

THE USE OF INTERACTIVE METHODS IN TEACHING BIOLOGY TO TRAINEES DURING THE PROFESSIONAL DEVELOPMENT PROCESS

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Annotation. The effectiveness of biology education largely depends on the teaching methods applied during the learning process. In professional development programs, the use of interactive teaching methods plays a significant role in improving trainees' subject knowledge, pedagogical skills, and professional competence. This article explores the importance, types, and pedagogical benefits of using interactive methods in teaching biology to trainees during the professional development process.

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

Modern educational reforms require biology teachers to continuously improve their professional skills and adopt innovative teaching approaches. Professional development programs aim not only to update subject knowledge but also to enhance pedagogical mastery. In this context, interactive teaching methods are considered one of the most effective tools for improving the quality of biology education.

Interactive methods promote active participation, critical thinking, and collaboration among trainees. Therefore, the study of interactive methods used in teaching biology during professional development is of great importance.

Interactive teaching methods are based on constructivist and learner-centered theories, which emphasize active knowledge construction through interaction and experience. In biology education, these methods enable trainees to better understand complex biological concepts, processes, and systems.

Unlike traditional lecture-based approaches, interactive methods encourage discussion, experimentation, and problem-solving, making learning more meaningful and effective.

The use of interactive methods in teaching biology during the professional development process significantly improves the quality of training. These methods support active learning, deepen subject knowledge, and enhance professional competence. Integrating interactive approaches into professional development programs contributes to the preparation of innovative and effective biology educators.

In the modern system of continuing education, improving the professional competence of biology teachers requires the application of scientifically grounded

and innovative teaching methods. Interactive teaching methods are recognized as an effective means of enhancing cognitive activity, methodological readiness, and pedagogical creativity of trainees. This article examines the scientific and methodological foundations, classification, and pedagogical effectiveness of interactive methods used in teaching biology during the professional development process.

The modernization of education places high demands on the professional training of biology teachers. Rapid advances in biological science, integration of interdisciplinary knowledge, and the introduction of competency-based education require teachers to continuously update their subject and methodological knowledge. In this regard, professional development programs play a crucial role in ensuring the quality of biology education.

One of the priority directions in professional development is the use of interactive teaching methods, which shift the focus from teacher-centered instruction to learner-centered and activity-based learning. These methods ensure active participation of trainees in the educational process and contribute to the formation of professional competencies.

The use of interactive methods in biology teaching is grounded in constructivist learning theory, activity-based approaches, and cognitive psychology. According to these theories, knowledge is effectively acquired through active engagement, interaction, and reflection.

In biology education, interactive methods facilitate the understanding of complex biological systems, processes, and relationships by involving trainees in inquiry, experimentation, and discussion. This methodological approach supports the integration of theoretical knowledge with practical application.

Scientific research indicates that the use of interactive methods in biology teaching improves learning outcomes by increasing cognitive engagement and motivation. Trainees develop higher-order thinking skills such as analysis, synthesis, and evaluation, which are essential for teaching biology at an advanced level.

Moreover, interactive methods contribute to the formation of reflective skills, enabling trainees to evaluate their own teaching practices and continuously improve them.

Despite the advantages of interactive methods, their implementation in professional development faces certain challenges, such as limited time, insufficient resources, and resistance to innovation. Addressing these challenges requires systematic methodological support and institutional commitment.

The use of interactive teaching methods in biology during the professional development process has strong scientific and methodological justification. These

methods enhance professional competence, promote active learning, and improve the quality of biology education. Therefore, interactive approaches should be considered an essential component of professional development programs for biology teachers.

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.

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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