

CHALLENGES OF DEVELOPING DIGITAL COMPETENCY AMONG STUDENTS OF THE OIL AND GAS UNIVERSITY

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***Abstract.** This study focuses on the challenges impeding the development of digital competencies in students of oil and gas higher education institutions. The theoretical frameworks underlying digital competence formation are analyzed. Special attention is given to the practical aspects of digital competencies peculiar to students specializing in the oil and gas field.*

***Keywords:** digitalization, competence, digital competencies, oil and gas industry, communicative competence, information and communication technologies*

Introduction.

The modern oil and gas industry is constantly evolving, driven by a series of transformative changes. A key factor influencing the direction of this transformation is the digitalization of the economy, which has introduced fundamental shifts in both the ideology and operational processes within the sector. In this context, higher education systems

must adapt to meet the evolving needs of the industry and harness the advantages offered by digital innovation.

Industry leaders, including executives, representatives of corporate universities, HR professionals, university rectors, and educational experts, are actively debating which models of digital competencies should be implemented in practice. The academic community is increasingly focused on critical issues such as: developing competency models for the digital economy within the framework of lifelong learning; redefining the role of educators in imparting digital skills; exploring innovative educational models and pedagogical technologies; and balancing digital, professional, and soft skills competencies.

Thus, the relevance of “digital competencies” has become indisputable. It is essential, therefore, to establish a clear understanding of the terminology surrounding digital transformation, as this provides a comprehensive foundation for developing digital skills and leveraging the benefits of digitalization within the oil and gas sector. Without this understanding, it is impossible to develop effective strategies for fostering digital competencies, establishing models for their formation, and creating methodologies for their development and evaluation. A holistic approach to the challenges of cultivating digital skills, as well as a thorough examination of the processes involved in updating and refining DC, is crucial for the sustained growth and success of the industry.

The COVID-19 pandemic, while severely impacting multiple industries, also catalyzed the rapid development of the information technology sector. It underscored the critical importance of integrating ICT and digital technologies into the operations of government

institutions, private enterprises, and public organizations. In response, the leadership of Uzbekistan is increasingly prioritizing international collaboration, particularly in the fields of innovation and the adoption of advanced technologies.

In this regard, it is essential to recognize the valuable experiences of Eastern nations, many of which have exhibited impressive rates of GDP growth. Regional leaders such as China, India, and Vietnam have become pivotal drivers of the global economy. Similarly, Japan and South Korea continue to lead in various domains of innovation and high-tech production. Singapore, Malaysia, and Thailand stand out for their remarkable achievements in global trade, particularly in the export of goods and services. Meanwhile, countries like the United Arab Emirates, Qatar, and Saudi Arabia are making significant strides in alternative energy, financial innovation, and space exploration. These examples highlight the potential benefits of adopting and adapting successful models of digital transformation and technological advancement for Uzbekistan's future development.

Contemporary digital technologies play a pivotal role in enhancing the operational efficiency of oil and gas companies. Innovations such as smart fields and digital twins of oil refineries are at the forefront of this transformation, positioning companies as leaders in the implementation of digital solutions. These advancements are central to the industry's overall competitiveness.

For this reason, it is essential that students in related academic programs gain proficiency in industry-specific software during their studies. These professional tools form the foundation of the automated workstations used by industry engineers, and equipping students with

this knowledge is crucial for fostering a workforce capable of supporting the ongoing digital evolution of the oil and gas sector.

A comprehensive understanding of concepts related to digitalization, particularly within the context of education, is crucial for fostering the dynamic development of digital communities. Such an understanding not only supports the flexible formation of these communities but also drives the continuous evolution and updating of digital skills. Ultimately, this process contributes to increased employment opportunities and enhanced productivity.

The phenomenon of digitalization has brought about significant changes in higher education, reshaping both the content and delivery of learning. Terms such as *digitalization*, *digital electronic environment*, *digital competencies*, *digital skills*, *digital literacy*, *digital content*, *digital footprint*, *digital twin*, *digital shadow*, and *digital tutor* have become increasingly prevalent in academic discourse. Initially, "digitalization" referred to the conversion of analog information into digital formats. However, in a broader sense, digitalization now encompasses social and economic transformations driven by information technologies, alongside corresponding shifts in business models.

In 2017, the European Commission (EC) launched the DigCompEdu project, within which digital competence is defined as the ability of individuals to apply ICT in a safe, critical, and creative manner.

According to G.U. Soldatova, digital competence is an individual's ability, grounded in continuous acquisition of knowledge, skills, motivation, and responsibility, to critically, effectively, and safely select and apply digital technologies across various life domains [2, p. 152].

The Higher School of Oil and Gas cannot remain indifferent to the challenges posed by digital transformation. Digitalization demands entirely new competencies, distinct from those possessed by university graduates. Moreover, according to G.L. Tulchinsky, the digital competence of university graduates should exceed the current nomenclature of competencies in order to stay ahead of the situation. The primary function of education, he argues, is to “teach how to learn”, to be ready for change, to work on more complex projects, to adopt advanced, including foreign, practices, and to broaden horizons by tracking trends in other industries and professions [3, p. 126].

In Uzbekistan, the development of the oil and gas industry is inextricably linked to the introduction of innovations at all stages. The oil industry today serves as the driving force for digitalization and the implementation of technological innovations. Modern industrial production complexes are so complex that operating them without digital technologies, automation, modeling, advanced equipment, modernization, and re-equipment is virtually impossible. Starting with the application of digital technologies in geophysics and seismic exploration, to drilling oil and gas wells, automating oil and gas production processes, managing pipelines, and overseeing transport infrastructure - not to mention the accounting of production, export, foreign currency, and tax revenues from the industry - all of this can only be achieved through digitalization, high energy efficiency, and optimal capital-labor ratios.

Currently, cutting-edge digital technologies help companies achieve high levels of operational efficiency. Smart fields and digital twins of oil refineries are leaders in adopting digital innovations, which, in essence,

form a core element of overall competitiveness. For this reason, it is of critical importance that students at our Branch study professional software products, based on which the automated workstations of industry engineers function, throughout their academic training.

The digitalization of both the economy and education has placed universities at the center of ongoing discussions regarding how to effectively and constructively respond to the demands of the digital economy. A key participant in the shift towards a digital economy is the university graduate, equipped with the skills necessary to work with information and digital technologies. Mastery of digital competence (DC) has become a critical factor determining the employability of graduates in the modern labor market.

The need to develop approaches to the formation and enhancement of digital competence among graduates of oil and gas universities calls for a thorough examination, justification, and research. It is essential to build models of digital competencies tailored to specific educational programs, as well as to design tools for supporting and updating these competencies.

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