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IMPROVING THE INNOVATIVE PEDAGOGICAL SYSTEM FOR DEVELOPING THE CREATIVE THINKING OF PROSPECTIVE PRIMARY SCHOOL TEACHERS

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Abstract: This article examines the theoretical, methodological, and technological foundations for improving an innovative pedagogical system aimed at developing the creative thinking of prospective primary school teachers. The increasing complexity of educational processes, the rapid expansion of digital technologies, and the transition toward competency-based education require future primary school teachers to demonstrate intellectual flexibility, originality, critical reflection, pedagogical imagination, and the ability to design non-standard solutions to professional problems. However, traditional teacher education frequently remains focused on the reproduction of established knowledge and instructional patterns, which may restrict students' independence, initiative, and creative activity.

The study proposes an integrated innovative pedagogical system consisting of goal-oriented, conceptual, content-related, procedural-technological, diagnostic, and reflective components. The system combines problem-based learning, project-based learning, design thinking, interdisciplinary integration, digital educational technologies, collaborative inquiry, reflective practice, and creative pedagogical tasks. Particular attention is paid to the establishment of a creativity-supportive educational environment in which prospective teachers are encouraged to generate ideas, test pedagogical hypotheses, evaluate alternative solutions, and transform theoretical knowledge into original instructional products. The article also introduces criteria, indicators, and levels for assessing the development of creative thinking, including motivational-value, cognitive, operational-creative, communicative, and reflective-evaluative dimensions.

It is concluded that the development of creative thinking should not be treated as a separate methodological activity or an episodic component of teacher training. Instead, it must function as a systemic principle that influences curriculum content, teaching methods, assessment procedures, pedagogical interaction, and students' independent professional activity. The proposed system may contribute to preparing primary school teachers who are capable of responding creatively to changing educational needs and designing meaningful, inclusive, and innovative learning experiences.

Keywords: prospective primary school teachers, creative thinking, pedagogical innovation, professional competence, design thinking, problem-based learning, reflective practice, digital pedagogy.

Introduction

Contemporary education is undergoing fundamental changes caused by technological development, the globalization of knowledge, increasing cultural diversity, and the changing social expectations placed on schools. In this context, the professional role of a primary school teacher is no longer limited to transmitting predetermined knowledge. Teachers are increasingly expected to design interactive learning environments, identify the individual educational needs of pupils, integrate digital resources, promote independent inquiry, and respond effectively to unfamiliar pedagogical situations. These responsibilities require not only subject knowledge and methodological competence but also highly developed creative thinking.

Primary education represents a particularly important stage in learners' intellectual and personal development. At this stage, children develop fundamental learning habits, cognitive interests, communicative skills, attitudes toward knowledge, and initial strategies for solving problems. The quality of primary education therefore depends substantially on the teacher's capacity to organize learning creatively and encourage pupils to investigate, question, compare, imagine, and construct meaning. A teacher who relies exclusively on reproductive methods may find it difficult to cultivate creativity in pupils. Consequently, the creative development of children should begin with the creative professional preparation of their teachers.

Creative thinking in teacher education may be understood as an integrated intellectual and personal capacity that enables prospective teachers to identify educational problems, generate multiple ideas, establish unusual connections between concepts, evaluate alternative decisions, and produce pedagogically valuable solutions. It involves divergent and convergent thinking, imagination, intellectual flexibility, originality, problem sensitivity, critical analysis, reflection, and the willingness to take reasonable intellectual risks.

Despite its significance, the development of creative thinking within higher pedagogical education is frequently fragmented. Creative assignments may be used in individual lessons, but they are not always integrated into a comprehensive pedagogical system. Traditional lecture-based instruction, standardized tasks, excessive dependence on ready-made teaching materials, and assessment practices that reward a single correct answer may limit students' creative initiative. Furthermore, digital technologies are sometimes used merely to present information rather than to facilitate collaboration, inquiry, modeling, experimentation, and the creation of original educational products.

The research problem is therefore determined by the contradiction between the growing need for creative and innovative primary school teachers and the insufficiently systematic organization of creative-thinking development in teacher education programs.

The purpose of this study is to substantiate and describe an innovative pedagogical system for developing the creative thinking of prospective primary school teachers and to determine its structural components, pedagogical conditions, implementation mechanisms, and assessment criteria.

