Global Conference on Medical and Health Sciences
Hosted Online from Madrid, Spain
Date: 14th January, 2026
Website: https://econferencia.com

FUTURE ENGINEERS PROFESSIONAL COMPETENCE DEVELOPMENT MODEL THROUGH DIGITAL TECHNOLOGIES

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Abstract
In the article modern education in the system engineering in the field bachelor's degree students for professional competence formation and in development digital of technologies role open This is also given. competence to form service doer model structure, composition parts, practical mechanisms and pedagogical conditions scientific basically illuminated.

Keywords: Engineering education, digital technologies, professional competence, innovative model, information and communication technologies (ICT), digital pedagogy.

Annotatsiya
Maqolada zamonaviy ta’lim tizimida muhandislik sohasidagi bakalavriat talabalari uchun kasbiy kompetentligini shakllantirish va rivojlantirishda raqamli texnologiyalarning roli ochib berilgan. Shuningdek, bu kompetentlikni shakllantirishga xizmat qiluvchi modelning tuzilmasi, tarkibiy qismlari, amaliy mexanizmlari va pedagogik shart- sharoitlari ilmiy asosda yoritilgan.

Kalit so‘zlar: muhandislik ta’limi, raqamli texnologiyalar, kasbiy kompetentlik, innovatsion model, axborot-kommunikatsion texnologiyalar (AKT), raqamli pedagogika.

Today digital in society high qualified engineers preparation important strategic from tasks is one . Engineering in the field experts modern working production , automation , artificial intellect and digital systems with closely performance necessary . So Yes , sir. education in institutions future engineers professional competence in formation digital technologies current to grow is a pressing issue Latest global digital in years transformation process education also widely in the field enter is coming . In particular , engineering in education digital technologies current of reaching new forms and opportunities appearance It was . Including :

- **Artificial intelligence (SI) and car learning (MO)** technologies using to the person customized training processes organization is being done . This students individual to the needs suitable coming knowledge to master accelerates and efficiency increases .
- **Extended and virtual reality (AR/VR)** tools through students complicated technological processes safe and interactive in the environment study to the possibility has This is a laboratory . of work quality new to the stage raises .
- **Cloudy technologies and cooperation platforms** (Microsoft Teams, Zoom, Google Meet and others) education process remotely to manage and collective work further effective organization to do help is giving .
- **Big data (Big Data) and analytics** engineering education quality assessment , training programs improvement and students in monitoring the success of new opportunities is creating .

Due to the rapid development of science, technology and technology, the content of knowledge, skills and qualifications that future engineers who are being trained in higher educational institutions must possess is constantly changing and their volume is increasing sharply. This, in turn, requires them to have a system of knowledge, skills and qualifications that will allow them to effectively use information and computer technologies in their future professional activities. In

other words, the effective use of digital technologies as a didactic tool in the training of future engineers is an important factor in improving the quality of education provided to them. However, an analysis of existing experiences in the application of digital technologies in the process of training engineers has shown the following shortcomings in this regard:

- insufficient readiness of the pedagogical teams of higher educational institutions in the field of Electrical Engineering, Electrical Mechanics and Electrical Technologies (Electrical Engineering) to apply digital technologies in the process of training energy engineers;
- Insufficient availability of electronic learning textbooks (ETD) that allow for virtual completion of practical exercises in the energy education process, and lack of methodological developments for their application.

In organizing energy education, developing fundamental mechanisms for its integration with science and production, implementing it in practice, individualizing learning and independent learning, developing and mastering technologies and tools for the distance education system, and accelerating student learning using a modular system based on new pedagogical and information technologies are among such urgent tasks.

Information and communication technology (ICT) in education is a set of forms, methods and means of implementing a theoretically based educational process that allows achieving set educational goals. In this, it relies on appropriate scientific modeling (design), in which these goals are given in a single sense and the possibility of objectively measuring and assessing the personal characteristics and qualities of the learner at a certain stage of his development is preserved.

"Information and communication technology" is a concept that interacts with scientific issues in any pedagogical system. However, if a scientific issue represents the goals of teaching and education, then ICT represents the ways of

teaching and education, the means of achieving them. In this process, the qualities that are determined in the structure of the scientific issue, which must be formed and developed in students, participate as the goals of teaching under certain conditions and generally determine the specific nature of the educational content. Information and communication technology is a set of regulated and organized systems and applications that implement the processes of collecting, processing, storing, representing, distributing, transmitting and delivering information to the consumer with the help of computers and telecommunications in order to find solutions to various problems. The widespread computerization of information processing processes constitutes the content of ICT. Therefore, computers and their devices are at the heart of all modern ICT and constitute their technical support. Although technical support is important, it is not the only type of ICT support; in this regard, software support, information support, organizational support, etc. can be cited. The combined presence of the four types of support provides the opportunity to perform the tasks of information support for information processing

At the same time, while digital technologies are improving the quality of education, they are also creating new challenges, including varying levels of digital literacy among teachers and students, difficulties in using technologies, and issues of quality control of online resources.

This approaches education process quality increase , engineering of experts digital literacy reinforcement and modern working release to the needs suitable personnel to prepare service does .

Engineering in education digital of technologies place increasingly increasing is going on . Professional competence in formation traditional approaches with one in line interactive and digital tools harmonization necessary . High education institutions to the following attention their attention must :

1. Training programs digital to the environment adaptation ;
2. ICT tools use skills teaching ; teachers digital competence development ;
3. Modern laboratories and virtual environments with to provide .

REFERENCES

1. Uktamov D.O. Regulatory and legal framework for the use of digital technologies in the educational process. Collection of materials of the "International Scientific and Technical" conference on computer science and engineering technologies No. 2 October 13, 2023, 339-342.
2. Uktamov D.O. The role and importance of digital technologies in preparing future engineers for professional activity. Scientific Methodological Journal 2024 No. 2/2 131-136.
3. Uktamov D.O. Methodological system for using digital technologies in training future engineers. Professional education in Uzbekistan 2024 No. 1, 52-58.
4. Akhmedov J.R, Nurov U.X, Uktamov D.O. Technological map of the methodology for preparing engineering and pedagogues for innovative activities in an informational educational environment . International scientific and practical online conference "Computer linguistics: problems and solutions ". - Tashkent. 19.04.2021. Pages 29-36.
5. Uktamov D.O. Digital educational technologies as a means of preparing future engineers for professional activity. Innovative technologies in the environment of digitalization of higher education: Problems and solutions International scientific and practical conference March 14-15, 2024 105-109 .
6. Hamidov J.A, Murodova A.Y. (2023) Technology for development of professional and technical component of future engineers through virtual educational technology Atamuratov RK The educational advantages of virtual

reality technologies. The Competing Science and Technology International Journal, 4 May 2023, pp. 87-90.

7. Murodova A.Y. (2023) Virtualization in the training of engineers as a factor of increasing scientific efficiency. Academic Research Journal 2023. Pages 184-189.