

THE USE OF PROJECT-BASED AND PROBLEM-BASED LEARNING METHODS IN DEVELOPING STUDENTS' SELF-EDUCATION COMPETENCIES

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Abstract

This article highlights the specific pedagogical potential of project-based and problem-based learning methods in developing students' self-education competencies. Furthermore, it demonstrates the opportunities offered by project-based learning to enhance students' skills in goal-setting, assignment planning, selecting relevant information and sources, applying a creative approach, and creating a final product. Problem-based learning is characterized as a key mechanism for fostering competencies in analyzing problem situations, critical thinking, evidence-based decision-making, and drawing logical conclusions.

Keywords

self-education, self-education competence, project-based learning, problem-based learning, pedagogical technologies, independent activity, problem situation, project activity, critical thinking.

Introduction. The rapid integration of information technologies into the educational process and the complete transition of the higher education system to a credit-module framework necessitate that students move beyond the passive absorption of ready-made knowledge. Instead, students must develop robust skills in independently searching for, critically analyzing, and practically applying new information. A core requirement of the credit-module system is that a substantial portion of the annual academic workload is allocated to students' self-directed learning activities. Consequently, organizing independent work in higher education institutions shifts from mere task completion to a systematic, goal-oriented process grounded in active learning methodologies-making this a highly relevant pedagogical issue.

Research Methodology. The methodological foundation of this research comprises systemic, activity-based, and student-centered approaches. Developing students' self-directed learning activities within an educational environment through pedagogical technologies requires designing an unbroken chain of defined objectives, content, organizational formats, methods, and tools. In our study, designing the self-education process is defined as the process of organizing and

implementing its active methods into practice, accounting for all internal and external factors to ensure the effective organization of a given instructional process.

Literature Review. International experience, along with the practice of pedagogical schools across Europe, the United States, Germany, and Russia, demonstrates that active and problem-based educational technologies play a priority role in fostering students' self-directed learning activities. However, higher education practice currently reveals a clear need for implementing new methodological approaches to developing students' self-education capabilities, as well as designing a system of active methods that motivate students to solve authentic professional and real-world challenges rather than confining them exclusively to theoretical tasks.

The problem of developing students' self-directed learning activities has been investigated for many years by international scholars and researchers across CIS countries through diverse didactic and psychological approaches. In particular, the American scholar Malcolm Knowles, a foundational pioneer in this field, noted in his seminal work that self-directed learning is a process in which individuals, without external assistance, identify their learning needs, formulate goals, and independently evaluate their learning outcomes. Furthermore, Australian researcher and professor David Boud, in studying the significance of peer-assessment and self-assessment techniques in organizing independent study within higher education, systematically structured evaluation and reflective criteria for students' knowledge acquisition during their independent research process [2].

Literature Review (Continued). In Russian pedagogical higher education institutions, students' self-directed learning activity is investigated within the context of mastering didactic systems, scientific methods, and the purposeful organization of educational activities. In this domain, O.A. Kozyreva developed a technology for fostering a culture of self-education among future teachers in her doctoral dissertation, placing primary emphasis on students' creative and project-based activities. Similarly, E.V. Sokolova provided scientific justification for a didactic model for designing and managing students' independent work within a credit-module system. Participation in research activities plays a vital role in advancing students' self-education competencies. Undergraduate research encompasses various complementary formats of independent study, facilitating the systematic, phased development of self-directed learning methods and skills through the in-depth study and creative mastery of curriculum disciplines. This approach ensures an integral link between instructional, research, and educational processes[7].

The issues of developing and systematically orienting the self-directed activities of future specialists and educators in Uzbekistan have also been thoroughly investigated by national scholars. Specifically, Sh. Sharipova analyzed the design of students' self-directed learning processes based on student-centered educational technologies. In her research, she validated a didactic framework that fosters students' independent professional thinking and creative capacities within the organization of self-education. In recent years, within the framework of

dissertation research by M. Yuldashev on enhancing higher education students' self-directed learning—particularly focusing on the design of independent study using modern information and communication technologies—a system of electronic didactic tools and interactive methods was developed to manage independent work under a credit-module system, thereby promoting students' self-improvement capabilities [6].

