
**RESEARCH OF PROBLEM-BASED LEARNING IN THE MODERN
EDUCATION SYSTEM**

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Abstract

This article presents a comprehensive analysis of the genesis and development of the concept of problem-based learning (PBL). Using the methodology of historical-philosophical and pedagogical reconstruction, the study explores the antecedents of this approach, from ancient dialectics to modern constructivist theories. The paper traces the evolution of methods that stimulate critical thinking, from the maieutics of Socrates, the scholastic disputation, and Hegelian dialectics to the pragmatic pedagogy of J. Dewey, the cultural-historical theory of L.S. Vygotsky, and the cognitive psychology of J. Piaget. Special attention is given to the systematization of the theory of problem-based learning in the works of M.I. Makhmutov and W. Okoń. The final part analyzes modern models for implementing problem-based learning in the teaching of humanities, particularly philosophy, considering the challenges of the digital era and the objectives of higher education modernization.

Keywords

problem-based learning, history of pedagogy, philosophy of education, dialectical method, constructivism, critical thinking, didactics, philosophy teaching methodology.

INTRODUCTION. The traditional, reproductive model of education, based for centuries on the passive transmission of existing knowledge from teacher to student, is demonstrating its increasing ineffectiveness. The modern labor market and complex social reality demand from specialists not so much an encyclopedic mastery of information, which is becoming increasingly accessible, but rather developed meta-subject competencies. These include critical and systemic thinking, the ability to independently search for and analyze information, the ability to solve unconventional, interdisciplinary problems, to argue convincingly for one's position, and, most importantly, a commitment to lifelong learning. In this context, problem-based learning (PBL), previously considered an alternative method, is

emerging as a leading didactic paradigm capable of adequately addressing this challenge. However, despite its widespread recognition, its theoretical foundations and methodological potential are often perceived oversimplified, reduced to a set of disparate techniques such as case studies or heuristic conversation. The true effectiveness of PBL is revealed only through a deep understanding of the powerful philosophical and psychological-pedagogical traditions that have shaped it over the centuries. The search for truth through questioning, intellectual challenge, resolving contradictions, and active thinking is a core element of both philosophical inquiry and problem-based learning.

The relevance of a comprehensive analysis of this concept stems from the need to systematize its theoretical foundation for informed and effective integration into modern educational practice. This is particularly important in the teaching of the humanities, particularly philosophy, where the development of critical thinking is not an incidental but a key, system-forming task. This study, based on the methodology of historical and pedagogical reconstruction and comparative analysis, aims to conduct a comprehensive historical, philosophical, and pedagogical analysis of the genesis of the problem-based learning concept, identify its key theoretical components, and determine the potential for their application in modern higher education.

RESULTS AND DISCUSSION. The development of a problem-based approach to education is inextricably linked to the very essence of philosophy. Reflection, criticism, analysis of contradictions, and questioning the obvious have always been integral parts of philosophical inquiry, creating fertile ground for a pedagogy based on questioning.

The first and most striking prototypes of the problem-based method are found in ancient philosophy. Socrates (469–399 BC), with his method of maieutics ("the art of the midwife"), laid down the fundamental principle of teaching through questioning. In the dialogues immortalized by Plato, Socrates never acts as a mentor providing ready-made answers [11]. Instead, through a series of skillfully constructed, often ironic, questions, he leads the interlocutor to recognize the gaps and contradictions in their own judgments. This process, based on creating a situation of intellectual impasse and then actively seeking a way out, is the philosophical core of heuristic conversation—one of the key methods of problem-based learning. Socrates' goal is not to imbue the student with knowledge, but to help them independently "give birth" to the truth already hidden within their soul.

Aristotle (384–322 BCE), a student of Plato, developed dialectic as a method of cognition based on the rigorous analysis and comparison of various, often

opposing, opinions on a given issue (endoxa). Unlike eristic (the art of debating for victory), Aristotelian dialectic aims to identify the most probable and substantiated truth. His approach, which involves a comprehensive examination of a problem, formed the basis of modern discussion-based learning, which encourages students to critically analyze arguments, identify the strengths and weaknesses of various positions, and form their own balanced judgment [1].

