Journal of Curriculum Studies Research

https://curriculumstudies.org

E-ISSN: 2690-2788

Volume: 7 Issue: 2 2025

pp. 522-540

Enhancing Creativity Through Project-Based Instruction: Insights from Kazakhstani Elementary Classrooms

Akgul Alimanova[a] , Bakit S. Kulbaeva*[b], Gulzhana Kuzembayeva[c], Salamat Idrissov[d] & Zhumagul Maydangalieva[b]

* Corresponding author
Email: kulbaeva_1972@mail.ru
a. Faculty of Pedagogy and Management in Education, K. Zhubanov Aktobe Regional University, Aktobe, Kazakhstan.
b. Higher School of Natural Sciences and Humanities, Baishev University, Aktobe, Kazakhstan
c. Faculty of Foreign Languages, Ph.D. in Philology, K. Zhubanov Aktobe Regional University, Aktobe, Kazakhstan,
d. Rector of Kh.Dosmukhamedov Atyrau University, Atyrau, Kazakhstan

Article Info
Received: May 25, 2025
Accepted: November 06, 2025
Published: November 19, 2025

10.46303/jcsr.2025.33

How to cite
Alimanova, A., Kulbaeva, B. S., Kuzembayeva, G., Idrissov, S., & Maydangalieva, Z. (2025). Enhancing Creativity Through Project-Based Instruction: Insights from Kazakhstani Elementary Classrooms. *Journal of Curriculum Studies Research*, 7(2), 522-540. https://doi.org/10.46303/jcsr.2025.33

ABSTRACT
Preparing the next generation of students for an unpredictable future is a key challenge facing educators today. This study aims to examine the effectiveness of a project-based learning (PBL) model for fostering creativity among third-grade students in Kazakhstan. Recognising creativity as a key 21st-century competency, the research aims to evaluate whether project-based instruction could considerably enhance young students' creative thinking within an elementary school setting. A quasi-experimental pretest-posttest control group design was employed, involving 35 students divided into experimental and control groups. Creativity was assessed using the Figural Form of the Torrance Tests of Creative Thinking (TTCT), focusing on fluency, flexibility, originality, and elaboration. Pretest scores revealed no significant differences between groups, while posttest results showed a statistically significant improvement in the experimental group, demonstrating the model's positive impact. These findings support the integration of project-based approaches in early education to cultivate creativity and offer meaningful implications for curriculum development and instructional practices in Kazakhstan and similar contexts. The study contributes to the growing body of literature advocating for student-centred, inquiry-based learning models as essential tools for developing creativity in young learners.

KEYWORDS
Creativity; elementary school; students; project-based instruction; model; development.

INTRODUCTION

In the face of rapid technological advancement, evolving workforce demands, and complex global challenges, education stakeholders are increasingly expected to prepare learners not only with foundational knowledge but also with the ability to adapt, innovate, and think critically. This has led to a heightened focus on instructional methods that promote active, meaningful learning and nurture students' capacity for higher-order thinking (Maharani et al., 2022). Among the core competencies required for the 21st century, creativity emerges as a foundational skill—empowering learners to generate original ideas, approach problems with flexibility, and navigate modern uncertainties with confidence.

The development of creativity in elementary education plays a critical role in shaping a child's cognitive growth, personality, and social-emotional skills. Research in developmental psychology and pedagogy highlights the importance of cultivating creativity from an early age, as it supports not only improved academic performance but also the development of key traits such as flexible thinking, problem-solving, emotional intelligence, resilience, and social adaptability (Chimbunde et al., 2023; Garaigordobil et al., 2022; Magolego et al., 2024). Early educational experiences have a lasting impact on a child's ability to engage with learning through curiosity, persistence, and imagination—qualities that underpin lifelong learning.

Modern education must therefore move beyond rote memorisation and passive instruction, instead offering opportunities for students to express, explore, and develop their creative potential (Gcabashe, 2024). As Alabbasi et al. (2022) note, understanding students' creative strengths and weaknesses is essential for supporting their overall growth. Yet, despite increasing recognition of creativity's value, educators often struggle with how to effectively teach and assess it in classroom settings (Abdulla & Runco, 2018; Schacter et al., 2006). This challenge is particularly pronounced in educational systems where traditional, teacher-centred approaches still prevail, frequently limiting students' imaginative development.

In this context, project-based instruction (PBI) has emerged as a promising approach for fostering student engagement, autonomy, and creativity. By involving learners in extended, interdisciplinary projects connected to real-world problems, PBI promotes deeper understanding and encourages divergent thinking, meaningful collaboration, and intellectual risk-taking (Bell, 2010; Thomas, 2000). Research indicates that project-based approaches are particularly effective in fostering creativity when introduced in early education, where learning through play, exploration, and experimentation aligns with both developmental needs and sound pedagogical practice (Beisly & Moffitt, 2024).

Despite its potential, the integration of creativity-enhancing models in elementary classrooms remains limited in many countries, including Kazakhstan, where educational reforms are still evolving towards more student-centred approaches. There is a clear need for empirical research that examines how innovative instructional models—such as those based on project-based learning—can be adapted to local contexts and effectively implemented to support the development of creativity in young learners.

Therefore, the purpose of this study is to evaluate the effectiveness of a project-based instruction model for developing creativity among elementary school students in Kazakhstan. The model was designed to align with modern educational goals and address the limitations of conventional teaching practices. By examining its impact on students' creative thinking skills, this research aims to provide educators, curriculum developers, and policymakers evidence-based insights and practical strategies to help prepare a new generation of learners—creative, capable, and equipped to succeed in an ever-changing world.

LITERATURE REVIEW

As the systematic transfer of knowledge, skills, values, and norms from one generation to the next (Naylor & Nyanjom, 2021; Pradana et al., 2021), education serves goals that vary across cultures and contexts, and its meaning often evolves in response to social, technological, and human developments (Botes & Philip, 2025; Lesmana et al., 2023).

Creativity, one of the core elements of the 21st-century skills framework (4 Cs: critical thinking, communication, collaboration, and creativity), is increasingly shaped by global expectations of the modern individual. Today's society demands individuals who can solve problems, think creatively, and make unconventional decisions. As a result, educational institutions play a growing role in preparing active, initiative-oriented, and creatively minded members of the younger generation (Alsitova et al., 2024; Omodan & Addam, 2022; Öcal Dörterler & Akay, 2022; Yıldız Taşdemir, 2021).

