resilience-focused interventions within schools therefore represents a promising direction for fostering psychological adjustment and academic success among young learners (4, 14).

Parallel to the concept of resilience, play therapy has long been recognized as an effective approach for facilitating children's emotional expression, cognitive development, and social adjustment (15, 16). Grounded in the humanistic principles of Carl Rogers' client-centered therapy (17) and Virginia Axline's child-centered play therapy model (18), play therapy provides a non-threatening context in which children can externalize inner experiences and resolve emotional conflicts through symbolic activity. The approach is based on the premise that play serves as the natural language of children and that therapeutic progress occurs as they engage in creative self-expression (15, 16). Recent empirical evidence has confirmed that structured play therapy can improve emotional regulation, cognitive flexibility, and interpersonal competence in children across various settings (19, 20).

Integrating resilience-building techniques with play therapy may therefore enhance the therapeutic impact of both methods. Play therapy, as a developmental and experiential process, can provide the medium through which children actively rehearse resilient behaviors—such as managing frustration, problem-solving, and self-control—in a safe and supportive context (21, 22). The integration of these approaches aligns with Piaget's cognitive-developmental theory, which emphasizes that learning and problem-solving emerge through active interaction with the environment and symbolic play (23). Moreover, Rogers' client-centered perspective underscores the role of acceptance, empathy, and congruence in promoting emotional growth, conditions inherently embedded within the play therapy framework (17).

Problem-solving skills represent a core outcome variable in the intersection between resilience training and play-based learning. Problem-solving competence is essential for cognitive growth and academic development, serving as the foundation for adaptive reasoning, mathematical thinking, and decision-making (24, 25). Prior studies have shown that training in structured problem-solving frameworks can enhance children's executive functions, self-efficacy, and academic achievement (26, 27). In the field of educational psychology, problem-solving ability is considered not only a cognitive skill but also an emotional and social competence influenced by self-regulation, resilience, and environmental support (28, 29).

Mathematical performance, in particular, is strongly affected by emotional and cognitive variables such as resilience, self-efficacy, and anxiety regulation (30, 31). Students with higher levels of resilience tend to approach mathematical challenges with greater persistence and lower anxiety, reflecting stronger emotional control and task engagement (32, 33). Conversely, deficits in problem-solving and emotional regulation often result in avoidance behaviors, lower academic motivation, and poor performance in mathematics (28, 34). Hence, the integration of resilience-oriented approaches within mathematics education may strengthen both affective and cognitive dimensions of learning (11, 12).

Empirical evidence supports the effectiveness of play-based interventions in improving children's academic and emotional outcomes. Studies have shown that game-based learning and play therapy significantly enhance motivation, working memory, and mathematical reasoning (32, 33). For example, Heydari et al. (2018) demonstrated that play therapy increased mathematical concept comprehension and problem-solving skills in students with learning difficulties (21). Similarly, Nafarieh and Pirkhaefi

(2021) found that child-centered play therapy improved attention and working memory, thereby promoting mathematical performance (20). Game-based interventions provide opportunities for children to apply abstract reasoning in concrete scenarios, thereby supporting deeper cognitive processing and conceptual learning (34, 35).

Resilience training programs in educational contexts have also been shown to reduce anxiety, increase emotional stability, and improve cognitive functioning. Interventions aimed at strengthening psychological resilience contribute to greater academic perseverance and reduced susceptibility to stress-induced academic disengagement (6, 10, 14). For instance, Ang et al. (2024) observed that students who received resilience enhancement training reported significant improvements in emotional regulation and learning satisfaction (11). Likewise, Bates et al. (2024) documented that resilience training in adolescent athletes promoted leadership, persistence, and adaptive coping—key attributes transferable to academic domains (13).

From a theoretical standpoint, resilience and play therapy share overlapping mechanisms that promote adaptive learning and psychological flexibility. Both approaches emphasize the importance of autonomy, self-expression, and positive emotional experiences in overcoming challenges (2, 15). The cognitive and emotional engagement fostered through play enables children to experiment with problem-solving strategies, thereby reinforcing self-efficacy and metacognitive awareness (16, 19). Integrating resilience training principles into play therapy may thus provide a holistic model for developing children's cognitive and socioemotional competencies in academic contexts (1, 9).

Research on the relationship between play, resilience, and academic success indicates that interactive and emotionally engaging learning environments support deeper understanding and long-term retention (12, 36). Such environments encourage self-regulated learning behaviors, collaborative problem-solving, and cognitive exploration—all of which align with the principles of developmental play and resilience-building (22, 29). Moreover, the affect-regulation framework of resilience posits that children who can modulate their emotions effectively in response to failure or challenge are more likely to sustain cognitive engagement and task persistence (4, 5).

Cultural and contextual factors also shape how resilience and play therapy are applied within educational systems. Cross-cultural studies have shown that supportive family and school environments enhance children's resilience and facilitate positive academic outcomes (10, 35). In collectivist contexts, such as Asian and Middle Eastern societies, the integration of emotional and cognitive development within educational frameworks aligns with cultural values emphasizing social harmony, perseverance, and interdependence (22, 27). Furthermore, modern educational technologies have expanded the potential of game-based resilience programs, offering interactive and adaptive learning environments that cater to individual needs (33, 34).

Recent advances in neuroscience and educational psychology have highlighted the bidirectional relationship between emotional regulation and executive function, supporting the inclusion of play-based resilience training within school curricula (8, 25). Such integrative programs address multiple developmental domains—cognitive, emotional, and social—resulting in measurable improvements in problem-solving skills, academic performance, and general well-being (4, 14). Importantly, resilience-oriented play therapy encourages intrinsic motivation and reduces anxiety by allowing children to learn through exploration and mastery rather than external evaluation (15, 16).

Despite these advancements, there remains a need for empirically validated models that integrate resilience training and play therapy in school contexts, particularly at the elementary level, where emotional and cognitive foundations for lifelong learning are established (31, 32). While previous studies have examined these constructs separately, few have explored their combined effects on both cognitive and affective outcomes such as problem-solving ability and mathematical achievement (21, 22). Therefore, designing and validating an integrated training model that merges resilience and play therapy principles could fill a significant gap in applied educational psychology.

