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TOPICAL ISSUES OF PREPARING STUDENTS FOR PROFESSIONAL ACTIVITY IN THE FIELD OF COMPUTER ENGINEERING IN TECHNICAL SCHOOLS

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Abstract
This article explores the topical issues related to preparing students studying in the field of computer engineering at technical schools for professional activity. It also presents the importance of the dual education approach in vocational training, the organization of educational activities based on innovative projects, and offers suggestions and recommendations for developing digital competencies.

Keywords: Computer engineering, technical school, professional activity, practical training, cooperation with IT companies, dual education, digital competencies, modern technologies, curriculum, industrial practice.

INTRODUCTION
In the 21st century, as information technologies have deeply penetrated all spheres of society, the demand for qualified specialists with up-to-date knowledge in the field of computer engineering is steadily increasing. For this reason, the training of personnel in this field has become a matter of great importance for professional educational institutions, particularly technical schools. There are several pressing issues in preparing students of computer engineering programs at technical schools for professional activity, and solving these problems is a key factor in improving the quality of education. Computer Engineering is an engineering discipline that deals with the development, creation, testing, and application of both hardware and software tools within the realm of information technology (IT). This field lies at the intersection of computer science and electrical engineering and is aimed at ensuring the efficient operation of computer systems and networks.

Computer engineering specialists are engaged in the following areas:

- Designing and developing hardware and software systems
- Systems engineering and technical maintenance
- Creating and managing IT infrastructure
- Ensuring data security
- Developing artificial intelligence solutions
- Working with Internet of Things (IoT) devices
- Providing services based on cloud technologies

Computer engineering is one of the most in-demand professions of today and the future. In Uzbekistan, as the processes of digital transformation are accelerating, the demand for specialists in this field is increasing year by year. The expansion of IT parks, technoparks, and collaborations with international IT companies in our country is creating significant opportunities for young people studying in this field.

In many technical and vocational education institutions, the current curricula and programs are primarily based on traditional approaches, which fail to fully meet the rapidly evolving needs of the information and communication technology (ICT) sector. In particular, the insufficient implementation of practice-oriented teaching technologies and the lack of integration of the latest achievements in software and hardware into the educational process hinder the alignment of education with the real demands of the production environment. Today, as the IT sector continues to develop dynamically and new professions, technologies, methods, and platforms emerge, the curricula offered in technical colleges often do not adequately cover essential modern topics such as programming languages, cloud technologies, cybersecurity, artificial intelligence, and data analytics. This creates significant obstacles to the formation of students as competitive professionals in the labor market. From this perspective, it is crucial to revise the computer engineering curricula, align them with the actual needs of IT companies and industries, and introduce elements of dual education aimed at developing practical skills closely connected to real-world production environments. Only such an approach can ensure that students are fully prepared for modern professional activities and can be successfully integrated into the labor market. Although many technical colleges are equipped with computer hardware, software tools, and local network infrastructures intended for practical training, most of these resources are outdated or do not meet the technical and functional requirements of today's production standards. The computers used in practical classes lag behind modern technological standards in terms of processor speed, RAM capacity, graphics processing capabilities, and support for virtual environments.

Moreover, the software provided to students is often unlicensed, outdated, or operates with limited functionality. This significantly hinders students from acquiring practical skills in working with modern development environments, integrated software platforms, virtualization tools, and cloud technologies. In particular, the absence of simulation environments and laboratory infrastructure that closely replicate real-world conditions in areas such as programming, network engineering, information security, and database management greatly reduces the effectiveness of the educational process.

As a result, although technical school students may possess theoretical knowledge, they often lack sufficient preparation to apply it in practice, adapt to real production environments, and work independently on practical projects. This situation decreases their competitiveness in the labor market and negatively affects the effectiveness of the vocational training system.

Therefore, it is essential to modernize the technical and software infrastructure used for practical training in technical schools, establish advanced laboratories in collaboration with leading IT companies, and create hands-on training grounds that closely simulate real industrial environments.

Establishing cooperation with real employers, especially IT companies, in the process of effectively preparing students for professional activity is considered a crucial strategic factor. When the theoretical knowledge acquired during education is reinforced with practical experience, students' subject-related knowledge and skills deepen, and they are shaped in accordance with labor market demands. Particularly in technological fields such as computer engineering, participation in industrial practice and real-life projects significantly enhances students' professional competence.

Unfortunately, current practice shows that not all technical schools in our country have systematic and effective partnerships with IT companies. This situation considerably limits students' opportunities to conduct practical training in production environments, develop software, work on system integration, and gain hands-on experience in network projects directly in the workplace.

Such gaps serve as serious obstacles, especially in the effective implementation of the dual education system. The success of the dual model is based on active, close cooperation between educational institutions and employers. When there are insufficient partner companies, students' options for professional practice narrow, the opportunity to gain real-world experience diminishes, and as a result, they remain limited to theoretical knowledge.

Therefore, in preparing students for professional activity in technical schools, it is necessary to establish long-term, mutually beneficial cooperation agreements with representatives of the IT sector, expand internship bases, and ensure students' participation in startups and projects. This will not only enhance students' vocational preparation but also help bridge the gap between education quality and the modern needs of the production sector.

In today's modern vocational education system, the dual education model — a blended approach combining theoretical and practical instruction — is recognized globally as one of the most effective and promising forms of education. This model allows students to simultaneously acquire theoretical knowledge in educational institutions while developing practical skills at industrial enterprises. Through dual education, students are trained as well-rounded specialists ready for the labor market and adapted to real working conditions.

However, in fast-evolving and constantly updating fields such as computer engineering, the comprehensive and systematic implementation of the dual education model has not yet been widely achieved. In most technical colleges, this approach is limited to small-scale pilot projects or organized only through cooperation with a few companies. As a result, students are not provided with sufficient opportunities to engage in practical training, gain work experience in modern technological environments, or participate in the development of digital solutions.

Furthermore, the necessary regulatory framework, financial mechanisms, methodological resources, and a stable system of collaboration with employers for the effective execution of dual education are not yet fully developed. This remains one of the key challenges to the widespread application of this model in the computer engineering field.

From this perspective, in order to prepare students in computer engineering programs for professional activity in line with modern requirements, it is essential to expand the dual education model systematically and gradually, based on cooperation between the public and private sectors. Only then can a strong and direct link be established between the education process and the needs of industry, allowing students to graduate as professionals who have mastered their specialty under real working conditions.

To elevate the quality of education in the computer engineering field at technical colleges to meet the demands of the times, the following measures are crucial:

- Updating curricula in accordance with the IT market;
- Broad implementation of the dual education system;
- Continuous professional development of instructors;
- Strengthening cooperation between technical colleges and IT companies;
- Actively involving students in IT projects and competitions;

- Modernizing technical infrastructure and improving the quality of practical training.

By addressing these pressing issues systematically, it will be possible to train highly capable young professionals in the field of computer engineering — individuals equipped with practical skills and competitive in the labor market.

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