An analysis of the existing scientific literature and empirical studies demonstrates that the theoretical and methodological foundations for developing students' self-directed learning activities are continuously evolving. However, a significant portion of this research still treats independent learning primarily as a general pedagogical concept or limits it to traditional assignments such as writing essays and taking notes.

Currently, amid the integration of artificial intelligence technologies into education and the deepening implementation of the credit-module system in higher education, systemic algorithms for transforming students' independent work into practice-oriented and problem-based formats remain under-researched. To address the need for a comprehensive didactic model of active methods—tailored to the higher education environment and designed to transform students from passive information seekers into active subjects who construct projects and make autonomous decisions—we propose a framework for using active methods for the systematic development of students' self-directed learning activities, structured into the following sequential stages.

Analysis and Results. To evaluate the practical effectiveness of the proposed active method framework and self-directed learning model, experimental research was conducted. The experimental study involved undergraduate students enrolled in teacher education programs at Kashkadarya and Andijan State Regional Universities.

The students participating in the experiment were divided into two groups:

Control Group (CG): In this group, independent study was conducted using traditional methods (such as taking notes, writing essays, and preparing written answers to questions).

Experimental Group (EG): In this group, self-directed learning activities were systematically designed using our proposed active methodologies, including the "field of professional situations" method, the "researcher" method, project-based learning, and problem-based learning.

Below, we detail the didactic goals and objectives of several active methods utilized in this study.

In project-based learning, traditional academic disciplines are not studied in isolation; instead, they are integrated around real-world operational or pedagogical situations (fields) encountered in the student's future professional activity. Within this context, the student is presented not with an isolated theoretical question, but with a systemic, complex problem.

Role in Self-Directed Learning: To resolve this complex scenario, students independently conduct literature searches, analyze data, and integrate knowledge

across psychology, pedagogy, and digital technologies. Rather than imparting "fragmented knowledge," this approach fosters "holistic professional thinking."

By shifting from a passive recipient of ready-made information to an active agent generating new insights, the student takes ownership of the learning process. Instead of delivering pre-packaged lectures and formulas, the instructor presents a problem-based question or observation task. Students independently formulate hypotheses, conduct experiments, gather evidence from academic databases and digital resources, and derive scientific conclusions based on their findings. Consequently, this active method enhances students' research competencies, critical inquiry skills, and capacity for evidence-based independent reasoning.

The Project Method is a systemic approach that aligns students' self-directed activities toward generating a specific, practical end product. In this format, individual students or small groups conduct long-term independent research—spanning several weeks or an entire semester—resulting in a concrete applied output. For example, for students in teacher education programs, the project deliverable may consist of an interactive lesson design for a new school textbook, a community project addressing a local environmental issue, or a novel hydroponic plant cultivation model.

Role in Self-Directed Learning: The project method enables students to independently develop competencies in strategic planning, time management, collaborative teamwork, and, most importantly, the application of theoretical knowledge to create real-world products.

The Problem-Based Learning Method is both a classic and contemporary approach that stimulates cognitive activity through didactic contradictions and problem situations. At the outset of a session or as an independent study assignment, the instructor presents a specific scientific contradiction within the discipline—creating a cognitive conflict between the student's existing knowledge and new empirical facts.

Role in Self-Directed Learning: To resolve this scientific contradiction or problem, the student is driven to engage in independent research. This process activates intrinsic cognitive motivation and fosters flexible, unscripted, investigative, and creative thinking.

The systematic assignment of self-directed learning tasks utilizing these active methodologies transformed the educational experience for participants in the experimental group from a mandatory obligation into an engaging process of creative inquiry. Ultimately, this approach facilitated the development of essential professional competencies for future specialists within a practice-oriented environment.