The aim of this study is to design and validate an integrated resilience and play therapy training model and to examine its effect on problem-solving skills and mathematical performance among elementary school students.

Methods and Materials

The first phase of this study was conducted using a qualitative method based on thematic analysis, which involved analyzing theoretical and empirical studies related to the integrated program model of resilience and play therapy. In this phase, the researcher identified the key themes for the sessions of the integrated resilience and play therapy model for elementary school students. Additionally, a library-based review was conducted to include essential topics in the integrated program, with the goal of identifying the needs of elementary school students. In the second phase, the effectiveness of the integrated resilience and play therapy model on problem-solving skills and mathematical performance among elementary school students was examined. Therefore, the research method in the first phase was qualitative (development of the integrated resilience and play therapy training program).

The quantitative phase employed a quasi-experimental design with pretest, posttest, and follow-up stages, including one experimental group and one control group. The independent variable was the integrated resilience and play therapy model, and the dependent variables were students' problem-solving skills and mathematical performance.

The implementation stages of the research were as follows:

1. Conducting the pretest and collecting data
2. Implementing the intervention for the experimental group
3. Conducting the posttest and collecting data
4. Conducting the follow-up test and collecting data.

In the qualitative phase, purposive sampling was used to select articles, books, and journals relevant to the resilience and play therapy model. To construct the integrated program based on the resilience and play therapy model, the researcher first identified related academic articles and texts and then used thematic analysis to extract and synthesize the qualitative content. To access core and seminal literature on resilience and play therapy programs, searches were performed in both English and Persian databases using keywords such as “resilience training,” “resilience educational program,” “resilience model training package,” “play therapy,” “play therapy training protocol,” “effectiveness of play therapy training,” and “resilience.” Studies were analyzed in terms of relevance, methodology, and effectiveness, and selected for inclusion in different sections of the study. The inclusion criterion was a strong theoretical or empirical connection with the research topic, based on which the training program was developed.

The qualitative sampling of the present study consisted of two parts:

a) In the systematic review phase, non-random purposive sampling was employed to select theoretical foundations and prior studies, using the 27-item PRISMA checklist as the inclusion criterion.

In the quantitative phase, the statistical population included all fourth-grade female elementary school students in Tehran during the 2024–2025 academic year. The sampling method in this phase was cluster sampling. Given that the research involved an intervention, the minimum sample size for each group was set at 15 students, resulting in a total of 30 participants. The students were randomly assigned to experimental and control groups using a matching method based on initial data and inclusion/exclusion criteria.

For sampling, two educational districts were randomly selected from Tehran's Department of Education, and one girls' elementary school from each district was chosen. From each selected school, one fourth-grade class was randomly chosen—one class served as the experimental group and the other as the control group.

Inclusion criteria included: absence of diagnostic criteria for major psychiatric disorders based on a psychiatrist's evaluation, no simultaneous participation in other psychological training programs, and no physical or psychological conditions preventing attendance.

Exclusion criteria included: missing more than two sessions of group therapy or unwillingness to continue participation.

After the groups were finalized, the first session introduced the process, objectives, schedule, structure, benefits of participation, and withdrawal procedures. The study's questionnaires were distributed, and instructions for completion were provided. Participants were then randomly assigned to the experimental and control groups, and the start date of sessions was set. The experimental group received ten 60-minute training sessions, while the control group was placed on a waiting list.

Through library research—including books, journals, theses, dissertations, and scientific articles—materials related to the literature and session themes of the integrated resilience and play therapy program were collected.

Problem-Solving Inventory (Heppner & Petersen, 1982): This 35-item inventory measures individuals' typical reactions to everyday problems. Responses are rated on a six-point Likert scale from 1 ("strongly disagree") to 6 ("strongly agree"). Khosravi et al. (1998) reported Cronbach's alpha coefficients between .83 and .89 over a two-week test–retest interval. Subscale alphas were .85 for confidence in problem-solving, .84 for approach–avoidance to problem-solving activities, and .72 for emotional and behavioral control during problem-solving, indicating acceptable internal consistency.

TIMSS Mathematics Performance Test: To measure the dependent variable in pre- and posttests, a mathematics performance test was developed based on TIMSS cognitive domains: knowing (40% of items), applying (40%), and reasoning (20%). Fifteen mathematics cognition items were selected from TIMSS tests conducted in 1995, 2003, 2007, and 2011. The test was reviewed and validated by elementary mathematics teachers and mathematics education experts. Scoring followed TIMSS guidelines: full credit for correct responses in "knowing" items, and zero for incorrect, blank, erased, or irrelevant responses. For "applying" items, single- or two-part constructed responses were scored 1 or 2 points depending on complexity. For "reasoning" items, scoring followed Miyazaki's (2000) model—responses written in formal mathematical (symbolic) language received the highest score, while those expressed visually received half a point. Cronbach's alpha reliability coefficients were .739 for the pretest and .771 for the posttest, indicating good internal reliability.

In this study, to construct the integrated program based on the resilience and play therapy model, thematic analysis was used in the first step, with the applied approach being the *template analysis of themes*. In this method, a list of themes identified from theoretical literature or derived from the textual data is organized hierarchically in a tree structure. The key feature of this method is the hierarchical organization of themes, where lower-level themes are grouped into clusters to generate higher-order themes. It should be noted that the validity of the integrated program based on the resilience and play therapy model was assessed using Lawshe's forms, including the CVR (Content Validity Ratio) and CVI (Content Validity Index) forms.

Questionnaire for Model Validity Assessment: This section included a closed-ended questionnaire derived from the educational program developed in the qualitative phase, designed to evaluate expert opinions regarding the validity of the package (external validity).