The following research objectives were established:

1. To clarify the pedagogical meaning and structural characteristics of creative thinking in the professional preparation of prospective primary school teachers.

2. To identify the limitations of conventional approaches to developing students' creativity.

3. To design an integrated innovative pedagogical system based on competency-oriented, activity-based, learner-centered, and reflective approaches.

4. To determine effective pedagogical technologies and conditions for implementing the proposed system.

5. To develop criteria, indicators, and levels for assessing prospective teachers' creative-thinking development.

Literature Review and Theoretical Framework

The scientific interpretation of creativity has developed through several complementary theoretical perspectives. Guilford's distinction between convergent and divergent thinking provided an important foundation for understanding creativity as the capacity to produce multiple relevant responses to an open-ended problem. Torrance subsequently emphasized such characteristics as fluency, flexibility, originality, and elaboration in the assessment of creative thinking. These dimensions remain relevant to pedagogical research because they make it possible to examine both the quantity and quality of ideas produced by learners.

Vygotsky's sociocultural theory provides another important foundation for understanding creativity. From this perspective, creative development does not occur independently of social interaction and cultural experience. Imagination transforms the elements of previous experience and produces new combinations. Thus, the richer and more meaningful a student's learning experience is, the greater the potential for creative transformation. Collaborative learning, guided inquiry, dialogue, and participation in authentic professional activities can therefore create favorable conditions for creativity.

Constructivist learning theory regards students as active participants who construct knowledge through experience, interaction, interpretation, and reflection. This approach is particularly relevant to creative teacher education because students must not merely memorize instructional methods; they must understand when, why, and how particular methods can be adapted to changing classroom conditions. From a constructivist perspective, a pedagogical problem may have several reasonable solutions, and the value of a solution depends on the context, the needs of pupils, the learning objectives, and the teacher's ability to justify the selected approach.

Amabile's componential theory indicates that creativity emerges through the interaction of domain-relevant knowledge, creativity-relevant processes, and task motivation. Applied to teacher education, this implies that creative thinking cannot develop without a strong foundation in pedagogy, psychology, teaching methodology, and subject knowledge. At the same time, knowledge alone does not guarantee creativity. Prospective teachers also require flexible thinking strategies, intrinsic professional motivation, autonomy, and a learning environment that supports exploration.

The systems approach makes it possible to consider creative-thinking development as a coordinated interaction between educational goals, curriculum content, pedagogical technologies, learning activities, assessment instruments, and institutional conditions. This is essential because

isolated creative tasks cannot ensure sustainable development if the broader educational system continues to promote passivity, imitation, and fear of error.

The following methodological approaches constitute the theoretical foundation of the proposed system:

- The **competency-based approach**, which focuses on students' capacity to apply knowledge in authentic professional situations;
- The **activity-based approach**, which develops creativity through purposeful problem solving and productive activity;
- The **learner-centered approach**, which recognizes individual differences in interests, experience, abilities, and creative potential;
- The **systemic approach**, which integrates all components of the educational process;
- The **reflective approach**, which enables students to analyze their decisions and improve their professional performance;
- The **interdisciplinary approach**, which supports the transfer and integration of knowledge from different academic fields;
- The **digital-pedagogical approach**, which uses technology for inquiry, collaboration, modeling, and the production of new educational content.

Research Methodology

The study adopts a conceptual and pedagogical-design methodology. It is based on the analysis, synthesis, comparison, classification, modeling, and generalization of theoretical perspectives and pedagogical practices related to creativity, teacher education, innovative learning, and professional competence.

The research logic consists of four interconnected stages. The first stage involves analyzing theoretical interpretations of creative thinking and identifying its profession-specific characteristics in primary teacher education. The second stage focuses on determining existing pedagogical contradictions and defining the structural components of the proposed system. The third stage involves selecting innovative pedagogical technologies and specifying the organizational conditions necessary for their implementation. The fourth stage concerns the development of assessment criteria and indicators that may be used in subsequent experimental research.

Creative-thinking development is examined not as an isolated psychological process but as a multidimensional professional formation. Accordingly, the proposed diagnostic framework covers motivation, knowledge, practical creativity, communication, and reflection.

