INNOVATIVE APPROACHES TO TEACHING THE "PROBLEM-SOLVING METHODOLOGY" MODULE IN FUTURE TEACHER TRAINING

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Abstract

This article examines innovative approaches to teaching the "problem-solving methodology" module within the "Primary Education" degree program. An analysis of domestic and international research in the fields of teaching methodology, pedagogical technologies, and digital resources is conducted, identifying current trends and diffculties in the professional training of future teachers. Based on experimental research, a model for implementing problem-based, project-based, and case-based learning, integrated with digital educational resources, is proposed. The experimental results demonstrated an increase in students' methodological preparedness, the development of their analytical and critical thinking skills, as well as competencies in designing learning situations aimed at teaching primary school pupils problem-solving. The effictiveness of combining interactive methods with digital technologies in the educational process is highlighted.

Keywords

innovative approaches, teaching methodology, problem-solving, primary education, digital educational technologies, competency-based approach.

INTRODUCTION. The current stage in the development of higher pedagogical education is characterized by increasingly stringent demands regarding the quality of professional training for future primary education teachers. These educators must be capable of effectively implementing new-generation educational standards. Within the context of digital transformation, curriculum renewal, and the shift towards a competency-based approach, the improvement of students' methodological training, particularly in teaching primary school pupils to solve both academic and practice-oriented problems, is of paramount importance.

The "problem-solving methodology" module holds a pivotal position within the professional training structure for future primary school teachers. It is this module that is instrumental in developing students' methodological, analytical, and reflective competencies, which are essential for organizing developmental learning, fostering pupils' logical and critical thinking, and cultivating their cognitive autonomy. However, an analysis of current teaching practices for this module reveals that traditional instructional approaches are increasingly misaligned with contemporary educational challenges. These challenges include the need to intensify student learning activity, personalize instruction, and seamlessly integrate digital educational resources.

Consequently, the issue of implementing innovative approaches to teaching the "problem-solving methodology" module becomes critically relevant. These approaches should focus on utilizing interactive pedagogical technologies, problem-based and project-based learning, case-study methods, as well as digital and blended learning formats. The application of such approaches serves not only to elevate the level of methodological preparedness among future teachers but also to instill in them robust skills for designing learning situations aimed at developing universal learning competencies in primary school pupils [2].

Therefore, research into innovative approaches for teaching the "problem-solving methodology" module within "Primary Education" programs is both timely and necessary. This urgency is driven by modern trends in pedagogical education and the practical needs of the general education system.

LITERATURE REVIEW. The issue of enhancing the methodological training of future primary education teachers through innovative approaches is a subject of active inquiry in contemporary pedagogical science. Scholarly works by domestic and international researchers examine the theoretical and methodological foundations of teacher training, questions regarding the formation of methodological competencies, and the specificities of integrating innovative educational technologies in higher education [3].

Research focused on the theory and methodology of teaching mathematics in primary school places particular emphasis on the role of problem-solving as a means of developing pupils' logical thinking, cognitive activity, and universal learning actions. Scholars stress that teaching problem-solving must be systematic, sequential, and activity-based, ensuring the formation of not only subject knowledge but also meta-subject skills in schoolchildren. In this regard, the methodological training of the future teacher is viewed as a key factor determining the quality of problem-solving instruction in primary education [4].

A significant body of scientific research is dedicated to the competency-based approach in professional pedagogical education. These studies substantiate the necessity of shifting from reproductive forms of instruction to active and interactive methods aimed at developing students' professional, methodological, and reflective competencies. Authors note that traditional lecture-practice formats of instruction do not fully ensure future teachers' readiness to design learning situations and employ varied methodologies for teaching problem-solving [5].

In the context of innovative approaches to higher education, the scientific literature extensively presents research exploring the potential of problem-based, project-based, and case-based learning, as well as technologies for developing critical thinking. It is noted that these approaches foster the activation of students' learning and cognitive activity, the development of analytical skills, and the formation of professional thinking [6]. Several studies highlight the efficacy of simulating pedagogical situations and analyzing methodological cases when training future teachers in problem-solving methodology.