From a cognitive perspective, creativity is defined as solving problems in innovative ways or demonstrating usefulness by applying existing knowledge to new domains (Sternberg et al., 2005; Steyn & Vanyoro, 2023). Vink et al. (2023) highlight that creativity helps address educational challenges by broadening students' perspectives and motivating them to explore fundamental concepts. Similarly, Rusilowati et al. (2023) emphasize that creativity enhances students' cognitive skills and critical thinking abilities.

The importance of developing students' creativity is affirmed in the laws and regulatory documents of the Republic of Kazakhstan. The Law on Education of the Republic of Kazakhstan (On Education, 2007) places particular emphasis on fostering students' creativity and ensuring conditions that support the expression and development of their personal and creative potential (Article 3, Section 2).

The Concept of Education Development of the Republic of Kazakhstan for 2022–2026 (On Approval…, 2022) emphasises that one of the core principles of curriculum renewal is its individual orientation, which includes fostering students' creative capacities, personalising the learning process, and considering their interests and inclinations toward creative activity. The Concept for the Development of Preschool, Secondary, Technical, and Vocational Education for 2023–2029 of the Republic of Kazakhstan (On Approval…, 2023) prioritises the development of universal values and students' emotional intelligence. These abilities are considered as integral

components of creative development, as they encompass the skills essential for fostering creative thinking.

In collaboration with UNICEF, Kazakhstan recently hosted a conference titled "Innovations in Education: From Idea to Implementation," aimed at addressing the evolving needs of the modern educational environment by promoting creativity and the application of innovative teaching strategies (Innovations…, 2024). However, to date, there appears to be little to no research specifically focused on the development of creativity among elementary school students in Kazakhstan.

Educators are strongly encouraged to enhance the learning process by adopting unique and innovative strategies, including the selection of instructional models and methodologies that effectively guide students through problem-solving tasks requiring higher-order thinking skills (Dube et al., 2023; Ndiung & Menggo, 2024). Equipping students with essential skills for their future careers—such as problem investigation, evidence-based reasoning, rational decision-making, and comprehensive understanding—is emphasised as a key educational priority (Moloi et al., 2023; Yermekbayeva et al., 2024).

Tanujaya et al. (2021) suggest that strengthening students' creativity requires engaging them in activities specifically designed to develop this skill. Implementing project-based instruction at the elementary level can provide students with deeper and more meaningful learning experiences (Latifa et al., 2022).

Project-based learning fosters a learner-centred and collaborative environment, where students actively participate in completing projects both independently and in groups, often addressing real-world problems (Jalinus et al., 2019). This approach can enhance motivation, learning processes, and academic achievement by connecting course content to practical, relevant challenges (Syahril et al., 2021). It enables students to recall and comprehend subjects, research and synthesise information, and critically evaluate and generate ideas. Moreover, once internalised, these concepts are more likely to be retained over time (Kurniawan et al., 2024).

To effectively teach children to think creatively, education researchers must first understand the factors that account for differences in creative thinking (Vink et al., 2023). Although creativity has received considerable attention across various fields—including the arts, sports, academics, and everyday life—measuring the construct and tracing its developmental mechanisms remain complex tasks (Kang & Park, 2024).

Efforts have been made to explore how an individual's attitude, cognition, and environment influence their creative disposition. For example, Kuzembayeva et al. (2022) examine logical connections within consciousness such as sensations, perceptions, ideas, and emotions through associative thinking. Additionally, creativity can be evaluated through experimental or psychometric approaches that assess cognitive abilities such as originality, flexibility, analytical and divergent thinking, elaboration, and segmentation, as well as creative functions involving working memory, conflict monitoring, and inhibitory control (Kang & Park, 2024).

This study aims to evaluate the effectiveness of the Model for Developing Creativity in Elementary Students Using Project-Based Instruction, developed by the authors. Methods for assessing the development of creativity will be tested with elementary school students in Kazakhstan, with the goal of refining these tools for more effective application in educational practice.

The Model for Developing Creativity in Elementary Students Using Project-Based Instruction

The Model for Developing Creativity in Elementary Students Using Project-Based Instruction (Figure 1) is grounded in a socio-pedagogical system. As a social system, it is directly affected by societal factors that shape its internal structure and functioning, operating through systemic elements of a pedagogical framework. The importance of these elements within the model is rooted in the understanding of creativity as a social phenomenon, emphasising that the development of creativity in elementary school students through project-based learning is both pedagogically and socially contextualised. The process of developing creativity in elementary school students through project-based instruction is characterised by the following features (Folkina, 2001; Rubtsova & Lenkov, 2015; Uyemov, 2013):