The effectiveness of the system may be investigated experimentally through mixed methods. Quantitative methods may include pre- and post-intervention creative-thinking tasks, pedagogical problem-solving assessments, creativity scales, and expert evaluation of instructional products. Qualitative methods may include observation, reflective journals, interviews, portfolio analysis,

focus-group discussions, and analysis of students' lesson designs. Since no empirical dataset was supplied for the present article, the study does not report fabricated numerical outcomes; instead, it presents a theoretically grounded framework for future experimental validation.

Results

Structure of the Innovative Pedagogical System

The proposed innovative pedagogical system consists of six mutually connected components: goal-oriented, conceptual-methodological, content-related, procedural-technological, organizational-environmental, and diagnostic-reflective.

The **goal-oriented component** defines the general purpose of the system: to prepare prospective primary school teachers who can independently identify educational problems and design original, appropriate, and practically effective solutions. This general purpose is specified through several objectives, including the development of creative motivation, pedagogical imagination, problem sensitivity, idea fluency, intellectual flexibility, originality, collaborative creativity, digital creativity, and reflective self-regulation.

The **conceptual-methodological component** incorporates the systemic, competency-based, activity-based, learner-centered, constructivist, interdisciplinary, and reflective approaches. These approaches determine the principles governing the system. The main principles include scientific validity, professional relevance, openness to multiple solutions, dialogue, collaboration, individualization, productive activity, digital integration, reflexivity, and continuous development.

The **content-related component** integrates creative-thinking development into professional and methodological subjects. Creativity should not be confined to a separate course. It must be embedded in such disciplines as general pedagogy, child psychology, methods of teaching mathematics, language and literacy education, natural sciences, educational technologies, classroom management, and teaching practicum.

The content should include pedagogical problems, interdisciplinary assignments, classroom scenarios, project tasks, research activities, methodological experiments, and the design of original learning resources. Students should work with ambiguous situations in which information is incomplete and several solutions are possible. Such situations reflect the realities of professional teaching more accurately than routine tasks with predetermined answers.

The **procedural-technological component** determines how creative thinking is developed. It includes problem-based learning, project-based learning, case analysis, design thinking, inquiry-based learning, brainstorming, mind mapping, morphological analysis, role play, pedagogical simulation, microteaching, digital storytelling, gamification, collaborative lesson design, and reflective discussion.

The **organizational-environmental component** focuses on the development of a psychologically safe and intellectually stimulating educational environment. Students must feel able to suggest unusual ideas without fear of humiliation or premature negative evaluation. Teachers should encourage questions, respect alternative perspectives, provide constructive feedback, and recognize the learning value of well-analyzed mistakes.

The **diagnostic-reflective component** ensures the continuous assessment and improvement of creative development. Assessment is organized through portfolios, self-assessment, peer review, expert evaluation, observation, reflective journals, creative tasks, project presentations, and analysis of pedagogical products.

Stages of System Implementation

The proposed system may be implemented through four progressive stages.

At the **motivational-diagnostic stage**, students' initial attitudes, professional interests, creative dispositions, and problem-solving tendencies are examined. The teacher introduces the professional significance of creativity and demonstrates how innovative thinking influences pupils' engagement and achievement. Diagnostic tasks are used to identify students' existing strengths and difficulties.

At the **cognitive-orientational stage**, students acquire theoretical knowledge concerning creativity, innovative pedagogy, child development, instructional design, and methods of creative problem solving. However, theoretical content is delivered through questions, cases, comparative analysis, and problem-centered lectures rather than through passive transmission alone.

At the **productive-transformational stage**, students apply their knowledge in creative professional tasks. They design non-standard lessons, develop interdisciplinary projects, create digital resources, adapt teaching methods to diverse learners, and solve simulated classroom problems. Collaborative projects allow participants to combine different perspectives and negotiate shared solutions.

At the **reflective-innovative stage**, students critically evaluate the novelty, relevance, feasibility, inclusiveness, and educational value of their products. They revise their decisions based on evidence and feedback, construct individual professional-development plans, and develop a personal style of pedagogical creativity.

Innovative Pedagogical Technologies

Problem-based learning occupies a central position in the system. Students are presented with professional situations that cannot be resolved through the mechanical reproduction of theoretical rules. For example, they may be asked to redesign a mathematics lesson for pupils with different readiness levels, develop a literacy activity for a multilingual classroom, or maintain pupils' engagement when digital resources are unavailable. Such tasks encourage analysis, hypothesis generation, comparison, decision-making, and justification.

