

METHODS OF DEVELOPING COMPETENCES THROUGH REAL-LIFE SITUATIONS IN PHYSICS LESSONS

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Abstract: This article analyzes the theoretical foundations and practical methodology of an approach aimed at developing competencies through real-life situations in physics lessons. Within the framework of a competency-based approach, students should develop the ability to apply their acquired knowledge to solve real-life problems, think independently, approach tasks creatively, work in teams, and adapt to problematic situations. Since the nature of physics is directly connected to technological, natural, and social processes in life, designing lessons based on real-life examples, problem-based tasks, and STEM elements becomes an effective means of developing students' practical competencies. The article highlights the scientific foundations of these approaches based on the theories of scholars such as Vygotsky, Dewey, and Jonassen, and analyzes the methods used in pedagogical practice, the results, and the assessment criteria.

Keywords: Physics education, competency-based approach, real-life situation, problem-based learning (PBL), STEM, independent thinking, critical analysis, creativity, practice-oriented lesson, quality of education.

Physics, by its very nature, teaches real-world phenomena, processes, and technologies. Therefore, developing competencies through real-life situations in the classroom is considered one of the most effective methods. This approach not only helps students understand the laws of physics but also enables them to apply these laws in practice, make informed decisions, and use their knowledge in social contexts.

This article explores the methods of organizing physics lessons based on real-life situations, their impact on the development of competencies, as well as the methodological foundations and practical outcomes of such an approach.

Literature Review: In recent years, lesson content and formats based on the competency-based approach have been widely implemented in education. International organizations such as UNESCO, OECD, and assessment systems like PISA determine students' competency levels by evaluating how well they adapt to real-life situations and on what knowledge and skills they rely when approaching problems. This, in turn, necessitates organizing every lesson in a practice-oriented and contextually life-connected manner.

As the pedagogue M. Yusupova emphasizes, competency is not merely knowledge, but the ability to act based on that knowledge. Therefore, lessons structured around real-life situations compel students to think critically, make choices, and analyze outcomes. According to N. Omonov, in order to develop competencies, each topic must be linked to practical life so that the student can perceive it within real-world problems.

Additionally, the international scholar D. Jonassen, in his theory of Problem-Based Learning, emphasizes the ways to develop competencies such as functional literacy, critical thinking, and integrity through real-life problems. In his works, learning through problematic situations – that is, real-life contexts – is presented as a core methodological approach.

Methodology: The methodology of developing competencies through real-life situations in physics lessons serves to prepare students for solving real-life problems and to shape them into independently thinking individuals who are capable of applying their knowledge in practice. Within

such an approach, the teacher must organize the lesson in such a way that the student can relate the lesson content to their real-life experiences, engage in active inquiry by searching for answers, and demonstrate their knowledge in practice.

During the lesson planning stage, the teacher connects the topic with real-life situations. For example, the topic "Ohm's Law" is linked to the issue of saving electrical energy, while the topic "Heat Transfer" is connected to its application in heating homes through thermal insulation. A lesson structured in this way, reflecting the student's real-life needs, provides a foundation for meaningful learning. Students find their own answers to the question "Where will I need this knowledge?" during the lesson.

Tasks based on problem situations serve as the foundation of this methodology. For example: "If you want to save electricity at home, what measures would you take?" or "What kind of wall materials would keep a house cool in summer and warm in winter?" Such life-related questions activate students' skills in thinking, reasoning, designing projects, and conducting experiments. Through this process, their critical and independent thinking is developed.

In such lessons, the use of the STEM approach plays a particularly important role. By integrating physics with elements of technology, engineering, and mathematics, students also develop professional competencies. For example, using solar panels, designing an energy-efficient heating system for a house, or creating lens-based devices using the principles of light refraction not only fosters knowledge, but also develops technical creativity and innovative thinking.

In the classroom, role-playing activities, dramatizations, and simulations of real-world professions help students imagine themselves as engineers, physicists, or energy consultants, enabling them to develop practical thinking skills. For example, a role-based task such as "You are a city energy analyst—identify shortcomings in the school's electrical system and propose solutions" confronts students with real-world problems and guides them toward finding solutions.