To assess the designed model, four main criteria were considered:

1. Structure
2. Process
3. Generalizability
4. Content

Additionally, Creswell (2005) emphasized that in developing a protocol, not only is the model itself important, but the process of its creation must also follow a systematic procedure. To ensure the credibility of qualitative findings, several

strategies can be employed, such as triangulation, member checking, and rich, thick description. In this study, the “member checking” strategy was used to verify the accuracy of findings.

Accordingly, the final designed model was returned to 15 experts familiar with the field, and a questionnaire consisting of six Likert-scale items across four dimensions was developed. The participants were asked to review and confirm the accuracy of the results. The questionnaire items were as follows:

Table 1. External Validity Questionnaire for the Integrated Resilience and Play Therapy Model Program

No.	Item	Questions
1	Process	Was the educational protocol developed based on data derived from thematic analysis, and was a proper process followed for its design?
2	Structure	Is the developed protocol systematically structured, and are its components understandable for the therapist?
3	Generalizability	Is the educational protocol described in a way that considers changes under different conditions?
4		Are broader contextual conditions that might affect the educational protocol explained?
5	Content	Are the session outlines, assignments, activities, educational aids, and evaluation components in each session well-formulated?

In the qualitative phase, theoretical coding derived from thematic analysis was conducted using MAXQDA software. In each study as a whole, data collection, organization, and analysis were interdependent processes. Three types of coding were used for analyzing interview data and theoretical materials:

1. Basic themes (open coding)
2. Organizing themes (axial coding)
3. Global themes (selective coding)

In the quantitative phase, both descriptive and inferential statistical methods were applied. To describe demographic characteristics collected from questionnaires, percentages, frequencies, tables, figures, and charts were used. Additionally, mean, standard deviation, skewness, and kurtosis were calculated to describe research variables. For inferential analysis and to test the hypotheses and research questions, mixed-design analysis of variance (ANOVA) was conducted using SPSS version 23.

Findings and Results

In this section, the research data were analyzed and evaluated using scientific methods. Since this study employed a mixed-methods design, data analysis consisted of two parts: qualitative and quantitative.

Based on the review of theoretical foundations and prior research, the components of the integrated resilience and play therapy training package were examined and coded. The results are presented in the following table.

Table 2. List of Extracted Concepts from Theoretical Foundations and Prior Studies for Identifying the Integrated Resilience and Play Therapy Training Package

Selective Coding	Axial Coding	Open Coding (Indicators)
Personal Empowerment	Individual Resilience Resources	Self-efficacy and Sense of Mastery
		Self-esteem and Self-worth
		Future Orientation and Hope
		Cognitive Flexibility
Adaptive Interaction in Relationships	Emotional Resilience Skills	Self-regulation and Self-discipline
		Emotion Regulation
		Optimism and Positive Attitude
		Active Coping and Problem-Solving
	Cognitive Resilience Skills	Social Competence
		Empathy and Compassion
	Social Resilience Skills	Personal Responsibility
		Emotional Support from Family
	Environmental Factors of Resilience	Family Cohesion

Play as a Path to Self-Expression and Therapy	Principles of Play Therapy	Authoritative Parenting Style Peer and School Support Access to Opportunities and Resources Play as the Child's Language
	Emotional Function of Play Therapy	Expression of Repressed Emotions Reduction of Anxiety and Tension Enhancement of Self-esteem and Self-confidence
	Cognitive Function of Play Therapy	Strengthening Problem-Solving Skills Indirect Learning of Academic Concepts Improvement of Concentration and Working Memory
	Social Function of Play Therapy	Strengthening Social and Communication Skills Enhancing Cooperation and Teamwork Practicing Social and Family Roles
	Humanistic Principles of Play Therapy	Unconditional Acceptance of the Child Freedom to Express Emotions Warm and Accepting Relationship with the Therapist
Play as a Path to Learning and Growth	Cognitive-Developmental Principles of Play Therapy	Active Role of the Child in Play
	Cognitive-Emotional Function of Play Therapy	Indirect Guidance by the Therapist Use of Imagination to Reconstruct Problems

Subsequently, based on the designed model, the protocol was developed. Table 5 presents the session content within the framework of a six-step guideline for developing high-quality interventions.

Table 3. Program of the Integrated Resilience and Play Therapy Training Package

Tasks and Activities	Session Content	Session Objective	Session Title
Drawing “the resilient self”; discussion with family about a successful experience	Introducing program objectives; creating a friendly atmosphere; free play for initial emotional expression; simple explanation of resilience	Establishing a safe relationship and increasing sense of acceptance	Session 1: Introduction and Relationship Building
Daily emotion journal (writing or drawing emotions)	Teaching emotion labeling; puppet play for emotional expression; recognizing facial expressions	Increasing emotional awareness	Session 2: Recognizing Emotions
Practicing deep breathing at home and reporting next session	Introducing relaxation strategies; balloon breathing game and drawing pre-/post-relaxation emotions	Strengthening emotion regulation skills	Session 3: Emotion Regulation
Writing or drawing a small daily success	Storytelling about success; “step challenge” game for solving simple problems; therapist’s positive feedback	Enhancing self-efficacy and confidence	Session 4: Self-Efficacy and Confidence
Solving a problem at home with parents’ help and writing the steps	Teaching Polya’s four-step problem-solving model (understand, plan, execute, review); group puzzle-solving game	Teaching problem-solving stages	Session 5: Problem-Solving Skills 1
Writing three solutions for a personal real-life problem	Role-playing daily situations (friendship, school); fostering creativity in finding solutions	Practicing problem-solving in groups	Session 6: Problem-Solving Skills 2
Performing a cooperative behavior at home/school and reporting it	Cooperative group game (e.g., tower building with LEGO); group discussion on helping friends	Enhancing empathy and communication skills	Session 7: Social Relationships and Cooperation
Making a list of short-term goals with family	“Dream Map” game (drawing or collage of future goals); discussion on perseverance and effort	Promoting positive thinking and goal setting	Session 8: Future Orientation and Hope
Preparing a short story titled “I am Resilient”	Combined play activity including problem-solving + cooperation + emotional expression; reviewing emotion journal and assignments	Reviewing learned content	Session 9: Review and Consolidation of Skills
Continuing home practice with parental support	Joyful group games; student presentations; positive feedback; awarding “Resilience Champion” certificates	Reinforcing learning and motivation	Session 10: Resilience Celebration

In the first step, the inter-rater reliability method was used. In this study, the Kappa coefficient between the two raters was calculated as 0.907, indicating that the integrated resilience and play therapy model had strong inter-rater reliability.

