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## Information technologies in the educational process of higher educational institutions

### Інформаційні Технології в Освітньому Процесі Закладів Вищої Освіти

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Written by:

**Olesia Stoika<sup>1</sup>**<https://orcid.org/0000-0002-7695-6100>**Nataliia Butenko<sup>2</sup>**<https://orcid.org/0000-0001-8498-6441>**Viktoriia Miziuk<sup>3</sup>**<https://orcid.org/0000-0001-8291-6597>**Oksana Zinchenko<sup>4</sup>**<https://orcid.org/0009-0000-0029-5628>**Irena Snikhovska<sup>5</sup>**<https://orcid.org/0000-0001-6775-274X>

#### Abstract

Informatization of the educational process, in general, and the educational system of the higher educational establishments, in particular, is one of the most significant tasks of restructuring and shaping the education system in accordance with society requirements. Educational institutions nowadays have an opportunity to disseminate new material in a way that responds to the unique needs of each student thanks to using computer networks and online technologies. The purpose of the academic paper is to identify and provide a brief assessment of the primary trends in implementing information technologies in higher educational institutions (HEIs) in terms of the specifics of their application in the educational process. Methodology. In the course of the research, analytical and bibliographic methods. At the same time, induction, deduction, analysis, synthesis of information, system-structural, comparative, logical-linguistic methods, abstraction, and idealization were applied to study and process data. By the way, the research authors also conducted a questionnaire in online mode. Results. Based on the

#### Анотація

Інформатизація навчального процесу в цілому та учбової системи вищої школи зокрема є одним із найважливіших завдань перебудови та формування системи освіти відповідно до потреб суспільства. Завдяки використанню комп'ютерних мереж і онлайн-інструментів заклади освіти тепер мають можливість подавати нову інформацію у спосіб, який відповідає індивідуальним потребам кожного здобувача освіти. Мета статті – виокремити та надати коротку оцінку основних тенденцій реалізації інформаційних технологій у вищій школі з точки зору особливості їх застосування у навчально-виховному процесі. Методологія. Під час здійснення дослідження застосовано аналітико-бібліографічний метод, а також індукцію, дедукцію, аналіз, синтез інформації, системно-структурний, порівняльний, логіко-лінгвістичний методи, абстрагування, ідеалізацію для вивчення та обробки даних, та анкетне опитування, що було проведено авторами дослідження в онлайн-режимі. Результати. За результатами дослідження встановлено основні найбільш важливі

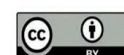
<sup>1</sup> Candidate of Pedagogical Sciences, Associate Professor, Foreign Languages Department, Faculty of Foreign Philology, Uzhhorod National University, Uzhhorod, Ukraine.

<sup>2</sup> Doctor of Economics, Professor, Department of Finance, Banking and Insurance, Taras Shevchenko National University of Kyiv, Kyiv, Ukraine.

<sup>3</sup> PhD in Pedagogical Sciences, Associate Professor, Department of Mathematics, Informatics and Information Activity, Izmail State University of Humanities, Izmail, Ukraine.

<sup>4</sup> Candidate of Philological Sciences, Associate professor, Faculty of Germanic Philology and Translation, Kyiv National Linguistic University Kyiv, Ukraine.

<sup>5</sup> Candidate of Philological Sciences, Associate Professor, Faculty of Pedagogical Technologies and Lifelong Learning, Department of Theoretical and Applied Linguistics, Zhytomyr Polytechnic State University, Zhytomyr, Ukraine.



research results, the primary and most significant theoretical aspects of using information tools in higher educational institutions, as well as the standpoints of scientists and heads of departments of higher educational institutions on key aspects of the issue outlined.

**Keywords:** information technologies, information and communication technologies, informatization of the educational process, information support, information educational resources.

## Introduction

The current level of development in the field of information technology requires the introduction of information tools in the educational process at various education levels. Information technologies make it possible for a HEI's teacher to conduct classes, lectures, and control activities in an effective, engaging, and understandable way.

The theoretical part of the present research substantiates the concept, components and key aspects of using information technologies in higher education.

The practical part of the research includes assessing the components of the content provision of the educational process in higher educational institutions that have been most developed in recent years. It comprises the main stages of ICT introduction in the educational process of higher educational institutions that are most in need of scientific and methodological refinement, the primary aspects of successful methodological work of higher educational institutions on introducing relevant ICTs in the educational process. Along with this, it determines key training directions that have been particularly successfully developed due to the active use of ICT in higher education, as well as the main ways to most effectively eliminate the shortcomings of ICT use in the educational process in HEIs.

