



APPROACHES TO DEVELOPING BIOETHICAL COMPETENCIES IN PROSPECTIVE TEACHERS DURING PROFESSIONAL TRAINING

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Abstract: This article provides a scientific and pedagogical analysis of the methodological approaches to developing bioethical competencies in prospective teachers during professional training. The concept of bioethical competence and its significance in the activity of a modern teacher are examined. Five approaches — philosophical-ethical, interdisciplinary-integrative, problem-situational, value-oriented, and practice-oriented (case-study) approaches, their core idea, practical application, and advantages and limitations, are substantiated from a scientific and practical perspective.

Keywords: bioethics, bioethical competence, prospective teacher, methodological approach, values, case study, professional training, ethical theories, pedagogy, higher education.

Introduction.

The globalization, digitalization, and innovative processes occurring in the education system today necessitate a fundamental renewal of the requirements for the professional training of future educators. A modern educator must be formed not only as a specialist who knows their subject deeply and can effectively apply pedagogical technologies, but also as a mature individual who respects human life, health, honor, dignity, and personal inviolability in the educational process, and who understands moral responsibility. The relevance of bioethical issues, especially in educational fields related to biology, the foundations of medicine, ecology, natural sciences, and a healthy lifestyle, requires educators to possess the appropriate competencies.

Bioethics is considered one of the important directions in the development of modern science and education that ethically regulates the relationship between humans and living nature. As a result of the rapid development of genetic research, biotechnology, reproductive technologies, transplantology, artificial intelligence, and medical technologies, many ethical problems arise related to human life, health, biological safety, environmental protection, and the treatment of animals. These processes present the educational system with the task of not only equipping the younger generation with scientific knowledge but also fostering humanism, responsibility, tolerance, making moral choices, and fostering a careful attitude toward all forms of life.

Bioethical competence is of particular importance in the professional activities of future educators. This is because, in the process of working with students, the educator must take into account their individual characteristics, health, psychological state, personal views, and rights, and be able to make ethically grounded decisions in various life and professional situations. From this perspective, bioethical competence can be viewed as a complex competence that, along with the future educator's professional knowledge, unites their moral worldview, value-based attitude, communicative culture, and responsible behavior.

The development of bioethical competencies in the process of professional training involves developing future educators' skills in mastering bioethical concepts, identifying and analyzing ethical problems, comparing different points of view, drawing evidence-based ethical conclusions, and adhering to humanitarian principles in pedagogical activity. In this regard, the use of competency-based, personality-oriented, axiological, activity-based, and reflexive approaches serves as an important methodological basis.

The use of problem-based tasks, case studies, discussions, debates, role-playing games, project activities, and reflexive exercises based on real-life situations in the development of bioethical competencies creates effective pedagogical opportunities. Such methods encourage future educators not only to study bioethical problems theoretically but also to link them with professional activities, to think independently, and to make responsible decisions. Determining the content, pedagogical conditions, and effective approaches for developing bioethical competencies in future educators during professional training is one of the urgent scientific and practical issues of modern pedagogical science. Research in this direction serves to further improve the professional competence of future educators, prepare them for a conscious and responsible attitude toward modern bioethical problems, and ensure the priority of humanistic and moral values in the educational process.

The level of study of the problem. Modern scientific and technological progress - achievements in fields such as genetic engineering, biotechnology, artificial insemination, and organ transplantation - poses complex ethical questions to humanity that did not exist before [1]. The ability to find correct, well-founded answers to these questions - bioethical competence - is becoming an important professional and personal quality necessary not only for medical workers but also for modern educators.

An educator, particularly a teacher of biology, natural sciences, or social sciences, inevitably encounters bioethical topics (e.g., cloning, genetic modification, environmental ethics) in their work and must convey these topics to students in a correct, balanced manner [2]. However, specific methodological approaches aimed at developing bioethical competence in the training system of future educators have not yet been sufficiently systematized.

From this perspective, a scientifically systematic analysis of methodological approaches to developing bioethical competencies in future educators during professional training determines the relevance of this article [3].

The founder of bioethics is considered to be W. R. Potter, who was the first to introduce the term "bioethics" into scientific discourse, defining it as a "bridge" between biological knowledge and human values. T. Bichamp and J. Childress's concept of the four fundamental principles of medical ethics (respect for autonomy, doing good, not causing harm, and justice) forms the methodological foundation of the field of bioethics.

