BO‘LAJAK BIOLOGIYA O‘QITUVCHILARINING KASBIY KOMPETENSIYASINI SHAKLLANTIRISHDA “O‘ZGARTIRILGAN SINF ” TEXNOLOGIYASINING ROLI

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Annotatsiya: Maqolada bo‘lajak biologiya o‘qituvchilarining kasbiy kompetensiyasini shakllantirishda "O‘zgartirilgan sinf" texnologiyasining pedagogik imkoniyatlari ko‘rib chiqiladi. Mahalliy va xorijiy olimlarning ishlari nazariy tahlil qilinadi va texnologiyaning kasbiy tayyorgarlikdagi roli aniqlanadi. Nazariy bilimlarni mustaqil o‘zlashtirish va amaliy faoliyatni birlashtirish xususiyatlari tavsiflanadi va ularning kasbiy kompetensiyaning asosiy komponentlari bilan bog'liqligi tahlil qilinadi. Bundan tashqari, kelajakdagi o‘qituvchilarning fan, metodologik, tadqiqot va raqamli ko‘nikmalarini rivojlantirishda texnologiyaning ahamiyati asoslanadi.

Kalit so‘zlar: "O‘zgartirilgan sinfxona" texnologiyasi, kelajakdagi biologiya o‘qituvchisi, professional kompetensiya, raqamli ta'lim.

Аннотация. В статье рассматриваются педагогические возможности технологии «перевернутого класса» в формировании профессиональной компетентности будущих учителей биологии. Проводится теоретический анализ работ отечественных и зарубежных ученых, определяется роль технологии в профессиональной подготовке. Описаны особенности сочетания самоосваивания теоретических знаний и практической деятельности, а также проанализирована их связь с основными компонентами профессиональной компетентности. Кроме того, обоснована важность технологий в развитии предметных, методических, исследовательских и цифровых навыков будущих учителей.

Ключевые слова: Технология «перевернутого класса», будущий учитель биологии, профессиональная компетентность, цифровое образование

Abstract. The article examines the pedagogical possibilities of the "Flipped Classroom" technology in the formation of professional competence of future biology teachers. A theoretical analysis of the works of domestic and foreign scientists is carried out, and the role of technology in professional training is determined. The features of combining self-mastery of theoretical knowledge and practical activity are described, and their relationship with the main components of professional competence

is analyzed. In addition, the importance of technology in the development of subject, methodological, research and digital skills of future teachers is substantiated.

Keywords: "Flipped classroom" technology, future biology teacher, professional competence, digital education

Introduction. The digitalization process in the modern education system, the development of innovative learning technologies, and the expansion of person-centered educational approaches place new demands on the professional training of future teachers, making the formation of their professional competence one of the priority tasks of higher pedagogical education.

From this perspective, the use of the "Flipped Classroom" technology is one of the important pedagogical opportunities for forming the professional competence of future biology teachers. This technology combines self-learning of theoretical knowledge with practical and research activities, creating conditions for the development of students' independence, professional thinking, and skills in applying biological knowledge in pedagogical practice.

Since the majority of class time in a traditional learning system is devoted to explaining theoretical material, the time allocated for students to apply their knowledge in practice, conduct laboratory work, and complete research assignments may be limited.

The "inverted classroom" technology is based on the combination of prior independent learning of theoretical knowledge and practical-research activity in the classroom. This approach allows future biology teachers to deepen their subject knowledge, improve their laboratory and analytical skills, and develop their ability to solve professional problems. In addition, the combination of the use of digital educational resources and active learning methods contributes to the development of students' independence, cognitive activity, and creative abilities. From this perspective, the "Flipped Classroom" technology is considered one of the effective pedagogical approaches aimed at connecting theoretical knowledge with practical activity and forming professional competence of future biology teachers.

In scientifically substantiating the issue of forming the professional competence of future biology teachers, an important place is occupied by the analysis of the works of domestic and foreign scientists who have studied the essence, structure, and features of the concept of professional competence. American scientist R. Boyatsis considers professional competence as a combination of abilities, personal qualities, and behavioral characteristics that contribute to the effective performance of professional duties by a specialist. [1] The scientist does not limit the meaning of professional

competence to the acquisition of theoretical knowledge and skills, but rather associates them with their effectiveness in real professional activities.