Elements of problem-solving can also be found in Eastern philosophical traditions. Confucian pedagogy emphasized the importance of reflection (si) and questioning, arguing that learning is inseparable from the analysis of life's and moral dilemmas. In Zen Buddhism, the method of koans – paradoxical riddles or stories with no logical solution (for example, "What is the sound of one hand clapping?") – was used to move the student's consciousness beyond stereotypical, dualistic thinking and achieve intuitive insight (satori). From a didactic perspective, a koan represents the ultimate form of a problematic situation, creating a profound cognitive conflict and requiring a complete restructuring of thought patterns.

In medieval Islamic philosophy, particularly within the framework of kalam (rational theology), the method of dialectical debate (ilm al-jadal) was actively used. Peripatetic thinkers such as Al-Farabi and Ibn Rushd (Averroes) championed the idea of attaining truth through logical analysis and rational argumentation, rather than through dogmatic memorization of sacred texts.

In the European Middle Ages, despite the dominance of authority, scholastic methodology contained a powerful problematic component. The structure of the scholastic disputation (disputatio) was a strict algorithm for investigating the problem:

1. Statement of the question (quaestio): A clear formulation of the problem.
2. Statement of opposing opinions (videtur quod non): A presentation of arguments against the expected answer, often with references to authority.
3. Argument in defense of the main position (sed contra): A presentation of a counter-thesis, also supported by an authoritative source.
4. Body of the paper (respondeo dicendum): A detailed analysis of the problem, in which the master presents his or her own solution.
5. Refutation of counter-arguments (ad obiecta): A systematic response to all objections raised in the videtur quod non.

This formalized method anticipated the modern case study method and debate technology, teaching students structured analysis, argumentation, and counterargumentation.

The revolutionary shift in understanding knowledge that occurred in the modern era became a crucial philosophical prerequisite for the development of problem-based learning. René Descartes (1596–1650), with his principle of radical doubt, affirmed the value of critical thinking as the sole starting point for constructing reliable knowledge. His famous "Cogito, ergo sum" ("I think, therefore I am") placed the thinking subject at the center of epistemology.

The philosophers of the Enlightenment laid the humanistic foundations of a new pedagogy. Jean-Jacques Rousseau (1712–1778), in his treatise "Émile, or On Education," sharply criticized bookish, verbal learning and called for education to be built on the child's natural curiosity and independent exploration of the world [12].

Immanuel Kant (1724–1804) played a key role in the philosophical justification of active learning. His "Copernican revolution" in philosophy consisted of the assertion that it is not our knowledge that conforms to objects, but, conversely, objects conform to our knowledge. Reason, according to Kant, does not passively reflect the world like a mirror, but actively constructs it through a priori (pre-experiential) forms of sensibility (space and time) and reason (categories).

This thesis became the philosophical foundation of constructivism in pedagogy, according to which learning is a process of active construction (rather than acquisition) of knowledge by the student themselves. Kant's famous call "Sapere aude!" ("Have the courage to use your own mind!") is the motto of both the Enlightenment and the entire paradigm of problem-based learning [6].

Georg Wilhelm Friedrich Hegel (1770–1831) perfected the dialectical method, describing development (in nature, society, and thought) as a universal process of movement through contradictions according to the scheme: thesis → antithesis → synthesis. A thesis (initial statement or condition) necessarily generates its negation, the antithesis. As a result of their struggle and interpenetration (sublation), synthesis emerges—new, richer, and more complex knowledge, which, in turn, becomes a new thesis for further development. This triadic model describes with remarkable precision the psychological mechanism for solving a problem: a student encounters a contradiction between existing knowledge and a new fact (thesis vs. antithesis) and, in the process of resolving it and restructuring their understanding, arrives at new, deeper knowledge (synthesis) [4]. In the 20th century, problem-based learning, which had been developing for centuries in the bosom of philosophy, received scientific systematization and experimental confirmation in the works of psychologists and educators, who translated them into the language of specific didactic principles and technologies. American philosopher

and educator John Dewey (1859–1952) is rightfully considered the "father" of modern problem-based learning. In his work, "How We Think" (1910), he sharply criticized the traditional school, which he aptly called the "listening school," where the student is a passive consumer of information. Dewey argued that genuine thinking is triggered only when a person encounters a real difficulty, problem, or doubt. He described the complete act of reflective thinking as a process consisting of five stages, which, in essence, are the algorithm for problem-based [14] learning:

1. Perception of Difficulty: The emergence of a situation that disrupts the usual course of events.
2. Definition and Localization: Transformation of a vague difficulty into a clearly defined problem.
3. Presentation of a Possible Solution: Formulation of Hypotheses.
4. Developing Consequences from the Hypothesis: Logically considering the consequences of accepting the hypothesis.
5. Further Observations and Experiments: Practical testing of the hypothesis, leading to its acceptance or rejection.