In the next step, to analyze the sessions derived from the quantitative section and to assess content validity of the questionnaire, the opinions of 15 experts were considered. All experts held PhDs in psychology and had at least five years of clinical experience using resilience training and play therapy approaches.

First, a content validity score for each session was obtained using the Content Validity Index (CVI). Each score was then compared with the values in Lawshe's content validity table. If the obtained value for a session exceeded the corresponding Lawshe ratio, that session was considered to have good content validity and was retained in the final structure.

To further assess content validity, the CVI was calculated. For this, the content of each session was rated by experts on four criteria—process, structure, generalizability, and content—using a 4-point scale (1 = not relevant, 2 = somewhat relevant, 3 = relevant, 4 = highly relevant). The CVI for each session was calculated using the following formula:

$$\text{CVI} = \text{Number of experts rating 3 or 4} / \text{Total number of experts}$$

Accordingly, the content of sessions with a CVI above 0.49 was retained in the protocol. At the end of this stage, the content of all 10 sessions was confirmed by the experts.

In this section, descriptive statistics for the variables of problem-solving skills and mathematical performance in the groups receiving the integrated resilience and play therapy training program and the control group are presented for the pretest, posttest, and follow-up stages. Subsequently, the research hypotheses were tested using appropriate statistical analyses in the data analysis section. Statistical computations were conducted using IBM SPSS Statistics Version 23.

In this part, descriptive statistics of the study variables were first computed, and potential differences between the groups across various measurement stages were examined.

Table 4. Mean and Standard Deviation of Problem-Solving Skills and Mathematical Performance by Measurement Stage and Group

Group	Variable	Index	Pretest	Posttest	Follow-up
Integrated Resilience and Play Therapy Training Program	Problem-Solving Skills	Mean	95.80	125.20	95.80
		Standard Deviation	14.20	12.97	14.20
		Skewness	0.55	-0.30	0.55
		Kurtosis	1.73	-0.29	1.73
Control	Problem-Solving Skills	Mean	96.00	93.20	96.00
		Standard Deviation	10.86	14.76	10.86
		Skewness	0.97	-0.16	0.97
		Kurtosis	0.85	-1.07	0.85
Integrated Resilience and Play Therapy Training Program	Mathematical Performance	Mean	22.87	26.73	27.73
		Standard Deviation	3.85	3.99	4.53
		Skewness	0.51	0.87	-0.24
		Kurtosis	-0.74	0.25	0.54
Control	Mathematical Performance	Mean	23.33	23.00	23.60
		Standard Deviation	3.37	4.31	4.44
		Skewness	0.16	0.43	0.29
		Kurtosis	-0.73	-1.55	-1.29

As observed, the mean scores in the integrated resilience and play therapy training group showed noticeable changes in the posttest compared to the pretest. Based on the results presented in the table, it can be described that the integrated resilience and play therapy training program led to improvements in students' problem-solving skills and mathematical performance scores.

Before applying repeated-measures MANOVA, the assumptions of this test were examined. These assumptions included: the normal distribution of the dependent variables based on all within-group and between-group independent variables (tested using the Shapiro–Wilk test); the homogeneity of variances (tested using Levene's test); the homogeneity of variance–covariance matrices (tested using Box's M test); the sphericity of within-group variances (tested using Mauchly's test); and the independence of observations.

After examining and confirming all assumptions of the repeated-measures MANOVA, the test results could be considered reliable. The following section presents the SPSS output related to this analysis.

Table 5. Summary of One-Way Repeated-Measures ANOVA for Problem-Solving Skills and Mathematical Performance

Variable	Source of Variation	SS	df	MS	F	Sig.	Effect Size (η^2)
Problem-Solving Skills	Between Groups	8410.00	1.00	8410.00	18.74	0.001	0.40
	Within Groups (Time)	3459.80	2.00	1729.90	22.17	0.001	0.44
	Time $\times$ Group Interaction	4418.60	1.94	2274.25	28.31	0.001	0.50
Mathematical Performance	Between Groups	136.90	1.00	136.90	4.51	0.041	0.15
	Within Groups (Time)	103.48	1.86	55.44	8.98	0.001	0.24
	Time $\times$ Group Interaction	97.40	1.86	52.18	8.44	0.001	0.23

The results of the repeated-measures ANOVA indicated that the integrated resilience and play therapy training program produced statistically significant improvements in both problem-solving skills and mathematical performance among students. For problem-solving skills, significant main effects were found for group membership ($F(1, 28) = 18.74, p < .001, \eta^2 = .40$) and time ($F(2, 28) = 22.17, p < .001, \eta^2 = .44$), as well as a significant time $\times$ group interaction ($F(1.94, 28) = 28.31, p < .001, \eta^2 = .50$). These results indicate that the experimental group's problem-solving scores improved significantly from pretest to posttest and follow-up, whereas the control group did not show meaningful change.

Similarly, for mathematical performance, significant main effects were observed for group ($F(1, 28) = 4.51, p = .041, \eta^2 = .15$) and time ($F(1.86, 28) = 8.98, p < .001, \eta^2 = .24$), along with a significant time $\times$ group interaction ($F(1.86, 28) = 8.44, p < .001, \eta^2 = .23$). These findings demonstrate that the integrated resilience and play therapy intervention effectively enhanced students' mathematical performance over time, with the effects remaining stable during the follow-up phase. Overall, the results confirm the program's strong positive and lasting impact on both cognitive and academic skills.