A.K. Markova considers professional competence as the mutual unity of a specialist's professional knowledge, practical skills, psychological preparation and personal qualities. [2] The scientist distinguishes between specific, social, personal and individual types of professional competence, linking their meaning with professional effectiveness, communicative abilities and personal development. Kazakhstani scientist B.T. Kenzhebekov studied the formation of professional competence of future specialists from the perspective of the interdependence of theoretical knowledge and practical training. [3] Based on his research direction, professional competence is a complex professional quality that combines the specialist's readiness to apply theoretical knowledge in practice, practical skills and personal abilities.

Dutch scientist M. Mulder considers professional competence as an integrative personal quality based on the mutual unity of theoretical knowledge, practical skills and abilities, and professional principles. [4] The scientist associates the main feature of professional competence with the ability to comprehensively and effectively apply acquired knowledge and experience in solving specific professional tasks. In these studies, a comparison of the scientific views of A.K. Markova, B.T. Kenzhebekov, R. Boyatsis and M. Mulder shows that professional competence is based on the mutual unity of theoretical knowledge, practical training, professional experience and personal qualities. Scientists associate the formation of professional competence with the effective application of acquired knowledge in real life and the process of developing a person's professional potential.

As for the research of domestic and foreign scientists on the "Flipped Classroom" technology, J. Bergmann and A. Sams in their work considered the use of the "Flipped Classroom" technology in educational practice and described the possibilities of directing classroom time to practical tasks and individual learning by mastering theoretical material before class. [5] J. Bishop and M. In his study, Verleger clarified the scientific definition of the "Flipped Classroom" technology, systematized its main features and the results of the first empirical studies. [6] L. Abeysekera and P. Dawson analyzed the theoretical foundations of the influence of the "Flipped Classroom" technology on students' learning motivation and cognitive load. [7] J. van Alten and colleagues conducted a meta-analysis of research in higher education and assessed the impact of the "Flipped Classroom" technology on learning outcomes and student satisfaction with learning. [8] E.E. Ospankulov, S. Kunai and B.R. Akhmetov examined the features of using the "Flipped Classroom" technology in higher education institutions and described the pedagogical possibilities of organizing students'

independent learning activities and using digital educational resources. [9] The scientific works of these researchers show that the "Flipped Classroom" technology is based on the combination of independent mastery of theoretical knowledge and practical activity. This approach may create favorable conditions for increasing the cognitive activity of future biology teachers, improving their research and methodological skills, and building their professional competence. "The role of the "Flipped Classroom" technology in the formation of professional competence of future biology teachers" is shown in the table below.

Table - 1

Components of professional competence	**Learning activity based on the "flipped classroom" technology**	**Pedagogical aspects of the formation of professional competence**
Motivational-value	Self-study of theoretical material before class, setting personal learning goals, and participating in professionally oriented tasks	To develop professional interest, learning responsibility, a desire for independent learning, and a value-based attitude towards the pedagogical profession
Cognitive	Mastering biological knowledge and analyzing scientific information through digital learning resources.	To systematize and deepen subject-pedagogical knowledge and improve the ability to explain biological processes on a scientific basis.
Action-practical	Solving biological problems, performing laboratory experiments and problem-based research tasks.	Combining theoretical knowledge with practice, developing laboratory and research skills and the ability to solve professional problems.
Organizational and methodological	Planning biology lessons, developing learning tasks, organizing group work and microlearning	Improve the ability to rationally select teaching methods, design the learning process, coordinate pedagogical interaction, and make methodological decisions.
Innovative-reflexive	Using digital platforms and virtual laboratories, designing interactive tasks,	Development of digital innovation skills and creative abilities, assessment of

	and implementing reflective assessment.	professional results and orientation towards personal professional development.

The table systematizes the possibilities of the "Flipped Classroom" technology in forming the professional competence of future biology teachers. The combination of independent mastery of theoretical knowledge and practical research activities helps to improve students' professional skills, while the use of digital resources and reflection helps to develop their organizational, innovative, and creative abilities.

Conclusion. The importance of the "flipped classroom" technology in the formation of professional competence of future biology teachers is determined by the fact that it ensures the unity of independent mastery of theoretical knowledge and its effective use in practical, research and pedagogical activities. This technology creates conditions for active participation of students in the educational process, deepens their subject-methodical knowledge, and systematically develops research abilities and digital skills.

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