Task Description: You are a teacher of the recently introduced school subject "Education" (*Tarbiya*). During observations of a 7th-grade class, you noticed several persistent issues: an inability to listen to one another, the division of the class into isolated cliques, and a lack of mutual respect in communication. The topic of the upcoming lesson is "*Tolerance and Mutual Respect – The Foundation of Peace*."

Independent Study Student Tasks: To successfully resolve this professional situation, the student must draw upon interdisciplinary connections and independently complete the following four key stages:

Problem Analysis: Independently analyze the psychological factors underlying peer conflicts and the lack of tolerance among students (within the context of 7th-grade developmental psychology) and formulate a concise pedagogical diagnosis.

Technology Selection and Justification: Based on the lesson topic and identified problem, select the most effective active pedagogical technology for the session (e.g., case studies, role-playing games, project-based learning, or debate technology). Provide a clear rationale explaining why this specific technology was chosen.

Lesson Plan and Didactic Design: Develop an interactive lesson plan centered around an instructional game, role-playing discussion, or social video analysis, rather than relying on a traditional lecture script. The objective is to transition students from passive listeners to active participants in classroom discourse.

Development of Assessment and Reflection Tools: Design a concise self-assessment questionnaire or a reflective evaluation rubric to measure shifts in student attitudes toward tolerance and mutual respect as a result of the lesson.

Tasks structured around this methodology enable pre-service teachers of the subject "*Education*" to move beyond the mechanical rote memorization of theoretical models taught in the "*Pedagogical Technologies*" course. Instead, students independently employ these methods as practical instruments to address real-world instructional and behavioral challenges in schools. By moving away from standardized templates, students autonomously devise creative strategies to integrate national and universal human values into the educational process through modern interactive approaches, such as media literacy and storytelling.

The use of these four active methods when organizing self-directed learning in the experimental group (EG) is not accidental; rather, it is grounded in the following didactic and psychological factors: Transition from Informational Passivity to Autonomous Activity (Based on Bloom's Taxonomy): Traditional methods of note-taking and preparing standard essays (utilized in the control group) restrict student cognitive processing primarily to the lower levels of Bloom's Taxonomy—specifically, knowledge recall and basic comprehension (the reproductive phase).

Conversely, the active methods proposed as our scientific framework elevate students to the higher-order cognitive domains of Bloom's Taxonomy—specifically, the stages of analysis, evaluation, and creation. Rather than merely reproducing existing information, the student processes and synthesizes data through problem-solving to construct an original pedagogical project.

Conclusion and Recommendations. The results of the study demonstrated that self-directed learning plays a paramount role in enabling students to apply theoretical knowledge in practice, fostering their creative and critical thinking, and instilling personal responsibility alongside self-management skills.

Independent study tasks should be developed with due consideration of discipline-specific complexity levels and creative requirements, accompanied by clearly defined assessment criteria and expected learning outcomes. Based on the analysis of the research findings and advanced practices, we propose the following practical recommendations for the higher education system:

Within the higher education process, it is essential to gradually phase out traditional, reproductive forms of self-directed learning—such as simple note-taking and routine literature reviews—and systematically replace them with active methodologies, including the "field of professional situations," the researcher method, project-based learning, and problem-based learning.

Specifically, within the course "*Pedagogical Technologies*," pre-service teachers—particularly those preparing to teach the subject "*Education*" (*Tarbiya*)—should regularly be assigned practice-oriented situations (case studies) and project tasks designed to independently address real-world instructional, methodological, and behavioral challenges in school environments. Crucially, a logical progression of methods must be maintained: students should not only conduct a theoretical analysis of a given problem (problem-based learning), but also construct a concrete instructional lesson design as a practical solution (project-based learning), and ultimately implement and test it within their own pedagogical practice.

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