Table 6. Bonferroni Post Hoc Test for Pairwise Comparison of Means Between Experimental and Control Groups

Variable	Measurement Stage	Group Comparison	Mean Difference	Standard Error	Sig. (p)
Problem-Solving Skills	Pretest	Integrated Resilience & Play Therapy – Control	-0.20	4.62	0.97
	Posttest	Integrated Resilience & Play Therapy – Control	32.00	5.07	0.001
	Follow-up	Integrated Resilience & Play Therapy – Control	26.20	5.80	0.001
Mathematical Performance	Pretest	Integrated Resilience & Play Therapy – Control	-0.47	1.32	0.73
	Posttest	Integrated Resilience & Play Therapy – Control	3.73	1.52	0.02
	Follow-up	Integrated Resilience & Play Therapy – Control	4.13	1.64	0.02

The Bonferroni post hoc comparisons were conducted to identify the source of significant differences between the experimental (integrated resilience and play therapy) and control groups across the three time points (pretest, posttest, and follow-up).

For problem-solving skills, no significant difference was observed between the two groups at the pretest stage ($p = 0.97$), confirming the equivalence of groups prior to the intervention. However, significant differences emerged in the posttest (Mean Difference = 32.00, $p < .001$) and follow-up (Mean Difference = 26.20, $p < .001$), indicating that students who received the integrated resilience and play therapy training demonstrated sustained improvement in problem-solving ability compared to those in the control group.

Similarly, for mathematical performance, no significant pretest difference was found between the groups ($p = 0.73$), while significant differences were observed at the posttest (Mean Difference = 3.73, $p = 0.02$) and follow-up (Mean Difference = 4.13, $p = 0.02$). These findings suggest that the intervention effectively enhanced students' mathematical performance, and the effects remained stable over time.

Overall, the Bonferroni post hoc results confirm that the observed improvements in both cognitive (problem-solving) and academic (mathematics) outcomes were attributable to the integrated resilience and play therapy program rather than random variation, and that these effects persisted during the follow-up period.

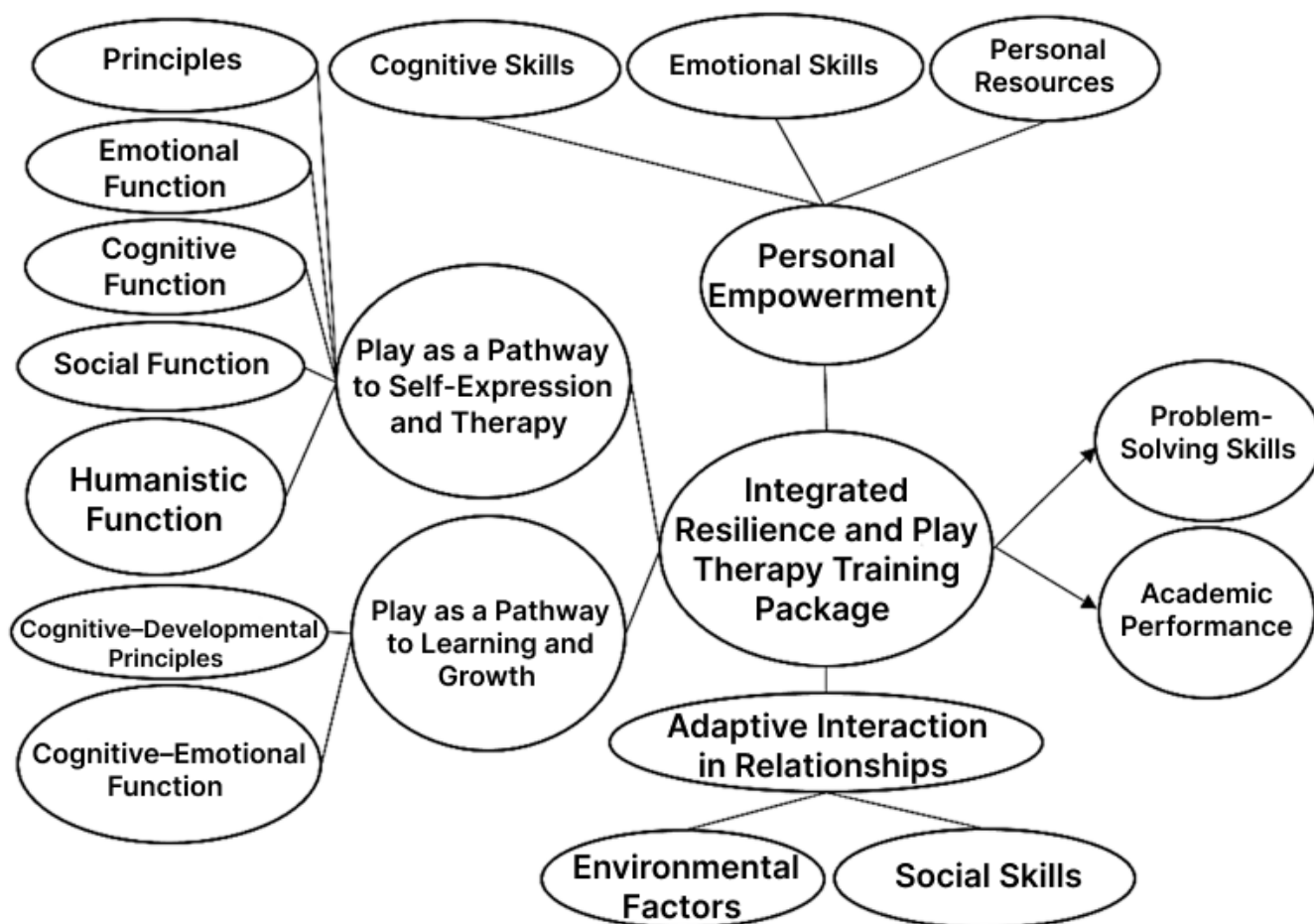


Figure 1. Final Model of The Study

Discussion and Conclusion

The present study aimed to design, validate, and evaluate the effectiveness of an integrated resilience and play therapy training model on the problem-solving skills and mathematical performance of elementary school students. The results obtained from the repeated-measures ANOVA indicated that the intervention significantly improved both variables in the experimental group compared to the control group, with these positive effects persisting during the follow-up phase. This demonstrates that the combination of resilience training and play therapy provides a synergistic effect, leading to sustained cognitive and emotional development among students. The findings align with previous empirical research underscoring the complementary nature of resilience-building programs and play-based interventions in enhancing children's learning capacity and adaptive functioning (6, 31-33).

