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The Role Of Steam Pedagogy In The Formation Of Environmental Competence Among Primary School Teachers

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Abstract: This article discusses the formation of interdisciplinary ecological culture through environmental education for students, STEAM education, interdisciplinary collaboration, the manifestation of creative abilities, and extracurricular independent learning.
Keywords: STEAM, education, technology, didactics, literacy, practical, approach, curriculum, project, integration.

Boshlang‘Ich Ta’lim O‘Qituvchilarining Ekologik Kompetentligini Shakllantirishda Steam Pedagogikasining O‘Rni

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Annotatsiya**:** *Ushbu maqolada talabalarga ekologik ta’lim berish, STEAM ta’limi fanlararo va o‘quvchilarni amaliyotga yo‘naltirish fanlararo hamkorlik, ijodiy qobiliyatlarni namoyon qilish, sinfdan tashqari mustaqil ta’lim orqali fanlararo ekologik madaniyatini shakllantirish haqida fikr yuritilgan.*
Kalit so‘zlar: *STEAM, ta’lim, texnologiya, didaktika, savodxonlik, amaliy, yondashuv, ta’lim dasturi, loyiha, integratsiya.*

Introduction. One of the ways to modernize and update education in the world is the development of the STEAM education system. The main goal of its implementation is to expand the opportunities of future elementary school teachers through the development of technical and natural science education,

based on the establishment of connections between STEAM networks, taking into account the need to develop critical and creative thinking skills in teachers and students. Specifically, the current development of higher pedagogical education depends on the interdisciplinary integration of research. Interdisciplinary integration is the foundation for training specialists who have critical thinking and are capable of "solving interdisciplinary problems, as well as problems of a diverse nature." The purpose of this study is to find ways to update the methodology of professional training for future elementary school teachers, taking into account the requirements of interdisciplinary integration and assessment of pedagogical competence.

STEAM was first introduced in the 1990s by the American National Organization. Education recommended and implemented in STEAM (science, mathematics, engineering, and technology) as a key component of U.S. public education. Currently, STEAM education is available in Australia, Canada, and Singapore, and later in France in the United Kingdom, Australia, Israel, China, Canada, and Turkey. Elements of the STEAM approach have been implemented in preschool education and the development of the high-tech robotics industry in schools.

The research methodology. This study examined the content, goals, objectives, and principles of using factors to enhance the environmental competence of future elementary school teachers in higher education based on a STEAM approach. The research employed a systematic approach and analytical methods.

Analysis and results, as well as an analytical review of advanced interdisciplinary educational technologies, allowed us to focus on STEAM education. A study was conducted to assess students' competencies in natural sciences and the development of critical thinking. In the course of the research, during laboratory and practical classes, students of Chirchik State Pedagogical University identified and further resolved interdisciplinary problems of both professional, scientific, and practical nature.

At the same time, STEAM education became the foundation for designing the educational process for future elementary school teachers. The results of this work demonstrate the following: the inclusion of interdisciplinary tasks in the structure and content of academic disciplines contributes to improving the quality of professional training for future elementary school teachers, as the learning process is practical and scientific in nature. Interdisciplinary integration

at the university level of pedagogical education, implemented through interdisciplinary tasks of scientific research and practical direction;

An analytical review of sources related to the concept of integration of future elementary school teachers reveals its complex and mutually reinforcing nature. Within the framework of the development of any specific science, there is an integration that establishes a connection between large blocks. As you can see, maintaining this connection has always been relevant. The idea of interdisciplinary connections in relation to the new model of specialist training in the higher pedagogical education system is conceptual. Both science and production seek specialists with knowledge in various professional fields and interdisciplinary disciplines. In the modern space of higher pedagogical education, personnel training occupies a special place. Today, pedagogical education, implementing a competency-based approach, organizes the structure and content of the educational process in such a way that the final result is measured by the quality of the graduates' activities and their competence.

The competence of future elementary school teachers can be defined by three components: competence expressed in professional pedagogical activity and the inseparable interaction of the teaching profession. The differences between the development of a specialist's pedagogical competence and the development of traditional qualities, knowledge, skills, abilities, and experience, are determined by the integrative nature of pedagogical competence as a professional and personal quality of future primary school teachers; practice-oriented and project-oriented pedagogical activity. The qualitative state of future elementary school teachers - their pedagogical competence can be linked to strategic values, the development of which contributes to the effective implementation of a competency-based approach in pedagogical education in the training of highly qualified personnel in the field of public education.

The relevance of the problem lies in the fact that the structure and content of teacher training undergo significant changes as a result of the introduction of new state higher education standards. The increase in the number of subject blocks in the curriculum did not affect the number of hours allocated for studying the subjects. It is important to understand that one of the solutions to rationalize the content of training future elementary school teachers is the implementation of interdisciplinary integration.