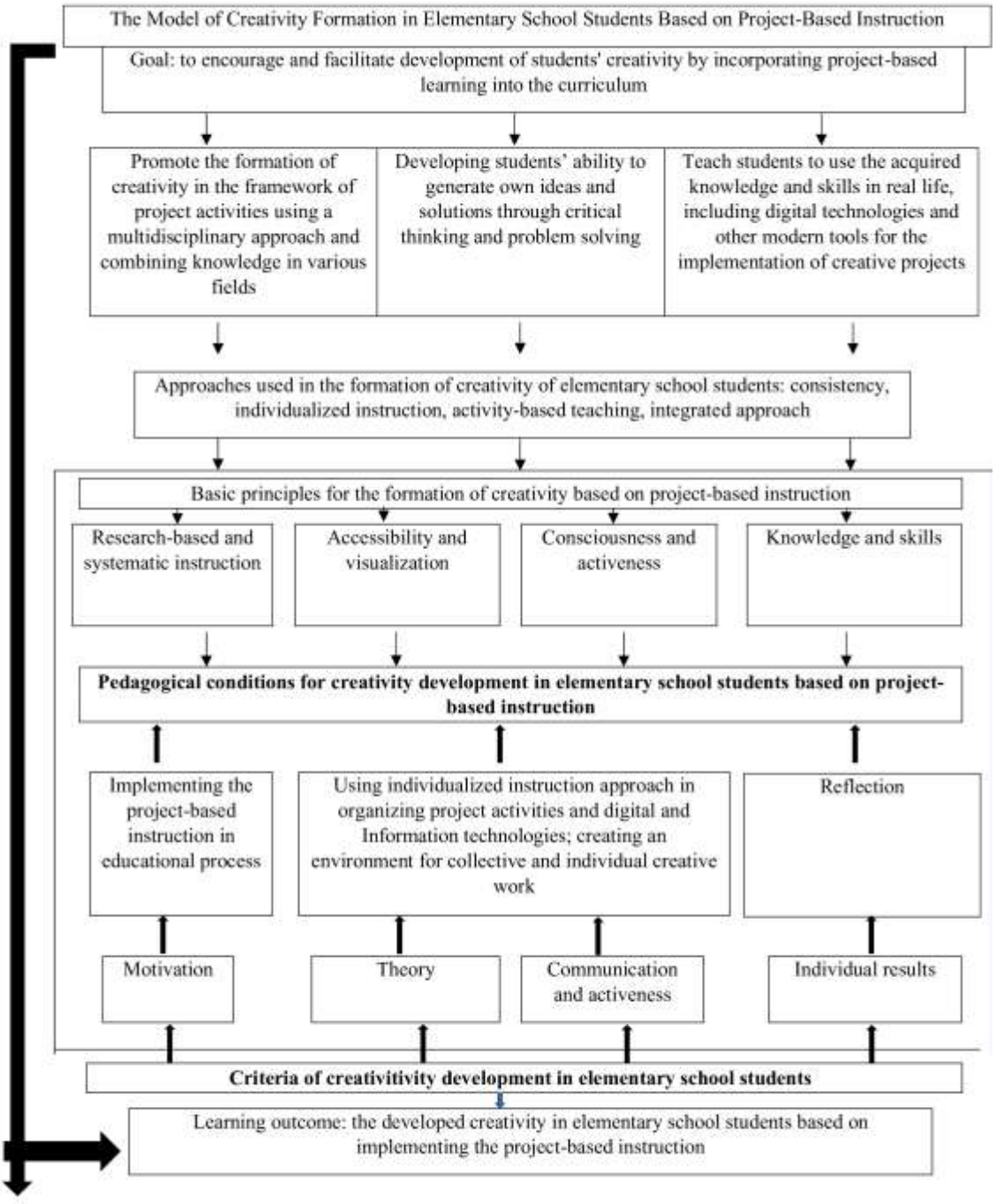
1. The importance of creativity is increasingly recognised across all areas of society, making its development a key aspect of the educational process aimed at preparing students for successful adaptation and self-realisation in a rapidly changing world.
2. Fostering creativity is one of the primary objectives of modern education and is especially relevant in classrooms that incorporate project-based and research-oriented learning activities.
3. The development of students' creativity is achieved through the deliberate, systematic, and purposeful application of project-based instruction, which actively engages students in the creative process, encourages initiative and independence, and provides opportunities for expressing and implementing their ideas.
4. Pedagogical support and teacher-student interaction are essential to cultivating creativity; the teacher serves not only as the organiser of the learning environment but also as a mentor who helps uncover and nurture each student's creative potential. This role demands flexibility in teaching strategies and the use of innovative educational technologies.

This research is grounded in the implementation of an innovative pedagogical model aimed at fostering creativity among elementary school students through project-based instruction. The model seeks to embed creative thinking into the learning process by involving students in multidisciplinary, real-world projects that require them to apply knowledge and skills from multiple subject areas.

At its core, the model focuses on developing students' ability to generate original ideas and solutions by fostering critical thinking and problem-solving skills. It also promotes the use of modern educational tools, including digital technologies, to support the planning and implementation of both individual and collaborative projects.

Figure 1.

The Model for Developing Creativity in Elementary Students Using Project-Based Instruction



The purpose of this study is to evaluate the effectiveness of a model for developing creativity through project-based instruction among Grade 3 elementary school students in Kazakhstan. In the Kazakhstani education system, elementary school (grades 1–4) follows one year of compulsory preschool preparation and precedes middle school (grades 5–9). Grade 3 students, typically aged 8–9, are in the mid-phase of foundational education, during which key cognitive, social, and creative skills are actively formed.

The proposed model was designed to align with contemporary educational objectives and to address the limitations of traditional teaching methods by incorporating structured, student-centred project work. By assessing its impact on students' creative thinking, this study aims to provide educators, curriculum designers, and policymakers evidence-based insights and practical strategies to nurture a generation of learners who are creative, adaptable, and equipped to thrive in a rapidly changing world.

The study seeks to answer the following research question (RQ):

RQ: To what extent does implementing the Model for Developing Creativity Using Project-Based Instruction enhance the creative thinking abilities—specifically fluency, flexibility, originality, and elaboration—of Grade 3 elementary school students in Kazakhstan, compared to traditional teaching methods?

METHODOLOGY

Research Design

To examine the effectiveness of the Model for Developing Creativity Using Project-Based Instruction, the study employed a quasi-experimental research design with a pretest-posttest control group structure, allowing for a straightforward assessment of the intervention applied to a specific cohort (Kairgozhin et al., 2023; Stratton, 2019).

The sample included 35 third-grade students from an elementary school in Kazakhstan, divided into two groups: an experimental group that received instruction through the project-based creativity model and a control group that continued with traditional teaching methods.

The intervention was conducted over a 15-week period, during which the experimental group participated in a series of structured project-based activities aimed at developing creative thinking skills, including fluency, flexibility, originality, and elaboration. Both the experimental and control groups completed a pretest before the intervention and a posttest after its conclusion, with the Figural Form of the Torrance Test of Creative Thinking (TTCT) used as the primary assessment instrument.

Due to the natural classroom setting and the use of intact class groups, random assignment was not feasible, thereby justifying the use of a quasi-experimental approach. This design enabled the examination of differences in creativity development while preserving ecological validity within a real-world educational context.

Research Instrument

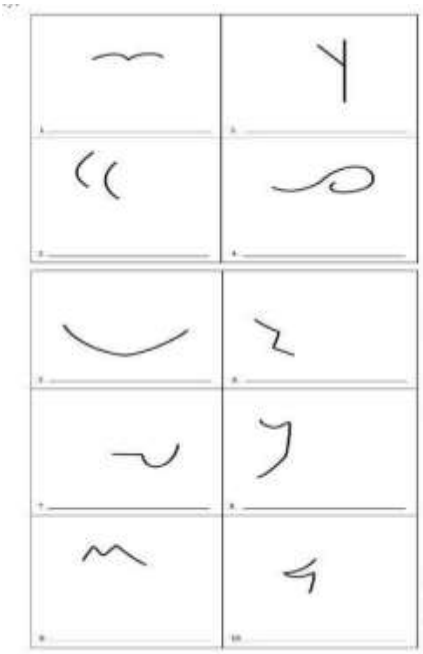
To ensure an objective assessment of third-grade students' creativity, the Figural Form of the Torrance Test of Creative Thinking (Torrance, 1972) was employed, as it is widely used with primary school children and involves visual or drawn responses rather than written ones. Given the minimal writing required, figural tasks are well-suited for diverse cultural and socioeconomic contexts and are considered a more comprehensive and valid measure of creativity compared to the verbal form (Kim, 2017).