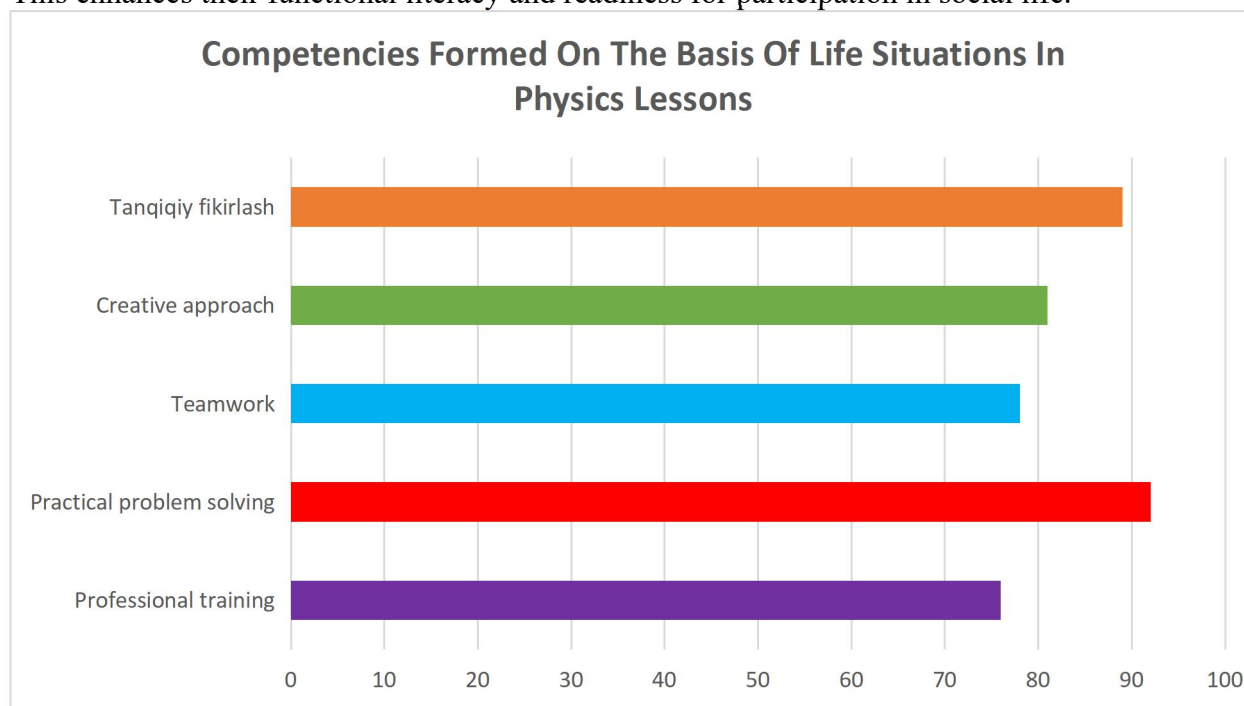
In the assessment process, the competency-based approach emphasizes not the final result, but rather the student's approach to the problem, the quality of their analysis, the solutions they propose, their collaborative engagement, and their ability to express ideas clearly. As assessment tools, in addition to scoring based on rubrics, reflective writing, peer assessment, and self-evaluation, qualitative analysis is also carried out.

Thus, organizing physics lessons based on real-life situations is not merely about delivering knowledge, but also a way to develop personal competencies—those that enable students to function in real-life contexts, express their opinions, and analyze and solve practical problems. This methodology not only improves the quality of education but also significantly enhances students' preparedness for real life.

Theory and Outcome: The approach of developing competencies through real-life situations in physics lessons is theoretically grounded in constructivist learning theory, the activity-based approach, and the competency-based model. At the core of these approaches lie the student's active engagement, independent thinking, and ability to make decisions in real-life contexts. The theory of the "zone of proximal development" proposed by Lev Vygotsky serves as a fundamental basis in this regard. According to his view, the learner acquires new knowledge with the help of others—through real activity and life experience. Thus, students' activity and independent thinking are extensively developed through practice-oriented tasks.

Furthermore, according to John Dewey's principle of "learning by doing," the student acts as an active participant in the learning process: analyzing problems, conducting inquiry, expressing opinions, making decisions, and evaluating outcomes. It is precisely the lessons structured around real-life situations that provide students with such opportunities. In the classroom, students encounter

real-life situations they might face in their own lives and learn to apply physical laws to solve them. This enhances their functional literacy and readiness for participation in social life.



Practical outcomes show that the use of real-life situations in physics lessons: enables students to apply their physics knowledge to real-world problems; develops students' competencies in critical analysis and creative thinking; fosters teamwork and a culture of collaboration; prepares students to make important decisions in life and strengthens their sense of responsibility; enhances students' analytical capacity through interdisciplinary integration (physics + technology + mathematics).

Within this approach, the student gains not only knowledge from the lesson, but also personal and social competencies essential for leading a successful life. They begin to see themselves as responsible individuals capable of tackling practical problems, and the lesson transforms into a space that prepares them for real life. Therefore, this approach not only deepens students' knowledge but also educates them to become mature individuals capable of responding to the needs of society.

Conclusion: The real-life situation-based approach in physics education not only deepens students' knowledge of physics but also helps shape them into individuals who can solve real-world problems, think critically, explore independently, and actively participate in society. By implementing the competency-based approach in practice, students make decisions based on theoretical knowledge, work collaboratively, propose practical solutions, and justify their ideas with sound reasoning during the lesson.

Lessons structured around real-life situations help develop critical thinking, creativity, communication, problem-solving in challenging contexts, and self-regulation skills. When such lessons are implemented in combination with the STEM approach, problem-based tasks, role-playing, and professional simulations, students gain a deeper understanding of how physical laws can be applied in everyday life.

Therefore, the use of real-life situations in physics lessons fully aligns with modern educational standards and serves as a powerful pedagogical tool for developing students' personal, social, and professional competencies. This approach not only enhances the quality of education but also improves students' preparedness for real life.

References:

1. Hasanboyev M. Fizika fanini o'qitish metodikasi. – Toshkent: TDPU, 2021.
2. Dewey J. Experience and Education. – New York: Macmillan, 1938.
3. Vygotsky L. S. Mind in Society: The Development of Higher Psychological Processes. – Harvard University Press, 1978.
4. Jonassen D. H. Learning to Solve Problems: A Handbook for Designing Problem-Solving Learning Environments. – Routledge, 2010.
5. Yusupova M. Fizikadan kompetensiyaviy yondashuv asosida dars tashkil etishning nazariy asoslari. – Ilmiy maqola, 2022.
6. Omonov N. Zamonaviy fizika ta'limida kompetensiyalarni shakllantirish yo'llari. – "Pedagogika" jurnali, 2023.
7. OECD. PISA 2022 Assessment and Analytical Framework. – OECD Publishing, 2022.
8. UNESCO. Reimagining our futures together: A new social contract for education. – Paris, 2021.