The significant increase in problem-solving ability observed among students following the intervention can be attributed to multiple components of the integrated model. Resilience-focused sessions targeted the development of self-regulation, emotional control, and cognitive flexibility, while play therapy facilitated experiential learning, creativity, and emotional expression. Together, these elements fostered a multidimensional learning experience that allowed children to approach challenges more constructively. This is consistent with the resilience framework proposed by Masten (2014), which conceptualizes resilience as the dynamic process of positive adaptation in the context of adversity (1). The current results also corroborate the theoretical perspective advanced by Rutter (2012), who emphasized that resilience acts as a mediating factor between stress exposure and adaptive outcomes, particularly when bolstered by supportive environments (2). By integrating structured play into resilience training, the present model strengthened children's intrinsic motivation and sense of mastery—key elements of successful problem-solving behavior (4, 5).

The findings concerning the enhancement of mathematical performance are similarly significant. Students who participated in the integrated training demonstrated higher posttest and follow-up scores in mathematics compared with the control group. This improvement reflects the intervention's effectiveness in addressing both cognitive and affective components of mathematical learning. Research has shown that emotional regulation and resilience are essential for overcoming mathematics-related anxiety, sustaining attention, and fostering self-efficacy (30, 35). The current findings are consistent with those of Habibi Khozani et al. (2024), who found that game-based and cognitive rehabilitation-integrated learning interventions significantly reduced anxiety and improved mathematical achievement among students with learning difficulties (32). Similarly, Samavati et al. (2024) reported that adaptive game-based learning enhanced mathematics performance and motivation in a mobile learning context, illustrating the powerful intersection between play, cognition, and academic resilience (33).

The persistent improvement observed during the follow-up period suggests that the effects of the integrated program extended beyond short-term behavioral changes and were internalized as enduring cognitive and emotional strategies. This durability of effects can be explained through Rogers' client-centered principles, emphasizing acceptance, empathy, and the facilitation of self-directed growth (17). Within play therapy sessions, these conditions were recreated through structured yet flexible activities that encouraged children to express feelings, test solutions, and experience mastery in problem-solving contexts. This aligns with Axline's (1947) child-centered play therapy approach, which views play as a natural means through which children resolve inner conflicts and develop adaptive coping mechanisms (18). The results also mirror Landreth's (2021) and Cochran et al.'s (2023) findings, which highlighted that play therapy nurtures emotional self-regulation, cognitive restructuring, and social competence, all of which contribute to improved academic performance (15, 16).

Another critical finding relates to the interaction effect between time and group for both dependent variables, indicating that the experimental group's progress over time was significantly greater than that of the control group. This trajectory of improvement underscores the developmental nature of the integrated program: children not only learned specific techniques but also internalized adaptive strategies that continued to operate autonomously. Such continuity of learning supports Piaget's (1962) developmental theory, which holds that cognitive progress is achieved through active interaction and reflective play (23). Moreover, as supported by contemporary research, cognitive and emotional skills develop interdependently; thus, integrating emotional resilience into academic instruction enhances both performance and well-being (8, 25).

The significant increase in problem-solving skills among students after exposure to the integrated intervention resonates with a growing body of evidence emphasizing the central role of resilience in cognitive flexibility and creativity. Studies have consistently found that resilience training fosters an adaptive mindset, enhances metacognitive monitoring, and strengthens students' capacity to confront and resolve novel problems (6, 10). The findings are congruent with those of Jahani Zadeh et al. (2023), who reported that explicit problem-solving training significantly improved academic achievement and reduced test anxiety among fourth-grade students (26). Similarly, Yasbolaghi Sharahi and Moradi (2023) found that design-thinking strategies—which share conceptual similarities with problem-solving-based resilience training—enhanced creative reasoning and adaptive cognitive processes among elementary learners (27).

From an emotional-cognitive standpoint, the intervention's success can also be explained through the affect-regulation model of resilience proposed by Troy et al. (2023). According to this framework, resilience operates through the flexible regulation of emotions to maintain goal-directed behavior under stress. Within the present study, play therapy activities provided the experiential context for such regulation, enabling students to process frustration, practice emotional control, and experience mastery—all essential for academic persistence (4). Similar mechanisms have been described by Bates et al. (2024), who observed that resilience training among adolescents improved both affective balance and performance outcomes (13).

The positive impact on mathematical performance also corroborates prior findings from both educational and clinical contexts. Li and Disney (2023) reported that young children's mathematical thinking improved significantly when mathematical concepts were embedded within playful, collaborative environments (7). Likewise, Awofala et al. (2024) found that teacher-related anxiety in mathematics directly influenced students' achievement levels, emphasizing the importance of affective interventions to promote mathematical resilience (28). In the same vein, Gharibi et al. (2023) and Heydari et al. (2018) confirmed that play therapy enhances mathematical understanding and problem-solving among students with learning difficulties, as it combines emotional safety with cognitive stimulation (21, 31). The consistency between these results and the present findings underscores the mediating role of emotional resilience in cognitive performance and provides empirical justification for integrating play and resilience within mathematics instruction.

At a theoretical level, the integrated training model validated in this study is grounded in three complementary traditions—resilience theory, cognitive-developmental theory, and humanistic play therapy. From the resilience perspective, as posited by Rutter (2012) and Masten (2014), adaptive functioning results from the interaction between individual protective factors (such as emotion regulation and problem-solving ability) and environmental support systems (such as family, school, and peer relationships) (1, 2). From the cognitive-developmental standpoint, Piaget (1962) and subsequent researchers emphasized that play and exploration constitute the primary means of learning and knowledge construction in childhood (23). Finally, from the humanistic perspective articulated by Rogers (1951) and Axline (1947), the therapeutic relationship and acceptance of the child's inner world are essential for self-directed growth (17, 18). The integration of these frameworks offers a holistic structure for enhancing academic resilience through affective and cognitive channels simultaneously.