Based on the research results, conclusions were made regarding the issues raised. In particular, it has been found that in recent years, information technologies have developed especially significantly the following components of the educational process in higher education institutions: structuring of educational material, development of particular educational and methodological modules, information support on the topic, tests for summarizing intermediate and final survey results, structured materials for distance learning courses. At the same time, the principal stages of ICT implementation in the

теоретичні аспекти питання використання інформаційних засобів у ЗВО, а також досліджено точку зору науковців та керівників кафедр закладів вищої освіти щодо ключових аспектів даного питання.

**Ключові слова:** інформаційні технології, інформаційно-комунікаційні технології, інформатизація освітнього процесу, інформаційне забезпечення, інформаційні освітні ресурси.

educational process of higher educational institutions that currently require the most scientific and methodological refinement are the knowledge and conviction of the participants of the educational process on using ICT in learning. The primary aspects of the successful methodological work of a higher educational institution on introducing particular ICTs in the educational process of a higher educational institution are as follows: focus and subordination of ICTs to general educational tasks, the established training priorities, effective selection of information methods, forms and means of training, provision of participants of the educational process with relevant pedagogical and methodological literature, information resources and training workshops. According to the survey results, it was established that the key areas of learning that have been particularly successful due to the active use of ICT in recent years in higher education are collaborative and practical learning, achieving personal results by each student, and as a powerful tool for effective independent study. The research has shown that the principal ways to eliminate the problems arising from using information technologies in higher education are familiarization with the theoretical fundamentals of ICT and the exchange of pedagogical experience through participation in specially organized workshops by ICT developers and scholars.

## Literature Review

Currently, it is necessary to teach each pupil or student to master, transform and use huge amounts of information in practical activities in a short time. It is very important to shape the learning process in such a way that the student actively, with interest and enthusiasm, works in the classroom, sees and appreciates the fruits of his labor (Ates, 2020; Lim et al., 2022).

A combination of traditional teaching methods and modern information technologies can help teachers solve this difficult task, as their use in

the classroom provides mobile, strictly differentiated, and individualized learning (Ridkodubska et al., 2022).

The application of the internet and other technological advances allows citizens to gain information, skills, and abilities in a variety of other fields. Digitalization and multi-formatting are currently the primary trends in the overall labor market. The ability to use digital technologies at work is gradually becoming a requirement for most disciplines and professions. The educational process nowadays faces fundamentally new challenges due to the peculiarities of developing the information society and the computerization of the management of planning the educational process of higher education. Their implementation is possible only through the rational use of technical achievements, creating conditions for free access to information resources. Only in this case will it be possible to increase the intensity of social-economic processes in general, enhance the role and importance of information technologies, continuously develop information and communication systems, technologies and services, and form a national scientific and educational information system (Moscardini, Strachan & Vlasova, 2022; Taroc & Paculba, 2018).

Currently, it is common to define information technology as a set of methods, production processes, and software and hardware tools integrated into a technological chain that ensures the collection, processing, storage, distribution, and display of information. The better a person knows and uses the latest information technologies, the more secure his position in the labor market is (Tracey, Wang, Trimble & Mainsbridge, Douglas, 2022).

Information technologies have a double impact on the education sector. On the one hand, ICTs initiate the creation of new approaches to learning, opening up additional opportunities in the field of training and knowledge management. On the other hand, the introduction of IT in the educational process contributes to developing a future specialist's important qualities (thinking, memory, attention, observation). ICTs contribute to acquiring professional knowledge, skills and abilities, creating conditions for developing talents, skills and abilities for optimal decision-making, and the ability to self-assess, systematize and summarize the information

received (Zhanga & Aslan, 2021; Fuertes-Camacho et al., 2019).

The leading vector of our modern times is the search for integrated solutions that allow creation a unified educational environment with the help of information technologies. As the experience of developed foreign countries shows, an excellent solution to this problem is the introduction of the latest information tools into the educational process (Starko et al., 2022; Ratheeswari, 2018).

The introduction and use of modern software tools and information technologies in the educational process of higher educational institutions radically change the conditions of activity of all participants in the educational process (Cherkasov et al., 2023).

The purpose of the research is to determine the standpoints of scientists and heads of departments of higher educational institutions on the features of using information technologies in higher education.