Dewey's concepts of "learning by doing" and "discovery learning" formed the basis of the project-based method and all progressive pedagogy, focused on developing practical skills and independent thinking [5].

Concurrently, in the former Soviet Union, Lev Semenovitch Vygotsky (1896–1934) developed ideas that became a crucial addition to the theory of problem-based learning. His concept of the "zone of proximal development" (ZPD) [3] defines the range of tasks that a student cannot yet solve independently, but can solve with the help of a teacher or in collaboration with more experienced peers. Vygotsky argued that effective teaching should "run ahead of development," that is, focus not on already mature functions, but specifically on the ZPD. The problematic situation created by the teacher should be within this zone: a task that is too easy will not elicit cognitive activity, while one that is too difficult will lead to frustration and loss of motivation. Thus, Vygotsky's theory provides the key to the proper organization of problem-based learning, emphasizing the crucial role of the teacher as facilitator and organizer of the learning environment, as well as the fundamental importance of collaborative, dialogic activity in the learning process.

Swiss psychologist Jean Piaget (1896–1980), studying the development of intelligence in children, concluded that cognitive development occurs through continuous processes of assimilation (the incorporation of new information into existing mental schemas) and accommodation (the restructuring of these schemas when new information contradicts them). The driving force behind this process is a

state of cognitive conflict, or disequilibrium, which arises when old knowledge proves inadequate to explain new experience. Overcoming this conflict through accommodation leads to the construction of more complex and adequate cognitive structures (equilibration). From a didactic point of view, the goal of problem-based learning is to purposefully create such cognitive conflicts that would stimulate students to actively review, deepen and restructure their knowledge [10].

American psychologist Jerome Bruner (1915–2016), building on Dewey's ideas, developed the concept of discovery learning [2]. Bruner argued that any subject can be taught in an intellectually honest manner to any student at any stage of development. The key is not the volume of information, but the assimilation of the structure of the discipline—its fundamental principles and methods. This is achieved when students do not receive knowledge in a pre-packaged form, but rather "discover" it through the process of solving research problems. Bruner also introduced the concept of a "spiral curriculum," according to which students repeatedly return to key concepts at increasingly higher levels of complexity and in new contexts, which is entirely consistent with the logic of problem-based learning.

Brazilian educator and philosopher Paulo Freire (1921–1997), in his landmark work "Pedagogy of the Oppressed" (1968), offered a devastating critique of the "banking" concept of education, in which teachers "infuse" knowledge into passive students, as if they were empty cells. In contrast, he proposed problem-posing education, based on dialogue and collaborative exploration of students' significant life problems (codes). The goal of such education is not simply the transfer of knowledge, but the development of critical consciousness (*conscientização*), the ability to analyze and change one's social reality. Freire's approach imbues problem-based learning with a powerful socially transformative and humanistic dimension [13].

In Soviet and post-Soviet pedagogy, Mirza Ismailovich Makhmutov made a significant contribution to the development of problem-based learning theory. In his monograph, *Problem-Based Learning: Basic Theory Issues* (1975), he provided a classic definition of a problem situation as "a conscious difficulty, the path to overcoming which requires a creative search for new knowledge and new methods of action." Makhmutov developed a detailed typology of problem-based learning methods, reflecting the degree of student independence: problem-based presentation, a partial-search (heuristic) method, and a research method [8]. Polish didactician Wincenty Okoń also made a significant contribution, emphasizing the role of PBL in developing creativity and transforming the student from an object to a subject of learning activity.