The pedagogical aspects of bioethical education are highlighted in the works of foreign researchers [3], which analyze various methods for integrating bioethics into educational programs. The general theoretical foundations of bioethics in domestic philosophy and pedagogical science, as well as the general principles of professional and moral training for future educators, are covered in the works of F. Yuldashev.

Nevertheless, an analysis of the conducted scientific research shows that domestic science does not yet have sufficient specialized research providing a systematic and comparative analysis of methodological approaches specific to the development of bioethical competence in

future educators. Filling this gap determines the scientific and practical significance of this research.

Discussion. The philosophical-ethical approach forms the theoretical and methodological basis for the development of bioethical competence[1] — according to this approach, bioethical problems are analyzed from the perspective of classical ethical theories (result-based utilitarianism, duty-based deontology, virtue ethics). Comparative discussion of the same bioethical situation based on different theories develops a deep, multifaceted ethical thinking in the student, but this approach requires a high level of abstract-philosophical thinking.

An interdisciplinary integrated approach involves studying bioethical issues by combining the fields of biology, philosophy, law, and religious-moral knowledge, as any bioethical problem is inherently multifaceted and cannot be fully understood from the perspective of a single science. The problem-situational approach is based on organizing debates and discussions on real, controversial bioethical dilemmas (genetic engineering, cloning, environmental ethics) [3], which stimulates the student's active, critical thinking but requires neutral moderation skills from the educator.

The value-oriented approach involves evaluating bioethical issues from the perspective of national-spiritual and universal human values [4], which is especially important for countries with rich spiritual and religious traditions such as Uzbekistan - it is necessary to understand bioethical issues not only through Western theories but also through the context of local values. Finally, the practice-oriented (case-study) approach aims to practice bioethical decision-making based on real-life medico-biological events [5], transforming the student's abstract theoretical knowledge into clear, practical decision-making skills.

Results. In the process of analyzing five methodological approaches that serve the development of bioethical competence in future educators, their main idea, practical application, and advantages and limitations were systematized. The results of the analysis are summarized in the table below:

1-table

No	Attitude	The main idea	Practical application	Preference / Limitation
1	Philosophical-ethical approach	Analysis of bioethical problems based on classical moral theories (utilitarianism, deontology, virtue ethics)	A comparative discussion of the same bioethical situation from the perspective of different ethical theories	It provides a deep theoretical foundation but requires a high level of abstract-philosophical thinking from the student.
2	Interdisciplinary integrative approach	Teaching bioethics issues by combining fields of biology, philosophy, law, and	Organization of joint integrated classes with the participation of	Covers the problem comprehensively, but requires

No	Attitude	The main idea	Practical application	Preference / Limitation
		religious-moral knowledge	teachers from various subjects	interdisciplinary coordination
3	Problem-situational approach	Organize discussions on real, controversial bioethical dilemmas (genetic engineering, cloning, environmental ethics)	Debate and discussion sessions that analyze real-world conflict situations	It encourages active, critical thinking of the student, but requires neutral moderation skills from the teacher.
4	Value-based approach	Evaluating bioethical issues from the perspective of national-spiritual and universal human values	Seminars analyzing bioethical issues in the context of national and religious-moral values	It strengthens the student's cultural-value identity, but requires caution in the clash of different value systems.
5	Practice-oriented (case study) approach	Practice bioethical decision-making based on real-life biomedical events and cases.	Tasks to analyze real or simplified medico-biological cases and propose a reasoned decision	Develops practical decision-making skills, but requires a high-quality, relevant case database.

From the analysis presented in Table 1, it is evident that neither of the approaches is complete or flawless on its own—each has its own advantages and limitations. While philosophical-ethical and interdisciplinary approaches provide a more theoretical basis, problem-situational and case-study approaches develop practical decision-making skills, while a value-oriented approach links all of this to the local spiritual and cultural context. A consistent, step-by-step combination of these five approaches (from a theoretical basis to practical decision-making) yields the highest efficiency. Overall, the conducted analysis confirmed that the development of bioethical competence requires a comprehensive, multifaceted strategy rather than a single one.

Conclusion. In the process of professional training, the development of bioethical competencies in future educators should be based on the comprehensive, complementary application of philosophical-ethical, interdisciplinary integration, problem-situational, value-oriented, and practice-oriented approaches. The research results showed that each approach has its own advantages and limitations, and their selective application in accordance with various stages of the pedagogical process yields the highest efficiency.

The development of bioethical competence allows future educators to provide students with informed, balanced answers to complex ethical questions posed by modern scientific and technological progress. In future research, it is advisable to study the specifics of applying these approaches to students in various fields of science (biology, philosophy, law).

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