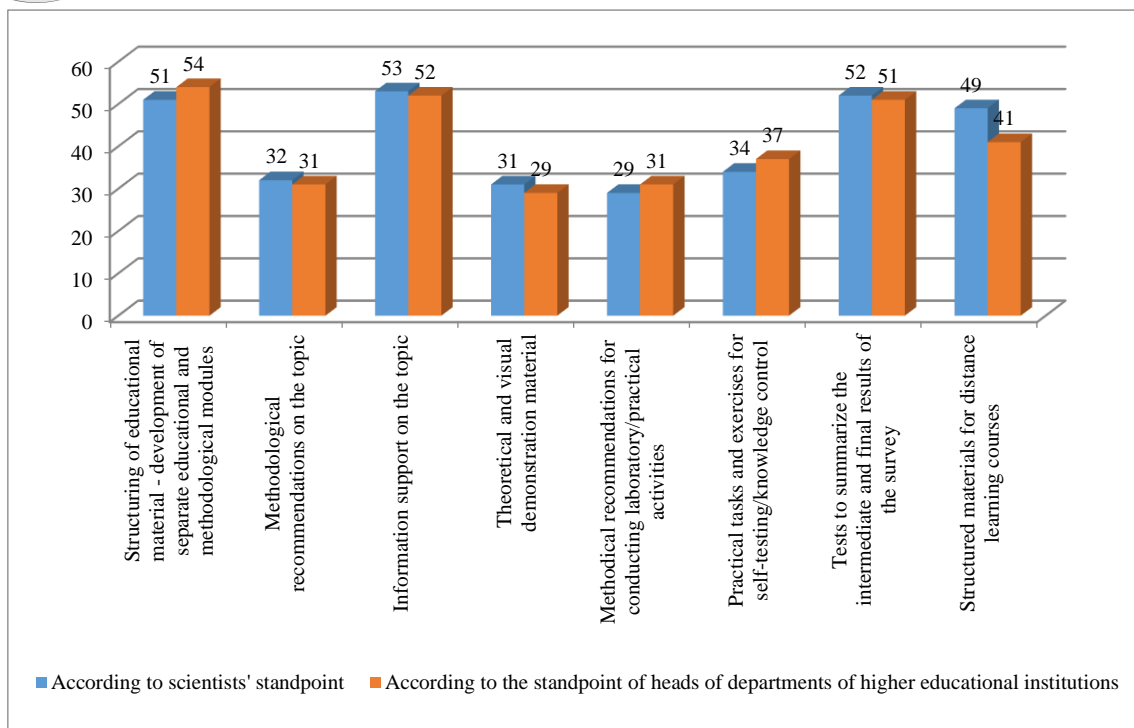
## Materials and Methods

A practical study of the modern trends of using information technologies in higher educational institutions was conducted by interviewing 217 scientists and 233 heads of departments of higher educational institutions conducting scientific activities and teaching in 11 higher educational institutions in Odesa, Cherkasy, Ivano-Frankivsk and Khmelnytsky regions of Ukraine. The research was conducted using the Google Forms service.

## Results

According to the survey participants' viewpoint, currently, in the conditions of special attention to the trends of education informatization, information technologies have gained the greatest development in recent years in relation to the following components of content provision of the educational process in higher educational institutions (Figure 1):

- structuring of educational material – development of separate educational and methodological modules;
- information support on the topic;
- tests to summarize the intermediate and final results of the survey;
- structured materials for distance learning courses.

