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DEVELOPING THE PROFESSIONAL COMPETENCE OF FUTURE TECHNOLOGY EDUCATION TEACHERS THROUGH PROJECT-BASED LEARNING TECHNOLOGIES

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Abstract

This article highlights the role and importance of project-based learning technologies in developing the professional competence of future technology education teachers. It also analyzes the stages of implementing the project method in the educational process, approaches to organizing practical classes, and opportunities for developing students' professional and creative abilities.

Keywords: technology education, professional competence, project-based learning, innovative pedagogical technologies, practical skills, creativity, independent learning, design.

Today, one of the important tasks of higher education is to prepare future teachers for professional activities and integrate their theoretical knowledge with practical skills. In particular, a technology education teacher should not only provide students with theoretical knowledge but also teach them to work independently, design products, solve technical problems, and think creatively. From this perspective, the use of project-based learning technologies is one of the important approaches to improving the professional preparation of future technology education teachers. This approach increases students' engagement in the learning process, encourages independent research, and enables them to apply the knowledge they have acquired in practical activities.

Professional competence is a set of knowledge, skills, abilities, and personal qualities required for a teacher to perform professional duties effectively. The professional competence of a future technology education teacher includes pedagogical, methodological, technical-technological, information and communication, and creative competencies. Project-based learning helps develop these competencies in an integrated manner. While working on a project, students identify a problem, collect information, compare possible solutions, select the necessary materials, and create a final product. In this process, theoretical knowledge is reinforced through practical activities.

An important feature of the project method is that students do not simply acquire ready-made information; rather, they actively participate in creating a new product or developing a practical solution. As a result, they develop the ability to make independent decisions, plan their activities, and analyze the outcomes.

It is advisable to organize project activities in clearly defined stages when training future technology education teachers.

The first stage — identifying the problem. Students are given a specific practical task. For example, they may be asked to create a convenient and safe item for use in a school workshop or produce a useful product from waste materials.

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The second stage — planning. Students define the project objectives, establish the sequence of activities, and determine the necessary materials, tools, equipment, and time.

The third stage — project implementation. Drawings, models, or products are created according to the established plan. Where necessary, computer software, digital presentations, and modeling tools are used.

The fourth stage — testing and evaluation. The quality, durability, convenience, safety, and compliance of the finished product with the specified requirements are assessed.

The fifth stage — presentation and analysis. Students present and defend their projects, explain the results achieved, and propose ways to eliminate identified shortcomings.

These stages develop students' ability to perform professional tasks independently and take responsibility for their work.

The effectiveness of project-based learning primarily depends on how closely the tasks are related to professional practice. Therefore, future technology education teachers should be encouraged to undertake practice-oriented projects.

For example:

- Design and construction project: creating a simple product model from cardboard, wood, or other materials.
- Sewing project: preparing a pattern for a simple garment, calculating material consumption, and sewing the product.
- Environmental project: producing a useful item from recyclable materials.
- Digital project: developing a product drawing or three-dimensional model using computer software.
- Pedagogical project: preparing a practical lesson plan for a school technology class and testing it in practice.

Such tasks strengthen students' technical knowledge and help them independently organize practical lessons in their future teaching careers.

Digital technologies provide additional opportunities to organize project activities effectively. Computer software can be used to create product drawings, design samples, and three-dimensional models. Electronic presentations help demonstrate the project idea, implementation process, and final results. In addition, students can use online resources to obtain information about modern technologies, material properties, and product manufacturing methods. Digital tools facilitate project planning, data organization, and comparison of results.

However, digital technologies should not completely replace practical activities. In technology education, it is important to connect drawings and virtual models with the production, testing, and improvement of real products.

In project-based learning, the teacher acts not merely as a source of knowledge but as an organizer and facilitator of students' activities. The teacher helps students select project topics, recommends appropriate resources, monitors compliance with safety regulations, and evaluates the completed work.

Instead of providing ready-made solutions, the teacher should create conditions that enable students to analyze problems independently and find appropriate solutions.

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Question-and-answer sessions, discussions, group work, and peer assessment can be used for this purpose.

In group projects, each student's responsibilities should be clearly defined. For example, one student may prepare the drawing, another may select the materials, a third may manufacture the product, and another may present the results. This approach develops collaboration skills and a sense of collective responsibility.

In project-based learning, assessment should not be limited to the final product. Students' participation throughout the process, independence, creativity, and problem-solving abilities should also be considered.

The following criteria can be used for assessment:

1. The ability to apply theoretical knowledge.
2. Project planning and organization.
3. Technical and practical skills.
4. Creativity and independent decision-making.
5. The quality and safety of the finished product.
6. Project presentation and analysis of results.

Clearly defined assessment criteria help students understand their capabilities, identify shortcomings, and improve their subsequent performance.

In conclusion, project-based learning technologies are an important pedagogical tool for developing the professional competence of future technology education teachers. This approach makes it possible to connect theoretical knowledge with practical activities, develop technical and technological skills, foster creativity, and strengthen independent decision-making abilities. To improve the effectiveness of the project method, it is necessary to select practical tasks relevant to professional activities, use digital tools purposefully, organize group work, and establish clear assessment criteria. As a result, the professional preparation of future teachers can be improved in accordance with the requirements of modern education.

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