Project-based learning connects creative thinking with tangible educational products. Prospective teachers may develop interdisciplinary lesson units, educational games, digital stories, formative-assessment tools, inclusive learning materials, or community-based projects. Project work strengthens planning, collaboration, responsibility, and the ability to transform ideas into applicable pedagogical solutions.

Design thinking provides a human-centered framework for pedagogical innovation. In teacher education, its stages may be adapted as follows: understanding pupils' needs, defining the educational problem, generating alternative ideas, developing a prototype, testing the solution, and

improving it through feedback. This process helps prospective teachers avoid designing lessons solely from the instructor's perspective.

Digital technologies should be used as instruments of creative production rather than as channels for presenting ready-made information. Students may collaboratively create interactive learning materials, multimedia narratives, virtual exhibitions, digital portfolios, concept maps, formative quizzes, simulations, and differentiated instructional resources. Artificial intelligence tools may also support idea generation and material adaptation, provided that students critically evaluate generated content, verify information, respect academic integrity, and retain responsibility for pedagogical decisions.

Microteaching and pedagogical simulation create opportunities for testing creative ideas in a controlled environment. Students conduct short lessons, receive structured feedback, analyze video recordings, identify limitations, and redesign their instructional strategies. Repeated cycles of design, implementation, feedback, and revision transform creativity from spontaneous inspiration into a disciplined professional practice.

Pedagogical Conditions

The effectiveness of the proposed system depends on several interrelated pedagogical conditions.

First, creative-thinking objectives must be explicitly represented in the teacher education curriculum. If creativity remains an implicit expectation, its development may be inconsistent and difficult to assess.

Second, students must regularly encounter open-ended professional tasks. A learning environment dominated by reproductive exercises cannot adequately develop originality and flexibility.

Third, theoretical learning should be integrated with teaching practice. Students require opportunities to observe classroom situations, communicate with pupils, test instructional ideas, and evaluate the consequences of pedagogical decisions.

Fourth, assessment criteria should value the quality of reasoning, originality, applicability, ethical appropriateness, and reflective improvement. If assessment rewards only conformity with a model answer, students may avoid intellectual risk and innovation.

Fifth, university teachers must demonstrate creative pedagogical behavior themselves. Their use of dialogue, flexible planning, interdisciplinary connections, digital resources, and reflective feedback serves as a professional model for students.

Sixth, the educational environment must support psychological safety. Creativity requires the freedom to explore incomplete ideas, make mistakes, receive feedback, and attempt improved solutions.

Assessment Criteria and Indicators

The development of creative thinking may be assessed through the following dimensions:

Criterion	Main indicators
Motivational-value	Interest in pedagogical innovation; intrinsic motivation; readiness to take initiative; openness to new ideas
Cognitive	Knowledge of creativity theories; understanding of innovative methods; ability to recognize pedagogical contradictions
Operational-creative	Fluency, flexibility, originality, elaboration, problem solving, and creation of original pedagogical products
Communicative-collaborative	Ability to exchange ideas, listen to alternatives, negotiate decisions, and participate in collective creativity
Digital-innovative	Purposeful use of digital tools; creation of interactive resources; critical and ethical use of artificial intelligence
Reflective-evaluative	Self-analysis, justification of decisions, response to feedback, identification of limitations, and improvement of solutions

Three general levels may be distinguished. At the **reproductive level**, students depend on established examples, demonstrate limited initiative, and experience difficulty in generating alternative solutions. At the **productive level**, they can adapt familiar methods, generate several relevant ideas, and independently solve moderately complex pedagogical problems. At the **creative-innovative level**, they consistently identify hidden problems, integrate knowledge from different domains, generate original and feasible solutions, critically evaluate results, and improve their products through reflection.

Discussion

The proposed system demonstrates that creative thinking in teacher education has both general psychological and profession-specific characteristics. Fluency, flexibility, and originality are important, but pedagogical creativity cannot be evaluated solely through novelty. An innovative teaching idea must also be developmentally appropriate, ethically responsible, inclusive, aligned with learning objectives, and feasible within a specific classroom context. Therefore, professional pedagogical creativity requires a balance between imagination and evidence-based judgment.