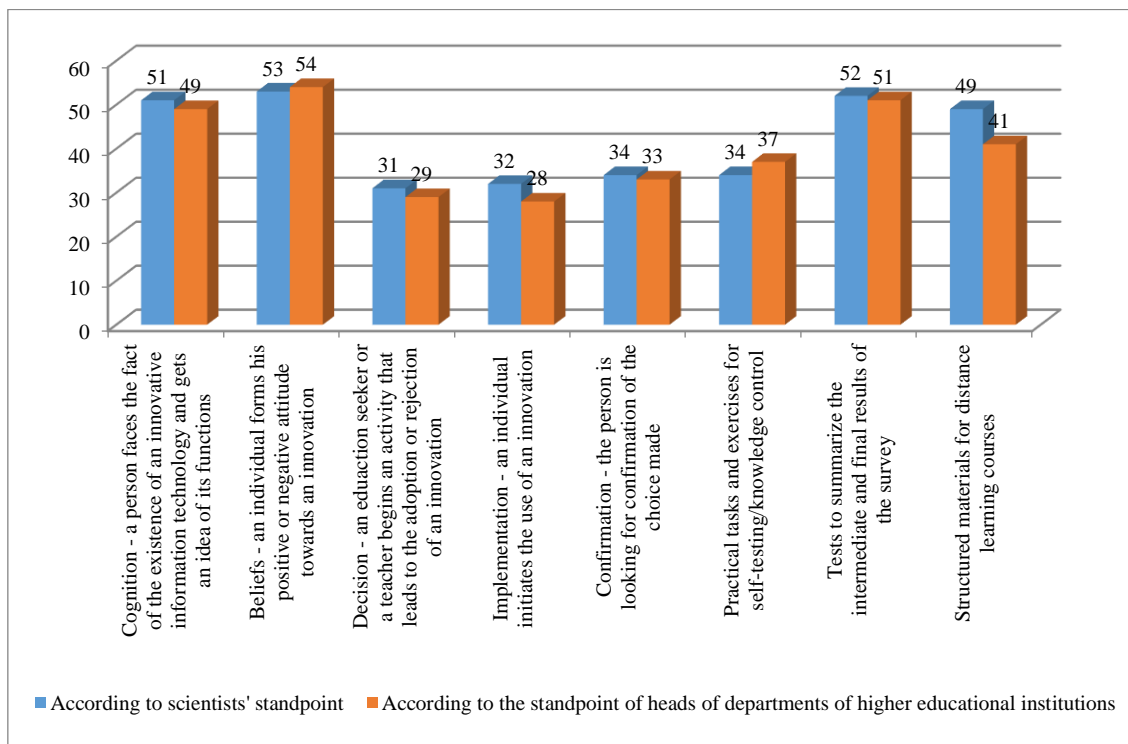


**Figure 1.** Components of the content provision of the educational process in higher educational institutions that have gained the greatest development in recent years, %.

Source: compiled by the authors.

In the course of the survey, respondents identified the stages of ICT implementation in the educational process of higher educational

institutions that currently require the most scientific and methodological refinement (Figure 2).

