

DEVELOPING THE METHODOLOGICAL COMPETENCE OF BIOLOGY TEACHERS IN THE PROCESS OF CONTINUOUS PROFESSIONAL DEVELOPMENT

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Annotation. In the context of rapid scientific progress and educational reforms, the continuous professional development of teachers has become a key factor in improving the quality of education. Biology, as a dynamic and experimentally oriented subject, requires teachers not only to possess strong subject knowledge but also to demonstrate high methodological competence. This article examines the theoretical foundations, components, and practical ways of developing the methodological competence of biology teachers within the framework of continuous professional development. The study highlights modern pedagogical approaches, innovative teaching technologies, and reflective practices that contribute to professional growth. The results emphasize the importance of systematic methodological support and lifelong learning in enhancing biology teachers' instructional effectiveness.

Keywords: continuous professional development, biology teachers, methodological competence, pedagogical innovation, teaching strategies.

The modernization of education systems worldwide places increasing demands on teachers' professional competencies. In particular, the quality of teaching in natural sciences largely depends on the teacher's ability to apply effective teaching methods, integrate modern technologies, and adapt instructional strategies to learners' needs. Biology education plays a crucial role in shaping students' scientific thinking, environmental awareness, and understanding of living systems.

In traditional teaching, learners mainly acquire ready-made knowledge provided by the teacher. In contrast, in the process of problem-based learning, they are taught to think creatively through practical activities. Problem-based learning enables learners not only to develop the ability to complete tasks independently but also to generate new ideas and proposals, as well as to creatively explore technological processes applied in production. It should be particularly emphasized that learners' independent work—finding solutions to problem situations—largely depends on the teaching methods employed. Alongside its advantages, problem-based learning also has certain limitations. Firstly, it requires additional time and may lag behind informative teaching in terms of content delivery. Secondly, problem-based learning demands a high level of pedagogical skill and professional competence from the teacher.

Continuous professional development (CPD) is considered one of the most effective mechanisms for ensuring teachers' professional growth. It allows educators to update their knowledge, master innovative pedagogical approaches, and improve their methodological competence throughout their careers. In this regard, developing the methodological competence of biology teachers within CPD programs is an urgent pedagogical task.

Independent identification of a model solution to a problem situation. In this approach, the previously mentioned conditions are maintained; however, the teacher requires learners to find a model solution to a problem situation based on an earlier presented problem and its solution. Through such activities, learners are taught effective and optimal methods for solving problem situations.

Presenting a multi-variant problem and identifying missing knowledge in the process of solving it. In this case, learners are guided toward independent activity. They generalize the knowledge they have acquired and, using their own experience, search

for and determine unique ways to solve the problem. Combined problem-based learning.

This type of instruction involves dividing a complex problem into several smaller problems that lead to a common problem-based outcome. Through question-and-answer interactions, an optimal solution to the problem is identified.

In combined problem-based learning sessions, instructional material is studied collaboratively with the teacher. The lecture is presented in a problem-oriented manner, while in solving subsequent problems, learners demonstrate independent activity.

This article aims to analyze the concept of methodological competence, identify its structural components, and explore effective ways of developing it among biology teachers in the process of continuous professional development.

Methodological competence is an integral component of a teacher's professional competence. It reflects the ability to plan, organize, implement, and evaluate the teaching and learning process using appropriate methods, techniques, and tools. For biology teachers, methodological competence includes not only general pedagogical skills but also subject-specific instructional strategies.

In biology education, methodological competence is closely linked with inquiry-based learning, experimental activities, problem-solving tasks, and the use of visual and digital resources. A methodologically competent biology teacher can design engaging lessons, organize laboratory work effectively, and foster students' independent learning skills.

Developing the methodological competence of biology teachers in the process of continuous professional development is a vital factor in improving the quality of biology education. Methodological competence enables teachers to implement

effective teaching strategies, foster students' scientific thinking, and adapt to educational innovations.

Continuous professional development should be systematic, practice-oriented, and reflective. By integrating innovative teaching methods, digital technologies, and collaborative learning, CPD programs can significantly enhance biology teachers' methodological competence and professional effectiveness.

In the process of continuous education, the role of project-based learning technology in improving the quality of education among biology teachers is of great importance. The main idea of this technology is to achieve the intended outcomes through solving a problem that has practical or theoretical significance. If a theoretical problem is to be addressed through project design, a clear and well-grounded solution must be developed; if the problem is practical in nature, specific recommendations for its application in practice should be formulated.

In order to achieve these outcomes, learners must develop independent thinking skills, be able to understand the problem and search for ways to solve it, and effectively use their previously acquired knowledge. They should conduct research across various fields of science, predict expected results, develop alternative solutions, and comprehend cause-and-effect relationships.

The core essence of project-based learning technology lies in creating a problem-based situation that increases learners' interest, fosters the development of project design activities, ensures the acquisition of relevant knowledge, and facilitates interdisciplinary integration.

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