The Figural Form of the Torrance Test of Creative Thinking contains four key constructs: fluency (the number of relevant responses), flexibility (the number of different categories of relevant responses), originality (the statistical rarity of relevant responses), and elaboration (the amount of detail provided in the responses).

Students were presented with 10 images containing various lines and curves and were instructed to create drawings based on them. The images used in the Figural Form of the Torrance Test of Creative Thinking are illustrated in Figure 2.

Figure 2.

Pictures Used in The Figurative Form Torrance Test of Creative Thinking



Students' results on the Figural Form of the Torrance Test of Creative Thinking, assessing fluency, flexibility, originality, and elaboration, were evaluated using the Criteria for Assessing the Levels of Creativity presented in Table 1.

Table 1.

Criteria for Assessing the Levels of Creativity in the Figural Form of the Torrance Test of Creative Thinking

Levels of Creativity	**Points**	**Description**
Low Level of Creativity	0-4 points	Students in this category are limited in completing tasks. They may have difficulty creating ideas or imagining them and need additional support and encouragement for creative thinking.
Medium Level of Creativity	5-7 points	Students can show originality and flexibility in completing tasks but lack clarity in their work.
High Level of Creativity	8+ points	Students show a remarkable ability to think creatively. They show high flexibility in tasks, originality in ideas and concreteness in their projects.

Sampling and Research Procedure

To ensure the research significance of the results, a purposive sampling method was employed, targeting two comparable third-grade classes within the same educational institution. The composition of both groups was carefully selected and monitored to maintain a balanced distribution of participants by gender, age, and other relevant social and educational characteristics. This approach ensured the statistical adequacy and reliability of the data analysis.

Grade 3A, consisting of 18 students, was designated as the experimental group and participated in the implementation of a new educational model based on project-based instruction, specifically aimed at fostering creativity in elementary school students. Grade 3B, comprising 17 students, served as the control group and continued their studies under the traditional educational program, allowing for an effective comparison of outcomes.

The assignment of classes to experimental and control groups was based on the feasibility of managing the educational process and maintaining comparable conditions. Although randomisation was not applied, equivalence between the groups was ensured through baseline comparisons of key demographic and educational variables.

Procedures in the Experimental and Control Groups

The study was conducted over a fifteen-week period using two intact third-grade classes from an elementary school in Kazakhstan. Both groups followed the same general curriculum content outlined in the Natural Science textbook by Andriyanova et al. (2018), which is structured around four thematic units: Plants, Animals, Humans, and Substances and Their Properties (Air and Water). These units include subtopics such as photosynthesis, environmental interactions, the human digestive and respiratory systems, and the properties of matter.

In the experimental group, the Model for Developing Creativity in Elementary Students Using Project-Based Instruction was implemented. Project-based activities were integrated into Natural Science lessons to enhance key dimensions of creative thinking, including fluency, flexibility, originality, and elaboration.

The project work was structured into five stages: (1) Preparation – gathering information, selecting and discussing project topics, and collecting necessary vocabulary and materials; (2) Discussion – clarifying project objectives, setting specific tasks, and developing a project plan; (3) Practical Work – executing tasks, conducting investigations, and producing a creative product under teacher guidance; (4) Presentation – preparing, presenting, defending the project, and receiving peer and teacher feedback; and (5) Reflection – analysing outcomes, evaluating the process, and engaging in self-assessment.

The control group received traditional instruction in the same Natural Science curriculum without the integration of the project-based creativity development model. Lessons followed a teacher-centred approach, emphasising direct instruction, textbook exercises, and individual written or oral responses.

Classroom activities primarily involved reading and explaining text material, answering comprehension questions, completing workbook assignments, and participating in brief, teacher-led discussions. Creativity development was not explicitly addressed; instead, instruction focused on factual knowledge acquisition and concept reinforcement in accordance with the standard national curriculum.

Both groups completed the Figural Form of the Torrance Test of Creative Thinking as a pretest before the intervention and as a posttest after its completion. The quasi-experimental pretest-posttest control group design enabled a comparison of changes in creativity between students exposed to the project-based creativity model and those taught using traditional methods, while maintaining ecological validity within the natural classroom setting.

Data Analysis

To evaluate the impact of the pedagogical intervention on students' creativity development, statistical analyses were conducted on both pretest and posttest scores. As part of the preliminary analysis, the Shapiro–Wilk test was used to assess the normality of the data distribution. The results indicated significant deviations from normality; therefore, non-parametric statistical tests were employed to ensure the robustness and reliability of the findings under non-normal distribution conditions.

To examine differences between the experimental and control groups, the Mann–Whitney U test was applied to both pretest and posttest data. This test is appropriate for comparing two independent samples when the assumptions of parametric tests are violated, allowing an evaluation of whether one group tends to have higher or lower scores than the other.

To assess within-group changes over time, the Wilcoxon signed-rank test was used to compare pretest and posttest scores separately for the experimental and control groups. This test determines whether the distribution of scores differs significantly across two related samples.

In addition, Levene's test for homogeneity of variances was conducted to verify that the variance between the experimental and control groups was approximately equal. All statistical analyses were performed using R software, with the significance level set at $\alpha = 0.05$.

