JOURNAL OF MULTIDISCIPLINARY SCIENCES AND INNOVATIONS
VOLUME 5, ISSUE 03
MONTHLY JOURNALS
ISSN NUMBER: 2751-4390
IMPACT FACTOR: 9,08

METHODOLOGY FOR ASSESSING THE LEVEL OF FORMATION OF STUDENTS' DIGITAL COMPETENCIES IN THE STUDY OF INFORMATION TECHNOLOGIES

Jasur Djo'rayevich Ashurov
PhD, Associate Professor, Department of General Technical Sciences, Asia International University

Abstract

In the context of the rapid digitalization of society, the formation of students' digital competencies has become particularly important for successful professional activity. A modern specialist should possess not only theoretical knowledge in the field of information technologies but also the ability to effectively apply digital tools when solving professional tasks. In this regard, one of the key objectives of higher education is the development of scientifically grounded approaches to assessing the level of students' digital competence formation. This article examines the theoretical foundations of digital competence development and proposes a methodology for assessing their level among students studying information technology–related disciplines. Particular attention is paid to the development of criteria, indicators, and levels for evaluating students' digital competencies. Various methods for diagnosing and assessing students' knowledge and practical skills are also discussed. The proposed approach can be used in the educational practice of higher education institutions to improve the effectiveness of teaching and to enhance the system for evaluating educational outcomes.

Keywords

digital competencies, information technologies, digital literacy, educational process, assessment methodology, digital transformation of education, higher education.

Introduction

Modern society is developing under conditions of the intensive introduction of digital technologies into almost all spheres of human activity. The development of information and communication technologies, the digital economy, and electronic services leads to significant changes in the professional activities of specialists in various fields. In this regard, the system of higher education faces the need to train specialists who possess a high level of digital literacy and are capable of effectively using information technologies in their professional activities.

The development of students' digital competencies is one of the most important tasks of the modern educational system. Digital competencies include knowledge, skills, and abilities that allow individuals to effectively use information resources, digital tools, and technologies to solve professional and educational tasks. Students must be able to work with various software tools, analyze digital information, use internet resources, and apply modern communication platforms.

However, the process of forming digital competencies requires not only the improvement of the content of academic disciplines but also the development of effective methods for assessing the level of their formation. Traditional forms of knowledge assessment do not always allow for an objective evaluation of students' practical skills in the field of information technology application. Therefore, there is a need to develop a comprehensive methodology for assessing students' digital competencies.

The relevance of this research is determined by the need for higher education institutions to implement effective tools for diagnosing the level of students' digital training. An objective assessment of the level of digital competence formation allows educators to determine students'

preparedness, identify areas for improvement in the educational process, and enhance the quality of professional training.

The purpose of this study is to develop a methodology for assessing the level of formation of students' digital competencies in the study of information technologies within the higher education system.

The object of the study is the process of forming students' digital competencies in the educational environment of higher education institutions.

The subject of the study is the methodology for assessing the level of formation of students' digital competencies in the study of information technologies.

Research Methods

To achieve the research objectives, several scientific research methods were used. One of the main methods was the analysis of scientific and pedagogical literature devoted to the issues of digital competencies, digital literacy, and methods of teaching information technologies. The study of scientific sources made it possible to determine the main approaches to the formation and assessment of students' digital competencies.

The comparative analysis method was also applied in the research process. This method made it possible to compare various models for assessing digital competencies used in modern educational practice and to identify the most effective approaches to diagnosing students' digital skills.

An important role in the study was played by the method of pedagogical observation, which made it possible to analyze students' learning activities during the completion of practical tasks related to the use of information technologies. Observation helped to determine the level of students' proficiency in digital tools and to identify difficulties encountered when working with digital information resources.

To assess the level of students' digital competence formation, testing methods and practical assignments were used. Test tasks made it possible to determine the level of theoretical knowledge in the field of information technologies, while practical tasks allowed for the evaluation of students' ability to apply digital tools in the learning process.

The obtained data were summarized and systematized using analytical and interpretative methods, which made it possible to develop a methodology for assessing students' digital competencies.

Results

The conducted research demonstrated that students' digital competencies represent a complex set of interconnected knowledge, skills, and abilities that ensure the effective use of information technologies in educational and professional activities. The development of such competencies involves the ability to work with digital information, use software tools, apply internet resources, and utilize digital communication technologies.

Digital competencies include several interconnected components. One of them is information competence, which involves the ability to search for, analyze, and use information from various digital sources. Technological competence is also an important component, including skills in working with software, office applications, online services, and digital platforms.