The study's outcomes further align with more recent empirical frameworks connecting resilience and digital or adaptive game-based learning. For example, Samavati et al. (2024) and Ventistas et al. (2024) demonstrated that technology-enhanced game-based learning can reinforce motivation and sustain problem-solving engagement, particularly among learners who struggle with traditional methods (12, 33). Similarly, Borazon and Chuang (2023) argued that resilience in educational systems can be intentionally cultivated through integrative pedagogical practices combining social–emotional and cognitive learning (9). This evidence strengthens the generalizability of the current findings to broader educational applications.

The results also reaffirm the importance of environmental and social support in promoting resilience. Consistent with Zhang et al. (2024), who found that family communication and social support predict family resilience and emotional well-being, the inclusion of group-based play activities in this study likely enhanced social cohesion and peer connectedness, further promoting emotional security and persistence in learning tasks (10). Furthermore, the use of play as a mediating medium allowed for cooperative problem-solving, aligning with Bahar and Aksut's (2020) findings that activity-based learning improves cognitive engagement and problem-solving skills in early education (29).

Overall, the findings of this research confirm that integrating resilience training with play therapy yields multidimensional benefits, strengthening children's problem-solving, emotional regulation, and academic performance. This model provides empirical evidence for the theoretical claim that resilience is not merely a trait but a trainable set of cognitive and emotional skills that can be effectively cultivated through experiential, play-based learning environments (8, 14, 36).

Despite its robust design and meaningful findings, this study has certain limitations that should be acknowledged. The first limitation lies in the relatively small sample size and the use of a single geographical location, which may restrict the generalizability of the results to wider populations. Second, the reliance on self-report instruments and standardized tests, although validated, may have introduced bias related to social desirability or subjective interpretation. Third, the study's duration was limited to a short intervention period followed by a single follow-up; therefore, long-term effects of the integrated training on resilience and academic achievement remain uncertain. Finally, since the study was conducted in an educational rather than clinical setting, the findings may not fully represent children with severe emotional or cognitive impairments.

Future studies could expand the scope of this research by employing larger and more diverse samples across multiple educational regions. Longitudinal designs with extended follow-up periods are recommended to evaluate the sustainability of the intervention's effects over time. Future research could also explore moderating variables such as gender, socioeconomic background, or prior exposure to emotional learning programs. Incorporating neurocognitive measures, such as executive function assessments, could further elucidate the underlying mechanisms linking resilience, emotional regulation, and problem-solving. Moreover, comparative studies testing digital and in-person implementations of resilience–play therapy integration could reveal the optimal delivery modes for modern classrooms.

Practitioners and educators can apply the findings of this study by embedding resilience training and play therapy principles within everyday classroom routines. Integrating playful problem-solving tasks, emotional regulation exercises, and cooperative learning activities into curricula can enhance students' cognitive engagement and psychological well-being. Teachers should receive training in both resilience-based pedagogy and therapeutic play techniques to better support students' emotional needs while maintaining academic rigor. Finally, school counselors and psychologists can adopt the integrated model as a preventive and developmental tool, promoting adaptive coping, emotional intelligence, and academic success in early education settings.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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References

1. Masten AS. Global perspectives on resilience in children and youth. *Child Development*. 2014;85(1):6–20. doi: 10.1111/cdev.12205.
2. Rutter M. Resilience as a dynamic concept. *Development and Psychopathology*. 2012;24(2). doi: 10.1017/S0954579412000028.
3. Garmzy N. Resilience in children's adaptation to negative life events and stressed environment. *Pediatric Annual*. 1991;20:459–66. doi: 10.3928/0090-4481-19910901-05.
4. Troy AS, Willroth EC, Shallcross AJ, Giuliani NR, Gross JJ, Mauss IB. Psychological resilience: an affect-regulation framework. *Annual Review of Psychology*. 2023;74(1):547–76. doi: 10.1146/annurev-psych-020122-041854.
5. Martin AJ, Marsh HW. Academic buoyancy: Towards an understanding of students' everyday academic resilience. *Journal of School Psychology*. 2008;46(1):53–83. doi: 10.1016/j.jsp.2007.01.002.
6. Wang S, Wang Y, Zhao L. Effects of psychological resilience on online learning performance and satisfaction among undergraduates: The mediating role of academic burnout. *The Asia-Pacific Education Researcher*. 2025;34(1):395–409. doi: 10.1007/s40299-024-00862-1.
7. Li S. The effect of teacher self-efficacy, teacher resilience, and emotion regulation on teacher burnout: a mediation model. *Frontiers in Psychology*. 2023;14:1185079. doi: 10.3389/fpsyg.2023.1185079.
8. Wang Y, Pan Z. Modeling the effect of Chinese EFL teachers' self-efficacy and resilience on their work engagement: A structural equation modeling analysis. *Sage Open*. 2023;13(4):21582440231214329. doi: 10.1177/21582440231214329.
9. Borazon EQ, Chuang HH. Resilience in educational system: A systematic review and directions for future research. *International Journal of Educational Development*. 2023. doi: 10.1016/j.ijedudev.2023.102761.
10. Zhang Y, Hu Y, Yang M. The relationship between family communication and family resilience in Chinese parents of depressed adolescents: a serial multiple mediation of social support and psychological resilience. *BMC Psychology*. 2024;12(1):33. doi: 10.1186/s40359-023-01514-7.