A distinct line of inquiry concerns the use of digital educational technologies and blended learning formats in higher pedagogical education systems. Authors point to the potential of electronic educational resources, interactive platforms, virtual simulators, and online environments for developing students' methodological skills [7]. Concurrently, it is emphasized that the implementation of digital technologies requires a scientifically-grounded methodology and integration with traditional forms of instruction.

In the works of international researchers, issues of training future primary school teachers are examined within the frameworks of competency-based, constructivist, and practice-oriented approaches. Particular attention is paid to developing students' ability to design a learning process focused on fostering pupils' thinking and their readiness to solve non-standard academic problems [8].

International studies in the field of problem-solving methodology emphasize the pivotal role of problems as a means of developing mathematical thinking, metacognitive skills, and reasoning abilities in primary school pupils. Authors view teaching problem-solving as a complex cognitive process encompassing the analysis of conditions, model construction, hypothesis generation, and reflection on solution strategies [9]. Consequently, the preparation of future teachers is oriented towards mastering problem-solving teaching strategies based on pupils' inquiry and problem-based activities.

Considerable attention in international literature is devoted to the use of active and interactive teaching methods in higher pedagogical education systems. Research by J.S.Bruner, J.Piaget, G.Polya, J.Hattie, M.Fullan, D.A.Schön,

A.Schleicher, R.E.Mayer, D.A.Kolb, and D.H.Jonassen substantiates the effectiveness of problem-oriented, inquiry-based, and project-based learning using specific examples for forming future teachers' professional and methodological competencies [10]. It is emphasized that these approaches promote the development of analytical thinking, independence, and the ability to make pedagogical decisions under conditions of uncertainty.

Several international works examine the integration of digital technologies in training future teachers in problem-solving methodology. They explore the possibilities of using digital learning environments, online platforms, interactive simulations, and educational applications for modeling learning situations and analyzing problem-solving strategies. Authors note that digital tools expand opportunities for differentiating instruction and contribute to the formation of students' digital-pedagogical competency [11].

Furthermore, international researchers emphasize the necessity of reflective teacher training, which involves analyzing one's own pedagogical experience, discussing alternative methodological solutions, and evaluating the effectiveness of employed approaches. In this context, a modular structure for educational programs is seen as an effective mechanism for integrating theoretical preparation, practical activity, and reflection [12].

Thus, an analysis of international research indicates a high degree of scholarly attention to the problem of implementing innovative approaches in the professional training of future teachers. However, it also reveals the need to adapt and critically examine international experience, taking into account national educational traditions and the specificities of primary teacher training.

In the papers of prominent domestic researchers such as Yu.K.Babansky, L.V.Zankov, V.V.Davydov, D.B.Elkonin, and I.Ya.Lerner, significant attention is paid to the methodological training of future primary education teachers, including the challenge of teaching primary school pupils to solve academic problems. These authors emphasize that problem-solving is viewed not only as a means of acquiring mathematical knowledge but also as a vital tool for developing thinking, fostering cognitive activity, and forming universal learning actions in pupils [13].

A number of studies are dedicated to the theoretical foundations of problem-solving methodology, which substantiate the sequential nature of developing pupils' skills in analyzing problem conditions, selecting rational solution methods, and justifying results. These works highlight the necessity of a systemic approach and consideration of the age-related and psychological characteristics of primary school children, which directly informs the requirements for the professional training of future teachers [14].

Domestic scholars, including M.N.Skatkin, E.S.Polat, A.V.Khutorskoy, G.K.Selevko, M.V.Klarin, and L.S.Vygotsky, also address the implementation of competency-based and activity-based approaches in higher pedagogical education. Their scientific works stress that the formation of students' methodological competencies should occur through active learning forms, the modeling of pedagogical situations, the analysis of pupils' typical errors, and the development of original methodological solutions [15]. In this context, the "problem-solving methodology" module is considered an effective platform for integrating theory and practice.