A significant role is played by communicative competence, which is associated with the use of digital communication tools for information exchange, interaction in the educational environment, and organization of collaborative work. In addition, an important element of digital

competencies is the ability to follow information security rules and protect personal data when working in the digital environment.

To assess the level of formation of students' digital competencies, a system of criteria and indicators was developed that makes it possible to determine the level of students' digital preparedness. The assessment criteria include the cognitive aspect, reflecting the level of theoretical knowledge in the field of information technologies. The practical aspect is associated with the ability to use digital tools and software when performing educational tasks. The communicative aspect reflects students' ability to use digital technologies for interaction and information exchange. The analytical aspect characterizes the ability to analyze digital data and use information resources for solving professional tasks.

Based on the proposed criteria, several levels of digital competence formation among students were identified. A high level is characterized by confident use of digital tools, the ability to effectively apply information technologies to solve educational and professional tasks, and the ability to independently master new digital resources. A medium level indicates the presence of basic knowledge and skills in working with information technologies, although students may experience certain difficulties when performing more complex tasks. A low level is characterized by insufficient mastery of digital tools and limited knowledge in the field of information technologies.

Various assessment methods can be used in the process of evaluating students' digital competencies. Computer-based testing allows for the determination of students' theoretical knowledge. Practical assignments provide an opportunity to evaluate skills in working with word processors, spreadsheets, presentation software, and other digital tools. Project-based learning allows educators to assess students' ability to apply information technologies in solving complex tasks. An effective assessment tool is also the student's electronic portfolio, which reflects the results of their academic activities and completed digital projects.

Discussion

The results of the study confirm the need for a comprehensive approach to assessing students' digital competencies. The use of only traditional forms of knowledge assessment does not allow for a full evaluation of practical skills related to the application of information technologies. Therefore, it is advisable to combine different diagnostic methods, including testing, practical assignments, project activities, and the analysis of students' electronic portfolios.

The use of modern educational technologies and digital platforms is also of particular importance in the assessment of digital competencies. Online learning systems make it possible to automate the process of knowledge control, analyze students' academic performance, and ensure a more objective evaluation of their digital skills.

The proposed methodology for assessing digital competencies can be successfully applied in the educational process of higher education institutions when teaching disciplines related to information technologies. Its implementation contributes to improving the effectiveness of teaching and developing students' skills necessary for successful professional activity in the digital economy.

Conclusion

The development of students' digital competencies is one of the key objectives of the modern education system. The rapid development of information technologies and the digital transformation of society require the training of specialists capable of effectively using digital tools in their professional activities.

In the course of this research, a methodology for assessing the level of formation of students' digital competencies in the study of information technologies was developed. The proposed methodology is based on a system of criteria and indicators that allow for an objective evaluation of students' digital preparedness.

The use of a comprehensive approach to assessing digital competencies, including testing, practical assignments, project activities, and the analysis of electronic portfolios, allows for a more complete determination of the level of students' digital skills.

The practical application of the proposed methodology in the educational process of higher education institutions contributes to improving the quality of student training and enhancing the methods of teaching information technologies. Future research prospects are associated with the development of automated systems for assessing students' digital competencies and the integration of artificial intelligence technologies into the educational process.

References

1. Ferrari, A. (2013). *DIGCOMP: A framework for developing and understanding digital competence in Europe*. Publications Office of the European Union.
2. Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union.
3. Selwyn, N. (2016). *Education and technology: Key issues and debates* (2nd ed.). Bloomsbury Academic.
4. Spante, M., Hashemi, S. S., Lundin, M., & Algers, A. (2018). Digital competence and digital literacy in higher education research: Systematic review of concept use. *Cogent Education, 5*(1), 1–21. https://doi.org/10.1080/2331186X.2018.1519143
5. Van Laar, E., Van Deursen, A. J. A. M., Van Dijk, J. A. G. M., & De Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers in Human Behavior, 72*, 577–588. https://doi.org/10.1016/j.chb.2017.03.010
6. Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to learning and schooling in the digital networked world of the 21st century. *Journal of Computer Assisted Learning, 29*(5), 403–413. https://doi.org/10.1111/jcal.12029
7. UNESCO. (2018). *A global framework of reference on digital literacy skills for indicator 4.4.2*. UNESCO Institute for Statistics.
8. European Commission. (2022). *DigComp 2.2: The digital competence framework for citizens*. Publications Office of the European Union.