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The Role Of Interactive Educational Technologies In Developing Professional Creativity Of Future Teachers

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Annotation. This article examines the role of interactive educational technologies in developing the professional creativity of future teachers. The study is based on pedagogical, psychological and methodological approaches that interpret creativity as a professionally significant quality of a teacher. The article analyzes how interactive methods such as problem-based learning, project work, debates, case studies, role-playing, collaborative tasks and digital platforms influence the formation of creative thinking, pedagogical initiative and reflective competence. Special attention is paid to the connection between interactive learning and the development of flexible pedagogical thinking, communication culture and innovative professional behavior. The article concludes that interactive educational technologies are an important factor in preparing future teachers for modern educational challenges.

Keywords: professional creativity, future teachers, interactive learning, educational technologies, pedagogical innovation, creative competence, teacher training.

Introduction. Modern education requires a teacher who is not only a transmitter of knowledge but also a designer of learning environments, a facilitator of students' independent thinking and an initiator of creative pedagogical solutions. In the conditions of rapid social, technological and cultural change, the professional activity of teachers is becoming increasingly complex. Therefore, the development of professional creativity among future teachers is one of the most important tasks of higher pedagogical education.

Professional creativity of a future teacher can be understood as the ability to find original, effective and pedagogically justified solutions in teaching, upbringing, communication and assessment. It includes creative thinking, methodological flexibility, emotional openness, readiness for innovation and the ability to adapt educational content to the needs of learners. According to Vygotsky's sociocultural approach, learning develops through interaction, cooperation and the transformation of external social experience into internal mental processes [1,86]. This idea is especially important for teacher education because pedagogical creativity is formed not in isolation, but in active educational communication.

Interactive educational technologies create favorable conditions for this process. They involve students in dialogue, cooperation, problem solving, reflection and creative activity. Unlike traditional reproductive teaching, interactive learning encourages future teachers to express their own ideas, defend arguments, analyze pedagogical situations and design new educational products. Therefore, the use of interactive technologies in higher pedagogical education is not simply a methodological choice; it is a strategic condition for preparing creative and competitive teachers.

Theoretical Foundations of Professional Creativity

Creativity in pedagogical activity is closely connected with the teacher's ability to act independently and responsibly in non-standard situations. Teresa Amabile emphasizes that creativity depends not only on individual abilities but also on the social environment, motivation and organizational conditions [2,45]. This means that future teachers should be placed in an educational environment where initiative, experimentation and independent thinking are encouraged.

Professional creativity differs from general creativity because it is directed toward solving practical pedagogical problems. A creative teacher should be able to design interesting lessons, motivate students, use

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non-traditional methods, adapt materials to different levels of learners and create a psychologically safe atmosphere in the classroom. In this sense, creativity becomes an integral part of pedagogical competence.

Kampylis, Berki and Saariluoma note that prospective teachers' understanding of creativity strongly influences their ability to support students' creative potential [3,15]. If future teachers perceive creativity only as artistic talent, they may fail to apply creative methods in everyday teaching. Therefore, teacher education programs should help students understand creativity as a universal professional quality that can be developed through systematic practice.

Essence of Interactive Educational Technologies

Interactive educational technologies are teaching methods and tools based on active cooperation between teacher and students, as well as among students themselves. Their main feature is the transformation of learners from passive recipients of information into active participants of the educational process. Bonwell and Eison define active learning as a process in which students do meaningful learning activities and think about what they are doing [4,19]. This definition shows that interactivity includes not only external activity but also internal reflection.

The main interactive technologies used in teacher education include problem-based learning, project-based learning, case-study analysis, brainstorming, debates, role-playing, cooperative learning, simulation, peer teaching, portfolio work and digital collaborative platforms. These methods create situations in which future teachers must analyze, compare, choose, create and justify their pedagogical decisions.

Interactive learning is especially useful in pedagogical higher education because teaching itself is an interactive profession. A future teacher who learns through dialogue, cooperation and reflection becomes more prepared to organize similar processes in school practice. In other words, interactive technologies serve both as a means of learning and as a model of future professional activity.

Influence of Interactive Technologies on Creative Thinking

One of the most important effects of interactive technologies is the development of creative thinking. In traditional lectures, students often memorize ready-made information. In interactive learning, they face open-ended problems that require several possible solutions. This stimulates divergent thinking, imagination and flexibility.

For example, in problem-based learning, future teachers analyze a pedagogical problem such as low student motivation, classroom conflict or difficulties in inclusive education. They are required to propose different solutions, evaluate their advantages and risks, and select the most appropriate strategy. Such tasks develop the ability to think beyond standard schemes.

Project-based learning also has strong creative potential. When students design educational projects, lesson scenarios, extracurricular activities or digital learning materials, they combine theoretical knowledge with practical imagination. Prince's review of active learning shows that active, collaborative and problem-based methods have positive effects on student engagement and learning outcomes [5,223]. For future teachers, this engagement is directly connected with the development of professional initiative.