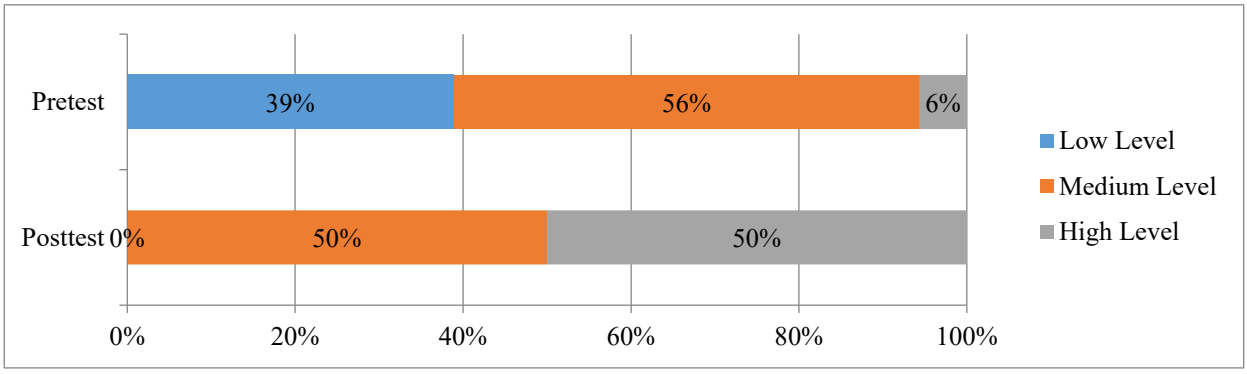
RESULTS AND DISCUSSION

The pretest and posttest results of the Figural Form of the Torrance Test of Creative Thinking, which includes four constructs—fluency, flexibility, originality, and elaboration—were evaluated in accordance with the Criteria for Assessing the Levels of Creativity for both the experimental and control groups.

Elementary students' levels of creativity in the experimental group are presented in Figure 3.

Figure 3.

Pretest-Posttest Results in the Experimental Group

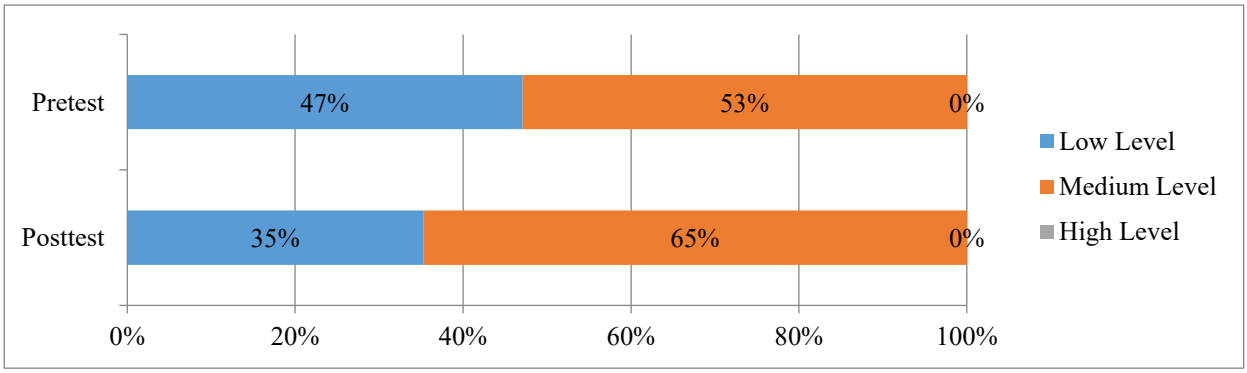


In the experimental group, the number of students with a low level of creativity decreased by 6%, dropping from 6% in the pretest to 0% in the posttest. Students at the medium level comprised 56% during the pretest and slightly declined to 50% in the posttest. Notably, the proportion of students with a high level of creativity increased by 44%, rising from 6% in the pretest to 50% in the posttest.

Elementary students' levels of creativity in the control group are presented in Figure 4.

Figure 4.

Pretest-Posttest Results in the Control Group



In the control group, the number of students with a low level of creativity decreased by 12%, from 47% in the pretest to 35% in the posttest. Students at the medium level comprised 65% during the pretest and declined to 53% in the posttest. Notably, there were no students with a high level of creativity in the control group during either the pretest or posttest.

To examine the impact of the pedagogical intervention on developing students' creativity, both parametric and non-parametric statistical methods were considered to ensure robustness under varying data distribution conditions.

The Shapiro–Wilk test was conducted to assess the normality of posttest scores in the experimental group. The results indicated a significant deviation from normality ($W = 0.85756$, $p = 0.01117$), suggesting that the data were not normally distributed. Therefore, non-parametric statistical tests were selected for further analyses.

To evaluate the assumption of homogeneity of variances between the experimental and control groups, Levene's test was performed. The result was not statistically significant, F(1, 33) = 1.0489, *p* = 0.3132, indicating that the variances between the two groups were approximately equal.

To compare the creativity scores of the experimental and control groups, the Mann–**Whitney U test** was applied to both pretest and posttest data.

Table 2.

The Mann–Whitney U test Results for Pretest and Posttest Scores

Measure	**Test Statistic (*W*)**	***p*-value**	**Result**
Pretest Scores	118.5	.241	No significant difference
Posttest Scores	21	< .001	Significant difference

The analysis revealed no statistically significant difference between the pretest scores of the two groups (*U* = 118.5, *p* = .241), indicating that both groups were comparable in their initial levels of creativity. In contrast, the posttest scores showed a significant difference (*U* = 21, *p* < .001), suggesting that the experimental group outperformed the control group following the intervention.

To evaluate changes within each group, the Wilcoxon signed-rank test was employed.

Table 3.

The Wilcoxon Rank Sum Test Results for Experimental and Control Groups

Group	**N**	**Test Statistic (Z)**	***p*-value**	**Effect Size (r)**	**Result**
Experimental Group	18	z = -3.45	< .001	r = 0.81	Significant improvement
Control Group	17	z = -1.01	0.315	r = 0.25	No significant change

The Wilcoxon signed-rank test shows a significant increase in creativity scores within the experimental group (Z = −3.45, *p* < .001, r = 0.84), indicating a large effect of the project-based instruction on participants' creativity. The control group showed no significant pre–post change (Z = −1.01, *p* = .315, r = 0.24), indicating that creativity levels remained stable under traditional instruction.

Overall, these findings demonstrate that the Model for Developing Creativity Using Project-Based Instruction Among Elementary School Students had a significant and positive impact on creativity development. Improvements were particularly evident in the domains assessed by the Torrance Test of Creative Thinking—fluency, flexibility, originality, and elaboration. The results collectively support the effectiveness of project-based instruction as a pedagogical approach for fostering creative competencies in early education.