The study identified two main problems in the study of interdisciplinary integration in the process of training future teachers.

First, the importance of synthesizing natural and scientific, as well as human knowledge, in the training of future elementary school teachers in higher education is increasing.

Secondly, updates on the use of pedagogical technologies and integrated laboratory and practical lessons, as well as lectures throughout the entire period of training future teachers.

The aim of the research is to focus on the results achieved in the educational process aimed at improving the quality of professional training for future teachers capable of applying professional competencies in solving interdisciplinary scientific and practical problems. The aim of the research is to find ways to update the methods of professional training for future primary school teachers, taking into account the requirements of interdisciplinary integration.

The study involved students of the primary education program at Chirchik State Pedagogical University. The areas of pedagogical education, technology, and safety of life. According to the logic of the analytical stage of learning, the study, comparison, and generalization of professional competencies in solving interdisciplinary practical problems were carried out. During the initial experimental stage, a survey was conducted among students, as well as an analysis of the results of educational activities after the implementation of integrated laboratory and practical classes and lectures. Changes in indicators for the development of students' professional competence through interdisciplinary integration have been noted.

At the same time, observations and interviews were conducted with university students at the stage of obtaining statistical data to diagnose the level of development of interdisciplinary competencies. Diagnostic methods are divided into substantive, indicative, and evaluative. Each block has its own goal.

The first block was aimed at determining the level of interdisciplinary knowledge of students on integration and interdisciplinary concepts. The work was conducted here based on interviews and questionnaires among students of all groups, i.e., participants in the experiment. The results of this survey, obtained at this stage, varied widely, ranging from simple ideas - integration - to integration - to emotional generalizations - to the process of action. One of them noted that students find it difficult to understand this concept. The concept of

interdisciplinary integration is included in the definition of the ability to receive and transmit information by highlighting the main idea. It was clear that future elementary school teachers did not have a clear understanding of interdisciplinary integration, as they were unable to connect this concept with information theory and replaced these concepts. Therefore, the content of the answers indicates insufficient awareness and understanding of the importance of interdisciplinary connections in the future profession.

The second stage - an approximation - allowed for the identification of students' attitudes towards the problem of developing interdisciplinary competencies and their role in the development of future teachers.

The importance of developing interdisciplinary competencies was noted by 71% of students in the experimental groups of the primary education program at Chirchik State Pedagogical University and 79% of students in the control groups of the primary education program at Bukhara State University and the Termez Pedagogical Institute. According to respondents, interdisciplinary competence is a priority quality of the modern individual and largely predetermines success in professional activity.

Students' attitudes towards their future profession are meaningful only when they encourage students to engage in academic activities, which serves as a means of achieving success in vocational education.

The goal of the third block was to summarize the results of the empirical study. The implementation of the model for developing students' interdisciplinary competence in the university's educational process is reflected in the following levels of development:

Motivation is the understanding of the purpose of the chosen profession, the formation of experience in mastering new information.

Knowledge of the relationship between the objects of study - a course of disciplines in the cultural and professional blocks.

The results of the experimental work showed respondents' attitude towards interdisciplinary competence and satisfaction with their level of development.

According to the research project, the level of development of interdisciplinary competence of future elementary school teachers was determined using the methodology of self-assessment. The application of this methodology allowed for obtaining information from students who answered the questions. Questionnaires aimed at determining the relevance of the need to combine knowledge to determine the degree of manifestation of any desired quality

were evaluated using a 5-point system. The objectivity of the obtained results and their reliability were achieved through an anonymous survey.

This study highlights different levels of development of interdisciplinary competence among future teachers. Interdisciplinary competence motivation is characterized by the presence of interest in the problem, the individual's focus on acquiring knowledge, and their practical application. The questions asked to future elementary school teachers implied the identification of these characteristics.

To enhance the level of development of the content component, students were involved in independent activities during the learning process, i.e., lectures, practical exercises, and extracurricular activities.

Conclusions and suggestions, the idea of a competency-based approach, are expressed in an interdisciplinary task, which is an integral part of the professional training of future teachers. The totality of various interdisciplinary tasks constitutes the integrity of the content of this lesson. Theoretically substantiated and implemented interdisciplinary integration during laboratory and practical classes ensured the effectiveness of professional training for future teachers. The implementation of interdisciplinary tasks in professional and scientific activities was carried out using methods such as developing professional and motivational situations in the process of studying science; changing knowledge. Integrated laboratory and practical exercises and lectures based on STEAM educational technology served as a tool for designing the educational process for future teachers. There are many advantages of teaching technology together, group work, and working in pairs. This helps to achieve educational goals, accustom oneself to responsibility, mutual support, increases student effectiveness, develops cognitive activity, independence, and expands student interpersonal relationships. It can be used both in learning new material and in the lesson to reinforce, repeat, and generalize lessons.

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