11. Ang WHD, Shorey S, Zheng ZJ, Ng WHD, Chen ECW, Shah L, et al. Evaluating the online Resilience Skills Enhancement programme among undergraduate students: A double-blind parallel randomized controlled trial. *Stress and Health*. 2024. doi: 10.1002/smi.3367.
12. Ventistas G, Ventista OM, Tsani P. The impact of realistic mathematics education on secondary school students' problem-solving skills: a comparative evaluation study. *Research in Mathematics Education*. 2024;1–25. doi: 10.1080/14794802.2024.2306633.
13. Bates S, Nothnagle E, Mokadam K. Resilience Training for High School Student-Athletes: A Pilot of the Life and Leadership through Sport Series. *Sport Social Work Journal*. 2024;6(1):32–53. doi: 10.33043/rdrbda.
14. Rancher C, Moreland AD. Adverse childhood experiences, stress, and resilience among early childhood teachers. *Early Childhood Research Quarterly*. 2023;62:186–93. doi: 10.1016/j.ecresq.2022.08.007.
15. Landreth GL. *Play therapy: The art of communicating with children*. Tehran: Ravan Publishing; 2021.
16. Cochran NH, Nordling WJ, Cochran JL. *Child-centered play therapy: A practical guide to therapeutic relationships with children*: Routledge; 2023.
17. Rogers CR. Perceptual reorganization in client-centered therapy. 1951. doi: 10.1037/11505-011.
18. Axline VM. *Play Therapy: The Inner Dynamics of Childhood*. 1947.
19. Thomas S, White V, Ryan N, Byrne L. Effectiveness of play therapy in enhancing psychosocial outcomes in children with chronic illness: A systematic review. *Journal of Pediatric Nursing*. 2022;63:e72–e81. doi: 10.1016/j.pedn.2021.10.009.
20. Nafarieh P, Pirkhaefi A. Effectiveness of child-centered play therapy on improving working memory and attention in children with mathematical learning disabilities. *Journal of Applied Behavioral Sciences Research*. 2021;55(11):86–101.
21. Heydari H, Zare A, Mohammadi M. Effectiveness of play therapy on enhancing mathematics concept learning and problem-solving ability in students with mathematical learning disabilities. *Quarterly Journal of Learning Disabilities*. 2018;7(3):57–76.
22. Salehi L, Badri-Gregory R, Aghdasi AN. Comparing the effectiveness of play therapy and mindfulness training on problem-solving skills of sixth-grade male students. *Family and Research Quarterly*. 2023;2(1):95–110.
23. Piaget J. The stages of the intellectual development of the child. *Bulletin of the Menninger Clinic*. 1962;26(3):120.
24. Heppner PP, Petersen CH. The development and implications of a personal problem-solving inventory. *Journal of Counseling Psychology*. 1982;29(1):66–. doi: 10.1037/0022-0167.29.1.66.
25. Schäfer J, Reuter T, Karbach J, Leuchter M. Domain-specific knowledge and domain-general abilities in children's science problem-solving. *British Journal of Educational Psychology*. 2024;94(2):346–66. doi: 10.1111/bjep.12649.
26. Jahani Zadeh J, Mousavi Nik M, Azimi R. Effectiveness of problem-solving skills training on academic achievement and test anxiety in fourth-grade female students in Kermanshah. *Journal of Modern Achievements in Humanities Studies*. 2023;63(11):17–28.
27. Yasbolaghi Sharahi B, Moradi R. Effectiveness of design thinking strategy instruction on problem-solving ability of elementary students in Thinking and Research course. *Journal of Teaching Research*. 2023;11(3):114–29.
28. Awofala AOA, Akinoso SO, Adeniyi CO, Jega SH, Fatade AO, Arigbabu AA. Primary teachers' mathematics anxiety and mathematics teaching anxiety as predictors of students' performance in mathematics. *ASEAN Journal of Science and Engineering Education*. 2024;4(1):9–24. doi: 10.17509/ajsee.v3i3.51065.
29. Bahar M, Aksut P. Investigation on the Effects of Activity-Based Science Teaching Practices in the Acquisition of Problem Solving Skills for 5-6 Year Old Pre-School Children. *Journal of Turkish Science Education*. 2020;17(1):22–39. doi: 10.36681/tused.2020.11.
30. Yu X, Zhou H, Sheng P, Ren B, Wang Y, Wang H, et al. Math anxiety is more closely associated with math performance in female students than in male students. *Current Psychology*. 2024;43(2):1381–94. doi: 10.1007/s12144-023-04349-y.
31. Gharibi H, Salhiyan A, Nouri P, Naderian A. Comparing the effectiveness of mathematics instruction and play therapy on specific mathematical learning disabilities and mathematics motivation. *Journal of Technology and Knowledge in Education*. 2023;3(4):13–28.

32. Habibi Khozani M, Tehranian A, Behzadi MH, Almelhodaei SH. Comparing the effectiveness of game-based learning and integrated game-based learning with cognitive rehabilitation on anxiety and mathematical performance of students with learning disabilities. *Quarterly Journal of Psychological Sciences*. 2024;134(11):413–29.
33. Samavati M, Pourrostai Ardakani S, Jameh Bozorg Z, Zarei Zavarki E, Aliabadi K. The impact of adaptive game-based learning on mathematics performance of students with learning disabilities in a mobile learning environment. *Quarterly Journal of Psychological Sciences*. 2024;23(135):503–22.
34. Bano F, Serbaya SH, Rizwan A, Shabaz M, Hasan F, Khalifa HS. An artificial neural network and Levenberg-Marquardt training algorithm-based mathematical model for performance prediction. *Applied Mathematics in Science and Engineering*. 2024. doi: 10.1080/27690911.2024.2375529.
35. Li L, Disney L. Young children's mathematical problem solving and thinking in a playworld. *Mathematics Education Research Journal*. 2023;35(1):23–44. doi: 10.1007/s13394-021-00373-y.
36. Ocampo EN, Mobo FD, Cutillas AL. Exploring the Relationship between Mathematics Performance and Learning Style among Grade 8 Students. *International Journal of Multidisciplinary: Applied Business and Education Research*. 2023;4(4):1165–72. doi: 10.11594/ijmaber.04.04.14.