DISCUSSION

The findings of this study reveal that the Model for Developing Creativity Using Project-Based Instruction Among Elementary School Students significantly enhanced students' creative thinking abilities. Although no statistically significant differences were observed between the experimental and control groups during the pretest stage, posttest results showed that students who participated in the model achieved notably higher creativity scores. This suggests that the model was effective in fostering creativity within the context of elementary education.

These results align with a growing body of research that supports project-based learning (PBL) as an effective pedagogical approach for enhancing creativity. PBL immerses students in authentic, inquiry-driven tasks that promote critical thinking, collaboration, and problem-solving—core components of creative development (Thomas, 2000). According to Bell (2010), PBL nurtures student autonomy and engagement by encouraging learners to construct their own understanding through meaningful, hands-on experiences. These experiences not only boost motivation but also cultivate divergent thinking, which plays a crucial role in generating original and innovative ideas.

The implementation of the model in this study is supported by the findings of Bas and Beyhan (2010), who observed improvements in both creative and academic performance among students engaged in project-based instruction. Likewise, Chu et al. (2011) found that collaborative, student-centred learning environments significantly improved students' creative thinking and inquiry skills, especially when learning tasks were grounded in real-world contexts. These environments foster deeper engagement by connecting theoretical concepts with practical application, allowing students to explore content more meaningfully and creatively.

The effectiveness of the Model for Developing Creativity can be attributed to several key components. First, it promoted student autonomy by allowing learners to make independent choices and explore personal interests within the framework of structured projects. This autonomy encouraged ownership of learning and intrinsic motivation. Second, the model incorporated open-ended tasks that supported multiple perspectives and solutions, which are critical for fostering originality and flexibility—core aspects of creativity (Craft, 2005). Third, the integration of interdisciplinary projects helped students make meaningful connections across subjects, applying their knowledge in diverse and innovative ways. Together, these features created a supportive learning environment that nurtured experimentation, risk-taking, and imaginative thought.

Additionally, the collaborative nature of the model likely played an important role in its success. Working in groups exposed students to a range of perspectives, encouraging them to consider alternative approaches and think more broadly. This kind of peer interaction often stimulates new ideas and challenges assumptions. Drawing from Vygotsky's (1978) sociocultural theory, which emphasises the importance of social interaction in cognitive development, collaboration in this context may have supported students in co-constructing knowledge and

building upon one another's ideas. As a result, the group dynamic likely acted as a catalyst for deeper thinking and enhanced creative expression.

Moreover, the cultural and educational context of Kazakhstan adds important depth to these findings. In environments where traditional, teacher-directed instruction still dominates classroom practice, the introduction of student-centred, creativity-focused models represents a meaningful shift towards progressive and skills-based education. This transition is particularly important in the early years, when foundational cognitive and creative abilities are being shaped. As Robinson (2011) argues, education systems should aim to cultivate—rather than constrain—students' creative potential.

While the results are encouraging, several limitations must be acknowledged. The quasi-experimental design, which was chosen due to practical constraints, did not include random assignment of participants. This limits the ability to draw definitive causal conclusions about the effectiveness of the intervention. Furthermore, the sample size was relatively small and restricted to a single elementary school in Kazakhstan, which reduces the generalisability of the findings to broader populations. Future research should aim to implement the model across a wider range of schools and regions, using larger and more diverse samples. This would allow for stronger validation of the results and a better understanding of the model's effectiveness in varied educational contexts.

Furthermore, it would be valuable to investigate the long-term impact of the model on students' creative development and academic achievement. Longitudinal studies could assess whether improvements in creativity are sustained over time and explore how these gains influence students' performance across other academic subjects. Additionally, examining teacher perceptions and the fidelity of model implementation could offer important insights into the practical factors that support or challenge its success in real classroom settings.

In conclusion, this study provides compelling evidence that the Model for Developing Creativity Using Project-Based Instruction Among Elementary School Students is both effective and practical for enhancing creativity in young learners. By fostering autonomy, encouraging open-ended exploration, and fostering collaborative learning, the model aligns with contemporary educational priorities that emphasise 21st-century skills. As creativity gains recognition as a fundamental competency in education and beyond, integrating such models into elementary curricula offers meaningful potential to cultivate innovative, flexible, and future-ready individuals.

Limitations and Future Research

Despite these promising outcomes, several limitations should be noted. The quasi-experimental design, based on pre-existing classroom groups, prevented random assignment and may have introduced selection bias. Moreover, the small sample size and focus on a single school limits the generalizability of the findings. To build a stronger evidence base, future research should apply the model across a variety of educational settings and student demographics, ideally using randomized controlled trials to enhance the validity and reliability of the results.

Nevertheless, this study offers valuable insights for educators and policymakers aiming to foster creativity in early education. In an era where creative thinking is recognised as a crucial 21st-century skill, the Model for Developing Creativity Using Project-Based Instruction Among Elementary School Students emerges as a practical and effective approach for cultivating creative potential from an early age.

This research was conducted with third-grade elementary students, focusing on the use of project-based learning to foster creativity. Future researchers are encouraged to explore additional variables, such as grade level differences and alternative instructional approaches, to further understand and enhance the development of creativity across diverse elementary school contexts.

CONCLUSION

This study examined the effectiveness of the Model for Developing Creativity Using Project-Based Instruction Among Elementary School Students and found clear evidence that the model significantly enhanced students' creative thinking abilities. Although no significant differences were observed at the pretest stage, posttest results showed that students who participated in the intervention outperformed their peers in the control group across multiple dimensions of creativity—namely fluency, flexibility, originality, and elaboration.

The findings reinforce the value of project-based learning as a transformative instructional approach for cultivating creativity in elementary education. By engaging students in meaningful, open-ended, and collaborative projects, the model created an environment that encouraged exploration, innovation, and critical thinking—skills that are essential for success in the 21st century. Moreover, the study contributes to the growing body of research supporting student-centred pedagogies within traditional education systems like Kazakhstan's. It offers a practical and scalable framework for embedding creativity development into early schooling, helping to align classroom practices with global competencies and the evolving demands of the future workforce.

Although the study has limitations concerning sample size and research design, its findings point towards promising directions for further investigation and practical application. Future studies should examine the long-term effects of the model, assess its adaptability across diverse educational settings, and identify strategies for effective implementation on a larger scale.

In conclusion, integrating structured, creativity-enhancing models like the one explored in this research holds considerable promise for creating more engaging, dynamic, and future-oriented learning environments. Empowering students to think creatively from an early age is not only beneficial for their individual growth but also essential for fostering innovation and progress within society.