A significant portion of domestic research is occupied by the analysis of innovative pedagogical technologies applied in preparing future primary school teachers. The potential of problem-based and project-based learning, the case method, game and interactive technologies, as well as elements of student research activity are examined. Authors note that the use of these technologies contributes to the formation of professional thinking, reflective skills, and readiness for innovative pedagogical practice.

Moreover, the works of domestic authors underscore the increasing role of digital educational resources in the methodological preparation of future educators. They investigate questions related to integrating electronic educational and methodological complexes, interactive platforms, and digital didactic materials into the process of learning problem-solving methodology. Simultaneously, they point to the need for a methodologically sound and purposeful use of digital technologies within professional modules.

Overall, the analysis of domestic literature allows for the conclusion that a solid theoretical and methodological foundation exists for researching this problem. However, it also reveals insufficient development in questions concerning the comprehensive implementation of innovative approaches to teaching the "problem-solving methodology" module, in line with contemporary requirements for the training of future primary education teachers.

In the works of Uzbek researchers, significant attention is devoted to modernizing the system of pedagogical education, improving the quality of training for future primary school teachers, and implementing innovative pedagogical technologies in the educational process. Scholarly investigations emphasize the need to update the content and methodology of teaching professional disciplines, considering national educational priorities and international trends in educational development.

A number of studies address problems in the methodology of teaching mathematics in primary school, including the formation of pupils' skills in solving

academic problems. Authors view problem-solving as an important component in developing logical thinking, cognitive activity, and independence in primary school pupils, highlighting the teacher's role in the purposeful cultivation of these qualities. In this connection, the methodological training of future primary school teachers is considered a key condition for effective problem-solving instruction.

Research by Uzbek scholars pays special attention to implementing competency-based and activity-based approaches in higher pedagogical education. It is noted that the professional preparation of future educators should be oriented towards forming practice-oriented methodological skills, the ability to analyze learning situations, select appropriate teaching methods and techniques, and engage in pedagogical reflection. The modular principle of constructing educational programs is viewed as an effective mechanism for realizing these goals.

A significant place in the works of Uzbek researchers is occupied by the analysis of using modern educational and digital technologies in preparing future teachers. The works of R.Kh. Zhuraev, J.Khasanboev, Kh.Turaev, A.Musurmanova, and Sh.A.Abdullaeva elucidate contemporary trends in pedagogical science and practice, focusing on innovative teaching approaches [16].

For instance, studies by N.SSaidakhmedov, U.K.Talipov, S.A.Usmanbaev, and R.Zh.Ishmukhamedov substantiate the necessity of using interactive and technology-oriented teaching methods aimed at forming students' professional and methodological competencies. They explore the possibilities of applying electronic textbooks, multimedia tools, interactive platforms, and distance learning formats in the process of mastering methodological disciplines. Authors emphasize that integrating digital resources helps increase student motivation, activate their learning activities, and form professional readiness to use innovations in school practice [17].

However, analysis of Uzbek research indicates that, despite a considerable body of theoretical and practical material, questions regarding the systematic, comprehensive implementation of innovative approaches in teaching the "problem-solving methodology" module within the "Primary Education" track remain insufficiently addressed. This necessitates further research aimed at the scientifically-grounded updating of the content and teaching technologies within this module, considering national experience and contemporary educational requirements.

The analysis of scientific literature demonstrates that, despite a significant number of studies dedicated to innovative learning technologies and problem-solving methodology, questions concerning the integrated application of innovative approaches specifically within the framework of the "problem-solving

methodology" module in "Primary Education" programs remain understudied. In particular, the problem of the methodological support for this module—considering modern educational standards, the digitalization of education, and requirements for the professional competency of the future teacher—requires further investigation.

Thus, the literature review confirms the relevance of the chosen topic and the necessity for further scientific reflection and experimental validation of innovative approaches to teaching the "problem-solving methodology" module within the system of training future primary education teachers.