The analysis shows that problem-based learning is not a newfangled invention, but rather the result of a long evolution in philosophical and pedagogical thought. Philosophy, as a discipline that is essentially a reflection on the ultimate foundations of being and knowledge, is an ideal field for the application of PBL. The traditional lecture-seminar format, which boils down to retelling and taking notes on philosophical systems, often leads to a formal, "dead" assimilation of the material. A problem-based approach allows us to "revive" philosophy, transforming its study into an engaging process of intellectual exploration.

Effective forms of PBL implementation in philosophy courses include:

Problem-based lectures: The lecture is structured not as a monologue, but as a formulation and collaborative solution of a scientific problem with the audience. For example, a lecture on epistemology might be structured around the central question: "How is reliable knowledge of the world possible?", consistently examining and critiquing the answers given by rationalism, empiricism, Kantianism, and other schools of thought, engaging students in evaluating their arguments.

Case study method (situational analysis): Students are presented with a specific real-life, cultural, or fictional situation for analysis, containing an ethical, social, or ideological dilemma. A classic example is the analysis of the famous "trolley dilemma" and its many variations. This forces students not only to memorize the principles of utilitarianism and Kantian deontology, but to apply them to making a complex decision and justifying their choice, confronting the limitations of each theory. **Debates and role-playing:** Organizing discussions on controversial issues ("Does free will exist?", "Are science and religion compatible?", "Is consciousness possible in artificial intelligence?") or simulating historical philosophical debates (for example, a debate between Plato and Aristotle on the problem of universals). This develops skills in argumentation, counterargumentation, public speaking, and listening skills.

Research Projects: Students, in small groups or individually, conduct comparative analyses of philosophical concepts (e.g., "The Concept of Justice in John Rawls and Robert Nozick"), analyze philosophical aspects of contemporary issues (bioethics, philosophy of technology, problems of digital society), and present their findings in the form of essays, presentations, or research reports [9].

Based on the above material on problem-based learning in the context of education modernization in Uzbekistan, the objectives set in the "Concept for the Development of the Higher Education System of the Republic of Uzbekistan until

2030" [7] directly align with the goals and principles of problem-based learning. The document emphasizes the need to transition from "traditional teaching methods to modern educational technologies" aimed at "developing the ability for independent learning and analytical thinking," as well as integrating education, science, and industry.

The implementation of a problem-based approach in universities in Uzbekistan can make a decisive contribution to achieving the following goals:

1. Overcoming student passivity: Creating intellectual challenges and problematic situations increases intrinsic motivation and engagement in the learning process, turning students into active participants in their education.

2. Developing practice-oriented competencies: Problem-solving methods teach the application of theoretical knowledge to solving specific, including professional, problems, bridging the gap between theory and practice.

3. Integrating the national cultural context: Problem-solving situations can and should be based on the rich historical, philosophical, and scientific heritage of Central Asia. Analyzing the ethical dilemmas in the works of Al-Farabi, examining the medical and philosophical cases of Ibn Sina, and exploring the cosmological and intercultural issues raised by Biruni will make learning more meaningful and relatable to students, contributing to the formation of national identity. Traditions of collective discussion (mahalla, gap) can be creatively reimagined as a form of collaborative learning. Stimulating innovation: The use of digital technologies (interactive platforms, simulations, online discussions) within the framework of a problem-based approach allows us to take education to a new technological level that meets the requirements of the digital economy.

CONCLUSION. Problem-based learning is a powerful didactic paradigm with deep historical and philosophical roots and a solid psychological and pedagogical foundation. Its genesis, traced from Socratic dialectic to 20th-century constructivism, demonstrates the enduring value of active, critical, and independent thinking in the learning process. The use of a problem-based approach, particularly in the humanities, allows us to move away from dogmatic presentation of material and transform the learning process into a lively dialogue, during which students learn to analyze complex ideological issues, argue their position, and develop a holistic worldview. In the context of global challenges and the modernization of the higher education system, including in the Republic of Uzbekistan, problem-based learning is not simply an effective method, but a key strategy for developing competent, creative, and socially responsible professionals prepared to meet the challenges of the future. Further research in this area could be

aimed at developing specific methodological complexes and diagnostic tools for assessing the effectiveness of implementing problem-based learning in various subject areas, as well as creating a bank of interdisciplinary, culturally adapted cases and problems for the higher education system.

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