Brainstorming and debate are also important tools for developing creativity. Brainstorming helps students generate many ideas without fear of immediate criticism, while debate teaches them to defend their position with arguments. However, these methods should be organized carefully. The teacher educator must create an atmosphere where different opinions are respected and mistakes are treated as a natural part of learning.

Development of Communicative and Reflective Competence

Professional creativity is impossible without communication and reflection. A teacher's creative idea becomes pedagogically valuable only when it is expressed clearly, discussed with others and improved through feedback. Interactive technologies develop these abilities because they require constant dialogue and cooperation.

Role-playing is one of the most effective methods in teacher education. Students may act as teachers, pupils, parents or school administrators. Such simulations allow future teachers to experience professional situations emotionally and practically. For example, a role-play on parent-teacher communication develops empathy, flexibility and the ability to react creatively to unexpected questions.

Case-study analysis also develops reflective thinking. Students examine real or model pedagogical situations, identify problems, discuss alternatives and make decisions. Through this process, they learn that

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there is rarely only one correct answer in teaching. This understanding is essential for professional creativity because creative teachers are able to make context-sensitive decisions.

Reflection is strengthened through portfolios, self-assessment and peer feedback. When students analyze their own learning products, lesson plans or microteaching experiences, they become aware of their strengths and weaknesses. Reflective practice helps them transform experience into professional growth. Dewey considered reflection a central element of meaningful education because it connects action with conscious analysis [6,87].

Digital Interactive Technologies and Pedagogical Creativity

In the digital age, interactive educational technologies also include online platforms, virtual classrooms, educational applications, multimedia tools and artificial intelligence-based resources. These technologies expand the possibilities of creative teaching. Future teachers can create digital presentations, quizzes, video lessons, interactive tasks, online discussions and collaborative documents.

UNESCO's ICT Competency Framework for Teachers emphasizes that teachers should be able to use digital technologies to support curriculum, assessment, pedagogy and professional development [7,9]. This requirement shows that digital competence is becoming an essential part of modern teacher creativity. A creative future teacher should not use technology mechanically; he or she should select digital tools according to pedagogical purpose.

For example, online discussion boards can be used to develop critical thinking, while digital storytelling can support language learning and emotional expression. Interactive quizzes can provide immediate feedback, and collaborative platforms can help students work on group projects. These tools develop not only technical skills but also pedagogical imagination.

However, digital technologies should not replace live pedagogical communication. Their effectiveness depends on meaningful integration with teaching objectives. Koehler and Mishra's TPACK model shows that effective technology integration requires the connection of technological, pedagogical and content knowledge [8,62]. Therefore, future teachers must learn not only how to use digital tools but also why and when to use them.

Pedagogical Conditions for Effective Use of Interactive Technologies

The development of professional creativity through interactive technologies depends on several pedagogical conditions. First, the educational environment must be psychologically safe. Students should not be afraid of expressing unusual ideas or making mistakes. Fear of criticism limits creativity, while trust and support stimulate initiative.

Second, interactive tasks must be connected with real professional situations. If activities are abstract and formal, they will not develop professional creativity. Teacher educators should use cases from school practice, lesson design tasks, microteaching, educational projects and reflective analysis.

Third, assessment should support creativity rather than suppress it. Traditional assessment often focuses on correct answers, while creative professional development requires evaluation of originality, flexibility, pedagogical relevance and reflection. Rubrics, portfolios and peer assessment are useful tools in this process.

Fourth, teacher educators themselves should demonstrate creative pedagogical behavior. Future teachers learn not only from theoretical content but also from the teaching style of their professors. If university teachers use interactive methods, respect student opinions and encourage innovation, they become models of creative professional activity.

Practical Importance for Teacher Training

The use of interactive educational technologies in higher pedagogical education has several practical outcomes. It develops students' ability to cooperate, communicate, solve problems and design educational materials. It also prepares them for work in modern schools where learners need active, student-centered and creative teaching methods.

Interactive learning helps future teachers understand that teaching is not a fixed set of instructions but a dynamic process requiring constant renewal. Through interactive technologies, students learn to adapt methods to age, subject, context and individual learner needs. This is especially important in inclusive and multicultural classrooms.

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Moreover, interactive technologies strengthen professional motivation. When students participate actively in the educational process, they feel personal responsibility for learning outcomes. This increases their interest in the teaching profession and forms a positive professional identity.

Conclusion

Interactive educational technologies play a significant role in developing the professional creativity of future teachers. They transform teacher education from passive knowledge transmission into active, reflective and practice-oriented learning. Through problem-based learning, projects, debates, case studies, role-playing, cooperative learning and digital platforms, future teachers develop creative thinking, communication skills, methodological flexibility and professional reflection.

The effectiveness of interactive technologies depends on the quality of their pedagogical organization. They should be used purposefully, systematically and in connection with real professional tasks. Higher pedagogical education institutions should create conditions in which future teachers can experiment, collaborate, reflect and design innovative solutions.

Thus, interactive educational technologies are not only modern teaching tools but also an important mechanism for forming creative, competent and socially responsible teachers. In the context of contemporary educational reforms, the development of professional creativity should become one of the central priorities of teacher training.

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