METHODS. Theoretical methods included analysis, synthesis, comparison, classification, systematization, and generalization. Empirical data were collected through testing and survey instruments.

RESULTS AND DISCUSSION. The study yielded results that substantiate the feasibility and effectiveness of implementing innovative approaches in teaching the "problem-solving methodology" module within the "Primary Education" program. The implementation of the updated instructional model was centered on integrating problem-based, project-based, and case-oriented learning, alongside the utilization of digital educational resources in the professional training of students.

Analysis of the learning outcomes indicated positive trends in the development of methodological competencies among future primary education teachers. Students in the experimental group demonstrated a higher level of readiness to design learning situations aimed at teaching problem-solving to primary school pupils compared to students in the control group, who were instructed using a traditional model. Specifically, enhancements were observed in the students' ability to analyze the structure of an academic task, select appropriate methods and techniques for its resolution, and provide well-reasoned justifications for pedagogical decisions.

Findings from diagnostic tasks and the analysis of student-generated learning products indicate an increase in their levels of cognitive engagement and autonomy. The use of problem-based and case-based methods contributed to the development of students' critical thinking skills, pedagogical reflection, and ability to work with varied problem-solving approaches. The incorporation of project-based assignments enabled students to gain practical experience in developing methodological materials and instructional scenarios focused on fostering universal learning actions in primary school pupils.

Particular emphasis during the investigation was placed on the application of digital educational technologies. The results obtained demonstrated that integrating electronic learning resources, interactive platforms, and multimedia

tools contributed to heightened student motivation in engaging with the module and to the expansion of their methodological repertoire. Concurrently, it was determined that the greatest pedagogical impact is achieved through a combined use of digital technologies with traditional and interactive face-to-face instructional formats, thereby validating the efficacy of blended learning models.

A discussion of the findings allows for their contextualization within the conclusions drawn by both domestic and international researchers, who highlight the effectiveness of activity-based, problem-based, and competency-oriented approaches in the professional preparation of future educators. The data align with the principles of developmental learning theory and corroborate the results of studies dedicated to the use of innovative and digital technologies in teacher education.

Simultaneously, the study's results identified several challenges, including the need to enhance the digital-pedagogical competence of both students and faculty, as well as the necessity for developing methodologically sound digital educational resources specifically tailored for teaching problem-solving in primary education. These considerations delineate promising avenues for further inquiry and practical development in this domain.

Thus, the results and subsequent discussion confirm that the implementation of innovative approaches to teaching the "problem-solving methodology" module contributes to improving the quality of methodological training for future primary education teachers and aligns with contemporary imperatives for advancing pedagogical education.

CONCLUSION. The conducted research affirms the relevance and necessity of implementing innovative approaches in teaching the "problem-solving methodology" module within the "Primary Education" program.

The theoretical analysis of domestic and international literature demonstrated that contemporary pedagogical practice requires the active application of problem-based, project-based, and case-oriented learning, coupled with the integration of digital educational technologies for cultivating the professional and methodological competencies of prospective teachers.

Experimental data revealed that the application of innovative approaches contributes to elevating the level of students' methodological preparedness, fostering analytical and critical thinking, and developing skills in designing learning situations oriented toward problem-solving by primary school pupils. The combination of interactive learning formats with digital educational resources proved especially effective, creating conditions for the active and independent acquisition of professional skills.

The study's findings support the conclusion that innovative approaches to teaching the "problem-solving methodology" module facilitate the development of future educators' readiness for professional practice that meets the current demands of primary education. At the same time, prospective directions for further research have been identified, encompassing the development of methodologically grounded digital educational resources, the enhancement of digital competence among students and instructors, and the refinement of organizational forms and methods within the educational process.

Consequently, the theoretical and practical outcomes of this research substantiate the need for systematically integrating innovative methods into the training of future primary education teachers. These insights can be leveraged in the modernization of educational curricula, the strategic planning of methodological initiatives, and the implementation of a competency-based framework in pedagogical education.

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