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DEVELOPING CONSTRUCTION AND MODELING COMPETENCIES OF FUTURE PRIMARY SCHOOL TEACHERS

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Abstract: This article examines the theoretical and pedagogical foundations of developing construction and modeling competencies among future primary school teachers. It analyzes the content, structural components, and effective methods for developing these competencies. Particular attention is paid to the role of construction and modeling in professional teacher preparation, creative and critical thinking, problem-solving, and innovative teaching practices.

Keywords: future primary school teacher, construction, modeling, professional competence, pedagogical skills.

In today's rapidly developing era of information technology, one of the most important tasks facing the education system is to educate the younger generation to become independent thinkers, creative individuals, proactive citizens, and individuals equipped with modern knowledge and skills. The implementation of these tasks directly depends on the professional training, level of knowledge, and readiness for innovative activities of teachers who organize the educational process.

In particular, primary education plays an important role in the formation of a child's personality, as well as in the development of their worldview, thinking abilities, creative potential, and practical skills. A primary school teacher is not only a provider of knowledge but also an organizer of pedagogical activities who facilitates students' independent research, observation, experimentation, project development, and creative approaches to various problems.

The Law of the Republic of Uzbekistan "On Education" defines the main directions of the education system and important tasks aimed at ensuring the intellectual, creative, and professional development of learners [1]. These tasks increase the need to prepare future teachers in accordance with modern educational requirements and to develop their professional competencies.

A teacher possessing construction and modeling competencies does not limit their activities to using ready-made teaching materials. Instead, they independently develop new educational situations, assignments, models, and learning projects, taking into account students' age, interests, individual abilities, and levels of academic achievement.

Theoretical and Pedagogical Foundations of Construction and Modeling Competencies

In a broad sense, construction refers to the process of designing and creating a new object, system, process, or activity structure in order to achieve a specific goal. In pedagogical practice, construction represents a teacher's ability to plan and design educational content, lesson structures, learning tasks, didactic materials, and students' independent activities in advance.

Pedagogical modeling is manifested in two important areas:

1. **Modeling the pedagogical process** – designing lesson processes, educational situations, learning activities, and expected outcomes in advance.

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2. **Modeling objects and phenomena** – creating various physical, graphical, mathematical, and digital models to explain complex concepts to students.

Although construction and modeling are closely interconnected, they are not identical concepts. Construction primarily focuses on creating a new object or activity structure, whereas modeling emphasizes representing the essential features of an existing object or process. In practical pedagogical activities, these two processes often complement each other.

The construction and modeling competence of a future teacher is an integrated system of knowledge, skills, abilities, and personal qualities that enables them to independently develop educational objects, learning materials, lesson processes, and practical projects in accordance with pedagogical objectives, represent them through models, test, evaluate, and improve them.

Pedagogical Conditions for Developing Construction and Modeling Competencies

The development of these competencies among future primary school teachers should not be limited to occasional practical lessons. For this purpose, targeted pedagogical conditions must be established in higher education institutions.

First, it is necessary to ensure the integration of theory and practice in the educational process. Along with acquiring theoretical knowledge related to construction and modeling, students should have opportunities to apply this knowledge in practical classes.

Second, strengthening interdisciplinary integration is essential. Construction and modeling activities are closely connected with mathematics, natural sciences, technology, fine arts, computer science, and pedagogical disciplines.

Third, students' independent and creative activities should be supported. Rather than simply reproducing ready-made examples, students should be given opportunities to develop independent projects, test their own ideas, and present their results.

Fourth, it is necessary to establish a modern material and technical infrastructure. This may include LEGO sets, geometric shapes, construction kits, cardboard, colored paper, natural materials, recyclable objects, computer software, and other educational resources.

Methods for Developing Competencies Based on Modern Pedagogical Technologies

Currently, the use of interactive, practical, and project-based learning methods is particularly important in developing construction and modeling competencies among future primary school teachers.

Project-Based Learning Method

The project-based learning method encourages students to solve specific problems independently or collaboratively. Through this method, students create teaching aids, models, or educational designs based on a particular objective.

Within the framework of the "My City" project, students create models of buildings, roads, bridges, green spaces, schools, and other objects.

The project is organized through the following stages:

1. Identifying the problem.
2. Defining the goals and objectives.
3. Collecting information.
4. Designing the initial model.
5. Selecting the necessary materials.
6. Constructing the model.

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7. Presenting and evaluating the results.

Problem-Based Learning Method

Problem-based learning encourages students not to simply accept ready-made answers but to identify the causes of problems and independently develop solutions.

For example: "Primary school students are experiencing difficulties in distinguishing geometric shapes. What kind of constructive model can a teacher create to teach this topic in an understandable and engaging way?"

Students discuss the problem, suggest different ideas, select materials, and create their own models.

Assessment Criteria for Construction and Modeling Competencies

Regular assessment of learning outcomes is essential in the process of developing construction and modeling competencies among future primary school teachers.

Assessment should not be based solely on the external appearance or technical quality of the created model. It should also take into account students' ability to develop ideas, define pedagogical objectives, select materials, make independent decisions, and analyze the products they have created.

The following criteria are recommended for assessing these competencies:

1. **Theoretical Knowledge Criterion** – students' knowledge of the concepts, principles, and methods of construction and modeling.
2. **Design Criterion** – the ability to develop ideas, define objectives, prepare drawings, and create work plans.
3. **Practical Activity Criterion** – skills in using various materials, creating models, and assembling structures.
4. **Creativity Criterion** – the ability to propose independent ideas, find innovative solutions, and improve existing models.
5. **Reflective Criterion** – the ability to analyze the created product, identify shortcomings, and evaluate the results.

Based on these criteria, the levels of competency development can be characterized as follows:

High Level. The student has a thorough understanding of the theoretical foundations of construction and modeling, can independently develop projects, effectively use various materials, propose innovative ideas, and justify the created product in accordance with pedagogical objectives.

Intermediate Level. The student possesses basic theoretical knowledge, creates models using examples and pedagogical guidance, and completes practical assignments. However, they may encounter certain difficulties when independently developing complex projects.

Beginning Level. The student has initial knowledge of construction and modeling but regularly requires pedagogical support when developing projects, selecting materials, creating independent structures, and analyzing their own work.

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