



Modern State And Problems Of Preparing Future Engineers For Such Activities

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ABSTRACT

This work reflects on the current situation and problems of training future engineers in higher education institutions.

Keywords:

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Today, the state of engineering training in many countries of the world is related to the rapid development of digital technologies, innovations and modern education methods. Engineering education is being reshaped based on new requirements and updated in order to train competitive and efficient specialists. Here are a few highlights of the current state of engineer training:

Modern engineering education is being integrated with digital technologies. Programming, artificial intelligence (AI), automation, and digital technologies are becoming an integral part of engineering. Students are making extensive use of cloud computing technologies, computer modeling and simulation tools that allow them to solve real-life technical problems in a virtual environment.

Solving environmental problems and working in accordance with the principles of sustainable development remain one of the main tasks of engineers. Therefore, studying environmental engineering, green technologies, energy efficiency and renewable energy sources

has become an integral part of engineering education.

The current educational process is aimed at not limiting engineers with theoretical knowledge, but also equipping them with practical skills and professional competencies. In this process, special attention is paid to the creation of projects and laboratories in cooperation with industry, practices, engineering design projects.

Many countries are trying to adapt engineering education to international requirements. In this process, the accreditation systems of engineering specialties are implemented based on the requirements set by international organizations such as ABET (USA), EUR-ACE (Europe). Such systems guarantee the quality of education and help engineers to be in demand in the global labor market.

Interactive and team approaches are increasing in the educational process. Students' close contact with teachers, mutual discussions and problem-solving activities through exchange of ideas are increasingly used. This is especially relevant in the format of distance education, which provides fast and effective

communication between students and teachers using digital platforms.

These aspects of engineering education in Uzbekistan and around the world are helping to train specialists with a competitive, technological and innovative mindset.

Scholars who have contributed greatly to the development and research of engineering education have provided valuable theoretical and practical insights into the current state and future of engineering education. In their research, these scientists focused on the main issues in the training of engineers, the updating of educational programs and the formation of professional competencies. Below is an analysis of some scientists who worked in the field of training engineers.

Charles M. West (USA) — as president of the Massachusetts Institute of Technology (MIT), made a significant contribution to the development of engineering education on a global scale. He advocated the development of an approach based on scientific innovation and solving global issues in engineering education. According to West's views, engineers should not only be technically mature, but also actively participate in solving global social and environmental problems.

Vladimir L. Skolkovo (Russia) is known for his many works to develop engineering education in Russia through advanced technologies and innovative programs. He led the development of the "Skolkovo" innovation center and played an important role in the field of technological entrepreneurship and engineering education. Skolkovo focuses on engineering education linked to scientific research.

Simon Singh (UK) - Known for his academic books and advocacy on engineering education and mathematics education. He has developed clear, practical approaches to teaching students scientific and mathematical concepts in engineering and technology. Singh's teaching methods served to popularize modern technology and science.

Juergen Mittelstraß (Germany) is one of the scientists who studied the inextricable connection of technological development and education with engineering. He analyzed the

role of engineering in solving sustainable development and environmental problems. His research focuses on a multidisciplinary approach and the creation of socially responsible technologies.

Felicity Astin (UK) - research focused on strengthening practice and laboratory training in engineering curricula. His research aims to improve the educational process by strengthening students' theoretical knowledge with practical projects and integrating it with industry.

Seeram Ramakrishna (Singapore) conducts research in engineering and innovation at the National University of Singapore. He advocated the integration of new technologies and scientific advances into engineering programs, focusing on sustainability and environmental engineering in engineering education. In his opinion, environmental responsibility should occupy a central place in engineering education.

Lars Eklundh (Sweden) - conducts research in the field of development of digital technologies and distance learning methods in engineering education. In Sweden, he developed several programs for the introduction of digital engineering laboratories and proposed innovative methods for integrating modern technologies into education.

Research in engineering education focuses on the study of modern technologies, environmental responsibility, and practical approaches. Topics such as new technological developments, design thinking, crossover disciplines, and creative thinking serve to advance engineering education. Through their research, these scientists are shaping new approaches in the field of engineering and playing an important role in developing modern and future professional skills for students.

The process of training engineers in our country consists of a number of important stages, and this process includes the following main elements:

- after school, students enter higher education institutions. There are universities and technical schools in our country that provide education in engineering fields. In higher education, various subjects are taught in

order to provide students with theoretical knowledge and practical skills.

- there are many directions in engineering education, for example, mechanics, electrical engineering, automatics, informatics, etc. Special courses and textbooks have been developed in each direction.

- practical exercises are conducted to improve students' practical skills. In this process, students participate in laboratory work, production practices and design activities.

- scientific research is conducted in higher education institutions. Students and teachers are engaged in research aimed at learning new technologies and solving engineering problems.

- in order to improve the quality of the educational process, permanent control is established by educational institutions and state bodies. The level of students' knowledge is assessed through state educational standards and state exams.

- after the educational process, cooperation relations are established to provide employment to graduates. In the country, the system of training students in the field of engineering is being improved in accordance with the needs of the labor market.

- There are partnerships with a number of international universities of Uzbekistan, through which students learn international experience and receive education that meets global engineering standards.

These processes serve to develop and improve the quality of engineering education in our country. It was adopted in order to fundamentally improve the system of higher education in our country, based on the priority tasks of the socio-economic development of the country, to fundamentally reconstruct the content of personnel training, and to ensure the creation of necessary conditions for the training of highly educated specialists at the level of international standards.

There are a number of challenges in training engineers today, including:

- rapid changes in the field of engineering require updating educational programs. Higher education institutions face difficulties in

incorporating modern technologies and methodologies.

- theoretical knowledge is often separated from practical skills. Students have more theoretical knowledge but lack practical experience, which makes it difficult for them to get a job.

- some institutions lack qualified and experienced teachers, which reduces the quality of education. Opportunities for teachers to continuously improve their skills are limited.

- cooperation relations with enterprises that conduct production practice for students may be weak. This does not help students to solve real problems.

- the lack of modern laboratories, equipment and educational materials in higher education institutions affects the quality of education. This limits the opportunities for students to experiment.

- engineering education sometimes does not correspond to the needs of the labor market. This can make it difficult for students to find a job after graduation.

- higher education institutions are often faced with financial constraints, which limit their ability to introduce new programs, conduct research, and purchase modern equipment.

- some students may be demotivated to study engineering. This can have a negative impact on the future level of professionalism.

In order to solve these problems, it is necessary to develop measures aimed at updating the educational system, training teachers, and increasing practical experiences for students.

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