REFERENCES

Abdulla, A. M., & Runco, M. A. (2018). Who funds the future? Federal funding support for 21st century learning research. *Business Creativity and the Creative Economy, 4*, 1-7. https://doi.org/10.18536/bcce.2018.10.8.1.01

Alabbasi, A. M. A., Paek, S. H., Kim, D., & Cramond, B. (2022). What do educators need to know about the Torrance Tests of Creative Thinking: A comprehensive review. *Frontiers in Psychology, 13*, 1000385. https://doi.org/10.3389/fpsyg.2022.1000385

Alsitova, A., Kuzembayeva, G., Zhazykova, M., & Maydangalieva, Z. (2024). Diagnostics of primary school teachers' creative potential in Kazakhstan. *Journal of Education and E-Learning Research, 11*(1), 166–173. https://doi.org/10.20448/jeelr.v11i1.5403

Andriyanova T., Berkalo V., Zhukupova N., & Polezhaeva A. (2018). *Natural Science Textbook for Grade 3.* Nazarbayev Intellectual Schools. https://emektep.kz/catalog/books/estestvoznanie_3_klass_kz/html5/

Bas, G., & Beyhan, O. (2010). Effects of multiple intelligences supported project-based learning on students' achievement levels and attitudes towards English lesson. *International Electronic Journal of Elementary Education*, *2*(3), 365–386.

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House*, *83*(2), 39–43. https://doi.org/10.1080/00098650903505415

Beisly, A., & Moffitt, A. (2024). Mixing it Up: Exploring Fizzical-Science through Play. *Theory and Practice in Child Development, 4*(1), 108–117. https://doi.org/10.46303.tpicd.2024.7

Botes, W., & Philip, A. (2025). Enhancing Pedagogical Development of Natural Science Teachers Through a Key Concepts in Science Project: A Social Constructivist Perspective. *Research in Social Sciences and Technology, 10*(1), 191-208. https://doi.org/10.46303/ressat.2025.11

Chimbunde, P., Moreeng, B., & Chawira, M. (2023). A Model for Developing Critical Thinking Skills in Teaching History: Lessons from Zimbabwe. *Journal of Culture and Values in Education, 6*(3), 194-212. https://doi.org/10.46303/jcve.2023.28

Chu, S. K. W., Tse, S. K., Loh, E. K. Y., & Chow, K. (2011). Collaborative inquiry project-based learning: Effects on reading ability and interests. *Library & Information Science Research*, *33*(3), 236–243. https://doi.org/10.1016/j.lisr.2010.09.008

Craft, A. (2005). *Creativity in schools: Tensions and dilemmas*. Routledge.

Dube, B., Mahlomaholo, S., Setlalentoa, W., & Tarman, B. (2023). Creating Sustainable Learning Environments in the Era of the Posthuman: Towards Borderless Curriculum. *Journal of Curriculum Studies Research*, *5*(1), i-x. https://doi.org/10.46303/jcsr.2023.1

Garaigordobil, M., Berrueco, L., & Celume, M. P. (2022). Developing Children's Creativity and Social-Emotional Competencies through Play: Summary of Twenty Years of Findings of the Evidence-Based Interventions "Game Program". *Journal of Intelligence, 10*(4), 77. https://doi.org/10.3390/jintelligence10040077

Gcabashe, N. (2024). Adopting Learner-Centred Pedagogy to Develop Business Studies Learners' Problem-Solving and Creative Thinking Skills in Selected Schools in South Africa. *Research in Social Sciences and Technology, 9*(2), 31–50. https://doi.org/10.46303/ressat.2024.24

Innovations in education: UNICEF presented its STEAM programmes in Turkestan. (2024). UNICEF Kazakhstan. https://www.unicef.org/kazakhstan/en/press-releases/innovations-education-unicef-presented-its-steam-programmes-turkestan

Jalinus, N., Syahril, S., & Nabawi, R. A. (2019). A Comparison of the Problem-solving Skills ofStudents in PjBL Versus CPjBL Model: An Experimental Study. *Journal of Technical Educationand Training, 11*(1), 36–43. https://doi.org/10.30880/jtet.2019.11.01.005

Kairgozhin, D., Kuzembayeva, G., Maydangalieva, Z., Bakhtiyarova, S., & Mugauina, G. (2023). Pedagogical Conditions for the Development of Cognitive Independence in Physical Education Lessons. *Journal of Education and E-Learning Research, 10*(3), 539–547. https://doi.org/10.20448/jeelr.v10i3.4952

Kang, S., & Park, H. S. (2024). Correlates of creativity and elementary school students' perceptions of individual and sociocultural factors. *European Journal of Psychology of Education, 39,* 4365–4391. https://doi.org/10.1007/s10212-024-00876-9

Kim, K. H. (2017). The torrance tests of creative thinking-figural or verbal: Which one should we use? *Creativity. Theories - Research - Applications, 4*(2), 302–321. https://doi.org/10.1515/ctra-2017-0015

Kurniawan, E. S., Mundilarto, M., & Istiyono, E. (2024). Improving student higher order thinking skills using Synectic-HOTS-oriented learning model. *International Journal of Evaluation and Research in Education*, 13(2), 1132–1140. https://doi.org/10.11591/ijere.v13i2.25002

Kuzembayeva, G. A., Maigeldiyeva, Zh. M., & Maydangalieva, Zh. A. (2022). The Perception of Medical Doctors on the Part of Hindu, Russian and Kazakh Linguoculture Bearers: Association Experiment. *RUDN Journal of Language Studies, Semiotics and Semantics, 13*(2), 567–580. https://doi.org/10.22363/2313-2299-2022-13-2-567-580

Latifa, D. K., Syahril, S., Jalinus, N., & Ridwan, R. (2022). Development of Mesin TeknologiTerapan Textbook Based on Project Tasks from Regional Potentials. *Jurnal Pendidikan Teknologi Kejuruan, 5*(2), 57–61. https://doi.org/10.24036/JPTK.V5I2.27523L

Lesmana, I., Mulianti, M., Primawati, P., & Kassymova, G. K. (2023). Implementation of project-based learning (PjBL) model to increasestudents' creativity and critical thinking skill in vocational creative product subjects. *Jurnal Pendidikan Teknologi Kejuruan, 6*(3), 202–215. https://doi.org/10.24036/jptk.v6i3.34023