A significant feature of the system is the integration of divergent and convergent thinking. During the divergent stage, students generate multiple possibilities without premature evaluation. During the convergent stage, they compare the alternatives, consider pupils' needs, examine available resources, and select the most appropriate solution. Excessive emphasis on divergence may produce original but impractical ideas, whereas excessive emphasis on convergence may lead to conventional and predictable decisions. Effective teacher education should develop both processes.

The teacher educator's role also changes within this system. The teacher becomes a designer of problem situations, facilitator of dialogue, consultant, evaluator, and reflective partner. This does

not reduce the importance of disciplinary expertise. On the contrary, sophisticated facilitation requires deep knowledge of content, pedagogy, assessment, child development, and classroom practice.

The proposed approach also emphasizes the relationship between individual and collaborative creativity. Individual creativity allows students to develop autonomy and a personal pedagogical position. Collaborative creativity exposes them to diverse perspectives and teaches them to explain, defend, modify, and integrate ideas. Since professional teaching frequently involves cooperation with colleagues, parents, specialists, and the wider community, collaborative creative competence is essential.

The integration of artificial intelligence and other digital technologies creates new opportunities as well as new responsibilities. Such tools may support brainstorming, differentiated instruction, visualization, language adaptation, and the rapid prototyping of educational resources. Nevertheless, uncritical reliance on automatically generated content may reduce students' independent thinking. Digital tools should therefore extend human creativity rather than replace intellectual effort. Prospective teachers must be able to examine the accuracy, bias, ethical acceptability, cultural relevance, and pedagogical value of digital content.

The implementation of the system may face several limitations, including insufficient technological infrastructure, unequal levels of digital competence, large student groups, limited teaching-practice opportunities, rigid assessment requirements, and resistance to changing traditional instructional roles. These barriers suggest that innovation should be introduced through coordinated curriculum reform, professional development for university teachers, improved institutional support, and systematic monitoring.

Practical Recommendations

To strengthen the creative preparation of prospective primary school teachers, higher education institutions should revise curricula to ensure that creative-thinking outcomes are represented across professional subjects. Each methodological course should contain open-ended cases, design tasks, reflective activities, and product-oriented projects.

Students should maintain a creative professional portfolio containing lesson plans, digital materials, project products, reflective reports, peer feedback, and revised versions of their work. The portfolio should demonstrate not only final achievements but also the process through which ideas were developed and improved.

Teaching practicum should include creativity-focused assignments. Prospective teachers may be required to identify a real classroom problem, collect relevant information, propose several solutions, test one solution, and analyze its effectiveness. Cooperation between universities and primary schools is especially important for connecting innovation with authentic educational needs.

Assessment rubrics should include originality, flexibility, professional relevance, inclusiveness, feasibility, evidence-based justification, and reflective improvement. Peer assessment and self-assessment should complement the evaluation provided by university teachers.

Professional-development programs for teacher educators should address design thinking, problem-based learning, digital pedagogy, interdisciplinary teaching, formative assessment, and methods for facilitating creative dialogue.

Conclusion

The development of creative thinking among prospective primary school teachers is a strategic requirement of contemporary teacher education. Primary school teachers work in dynamic environments where learners' abilities, interests, experiences, and educational needs differ considerably. Standardized instructional responses are therefore insufficient for addressing the full complexity of professional practice.

The innovative pedagogical system proposed in this article integrates goal-oriented, conceptual, content-related, technological, environmental, diagnostic, and reflective components. Its effectiveness depends on the systematic use of problem-based learning, project work, design thinking, pedagogical simulation, interdisciplinary integration, digital creativity, collaborative inquiry, and reflective practice.

Creative-thinking development should become a continuous principle of professional preparation rather than an occasional addition to conventional instruction. Prospective teachers should be given regular opportunities to identify problems, generate alternatives, create educational products, test their ideas, analyze feedback, and improve their solutions.

The proposed system provides a theoretical and methodological foundation for future empirical research. Subsequent studies may experimentally examine its effectiveness in different higher education contexts, compare the impact of particular pedagogical technologies, and investigate the long-term relationship between teachers' creative competence and pupils' learning outcomes. The systematic implementation of this model can contribute to preparing reflective, innovative, and socially responsible primary school teachers capable of designing high-quality education for a rapidly changing world.

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