Maharani, S.D., Susanti R., Indarti L.H. & Syamsi A. (2022). Integrating HOTS-Based Student Electronic Worksheet: Teaching Styles in Elementary School During the COVID-19

Pandemic. *Journal of Social Studies Education Research, 13* (3), 98 – 119. https://jsser.org/index.php/jsser/article/view/4016/578

Magolego, M., Mtshali, I., & Manto, R. (2024). A Quest to Nurture Creativity in Technology Classrooms: Are Physical Factors a Spanner in the Works?. *Research in Social Sciences and Technology*, *9*(3), 45–62. https://doi.org/10.46303/ressat.2024.46

Moloi, T., Matabane, M., Simuja, C., Seo, B.-I., & Tarman, B. (2023). Constructing a Social Justice Curriculum Policy in the 21st Century. *Research in Educational Policy and Management*, *5*(3), i-iv. https://doi.org/10.46303/repam.2023.36

Naylor, D., & Nyanjom, J. (2021). Educators' emotions involved in the transition to online teaching in higher education. *Higher Education Research & Development, 40*(6), 1236–1250. https://doi.org/10.1080/07294360.2020.1811645

Ndiung, S., & Menggo, S. (2024). Project-Based Learning in Fostering Creative Thinking and Mathematical Problem-Solving Skills: Evidence from Primary Education in Indonesia. *International Journal of Learning, Teaching and Educational Research, 23*(8), 289–308. https://doi.org/10.26803/ijlter.23.8.15

Omodan, B., & Addam, B. (2022). Analysis of Transformational Teaching as a Philosophical Foundation for Effective Classrooms. *Journal of Curriculum Studies Research, 4*(2), 15-29. https://doi.org/10.46303/jcsr.2022.9

On Approval of the Concept of Development of Preschool, Secondary, Technical and Vocational Education of the Republic of Kazakhstan for 2023-2029. (2023). Resolution of the Government of the Republic of Kazakhstan dated March 28, 2023 No. 249. https://adilet.zan.kz/rus/docs/P2300000249

On Education. (2007). The Law of the Republic of Kazakhstan dated 27 July, 2007 № 319-III. https://adilet.zan.kz/eng/docs/Z070000319_

On Approval of the Concept of Education Development of the Republic of Kazakhstan for 2022-2026. (2022). Resolution of the Government of the Republic of Kazakhstan dated November 24, 2022 No. 941. https://adilet.zan.kz/rus/docs/P2200000941

Öcal Dörterler, S., & Akay, D. (2022). The examination of the relationship between creative thinking tendencies and organizational creativities of preschool teachers. *Theory and Practice in Child Development, 2*(1), 64–75. https://doi.org/10.46303/tpicd.2022.10

Pradana, D. A., Mahfud, M., Hermawan, C., & Susanti, H. D. (2021). Nasionalism: Character Education Orientation in Learning Development. Budapest *International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences, 3*(4), 4026–4034. https://doi.org/10.33258/birci.v3i4.1501

Robinson, K. (2011). *Out of our minds: Learning to be creative* (2nd ed.). Capstone.

Rubtsova N. E., & Lenkov S. L. (2015). Psychological and pedagogical models of professional development: a cross-cultural analysis. *Man and Education, 1*(42), 123-128.

Rusilowati, A., Negoro, R. A., Aji, A. P., & Subali, B. (2023). Development of waves critical thinking test: Physics essay test for high school student. *European Journal of Educational Research, 12*(4), 1781–1794. https://doi.org/10.12973/eu-jer.12.4.1781

Schacter, J., Thum, Y. M., & Zifkin, D. (2006). How much does creative teaching enhance elementary school students' achievement? *The Journal of Creative Behavior, 40*(1), 47–72. https://doi.org/10.1002/j.2162-6057.2006.tb01266.x

Sternberg, R. J., Lubart, T. I., Kaufman, J. C., & Pretz, J. E. (2005). Creativity. In K. J. Holyoak & R. G. Morrison (Eds.), *The Cambridge handbook of thinking and reasoning* (pp. 351–369). Cambridge University Press.

Steyn, M., & Vanyoro, K. (2023). Debunking Critical Theory's 'Indoctrination' Charge: Provisional Notes on Critical Diversity Literacy Pedagogy. *Research in Educational Policy and Management, 5*(3), 128-144. https://doi.org/10.46303/repam.2023.27

Stratton, S. J. (2019). Quasi-Experimental Design (Pre-Test and Post-Test Studies) in Prehospital and Disaster Research. *Prehospital and disaster medicine*, *34*(6), 573–574. https://doi.org/10.1017/S1049023X19005053

Syahril, S., Nabawi, R. A., & Safitri, D. (2021). Students' perceptions of the project based on thepotential of their region: A Project-based learning implementation. *Journal of Technology and Science Education, 11*(2), 295–314. https://doi.org/10.3926/jotse.1153

Tanujaya, B., Prahmana, R. C. I., & Mumu, J. (2021). Mathematics instruction to promote mathematics higher-order thinking skills of students in Indonesia: Moving forward. *TEM Journal*, 10(4), 1945–1954. https://doi.org/10.18421/TEM104-60

Thomas, J. W. (2000). *A review of research on project-based learning*. The Autodesk Foundation.

Torrance, E. P. (1972). *Torrance test of creative thinking: Directions, manual and scoring guide, figural test booklet A.* Bensenville: Scholastic Testing Service.

Uyemov, A. I. (2013). *Logical foundations of modelling method*. Ripol Klassik.

Vink, I. C. D., Hornstra, L., & Kroesbergen, E. H. (2023). Latent profile analysis of working memory: Relations with creativity and academic achievement. *Creativity Research Journal,* 36(4), 587–603. https://doi.org/10.1080/10400419.2023.2183323

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Yermekbayeva, G., Kuzembayeva, G., Maydangalieva, Z., & Goncharenko, O. (2024). Implementing Research-Based Learning in Kazakhstan's Pre-Service Teacher Education. *Journal of Social Studies Education Research, 15*(4), 316–337. https://jsser.org/index.php/jsser/article/view/5822/704

Yıldız Taşdemir, C. (2021). Is Scientific Creativity Possible in Early Childhood?. *Theory and Practice in Child Development, 1*(1), 71–82. https://doi.org/10.46303/tpicd.2021.6