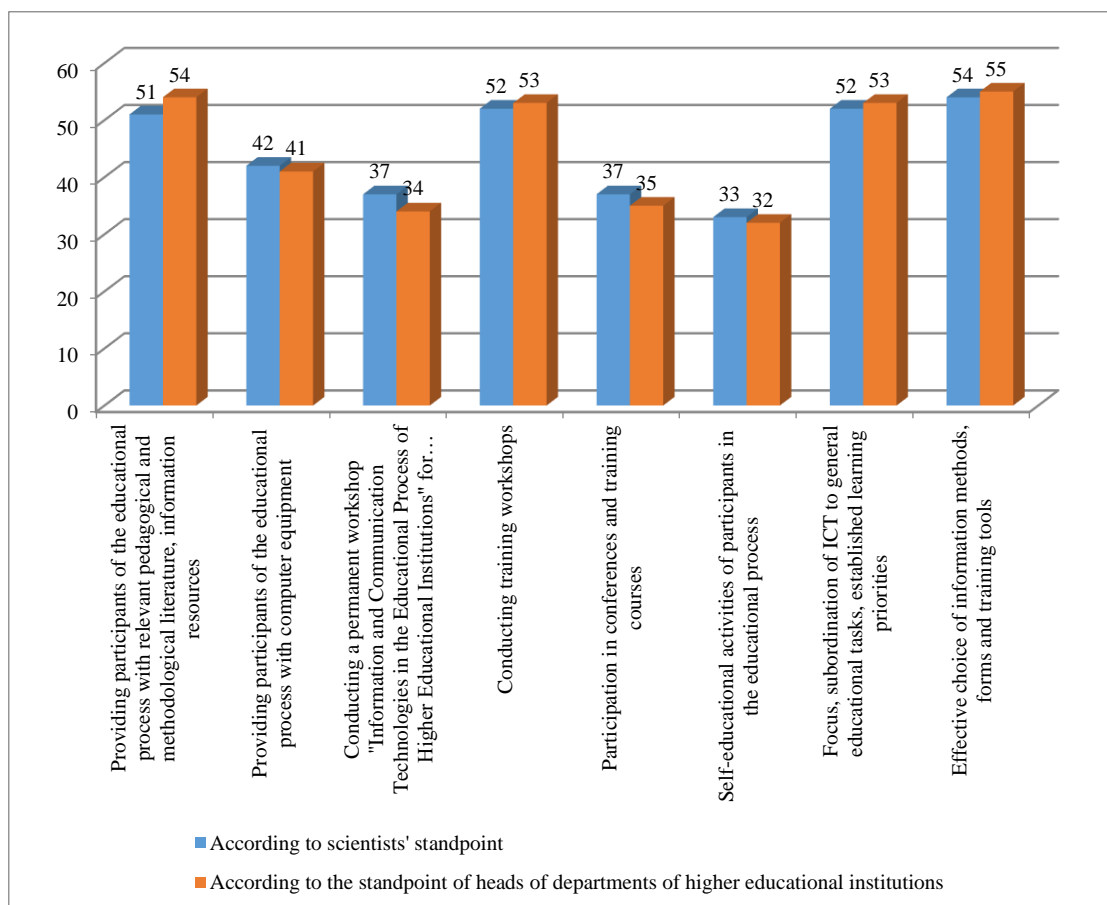


**Figure 2.** Stages of ICT implementation in the educational process of higher educational institutions that currently require the most scientific and methodological refinement, %.

Source: compiled by the authors.

As can be observed from Figure 2, according to the respondents' standpoint, special attention in terms of scientific and methodological support nowadays is needed to educate and convince the participants of the educational process to use ICT in the learning process.

An important survey result is the identification of the successful methodological work's principal aspects in introducing certain ICTs into the educational process of higher educational institutions (Figure 3).



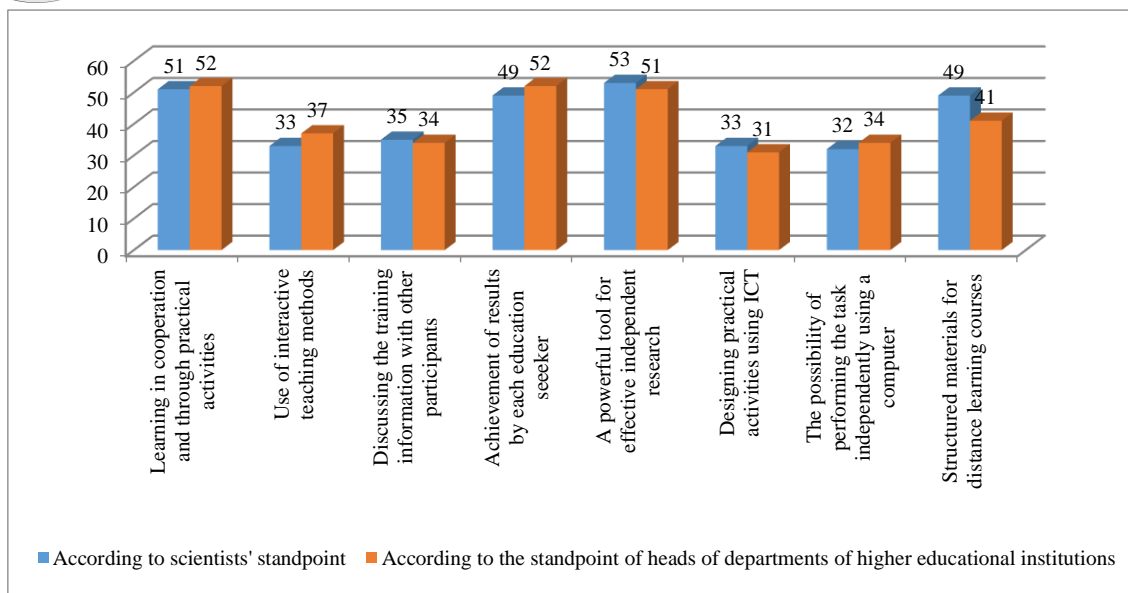
**Figure 3.** The primary aspects of the successful methodological work on introducing certain ICTs in the educational process of a higher educational institution, %.

Source: compiled by the authors.

As can be seen from Figure 3, according to the survey participants' standpoint, the quality of using information technologies in higher education is determined by the content of the methodical work of the higher educational institution in the following directions: the orientation, subordination of ICT to general educational tasks, established learning priorities, effective selection of information methods, forms and means of education, provision of participants in the educational process with relevant pedagogical and methodical literature, information resources and conducting educational workshops.

In the course of the research, the respondents were asked to identify the key areas of study that have been particularly successful due to the active use of ICT in recent years in higher education (Figure 4):

- learning in cooperation and through practical activities;
- achievement of results by each education seeker;
- a powerful tool for effective independent research.

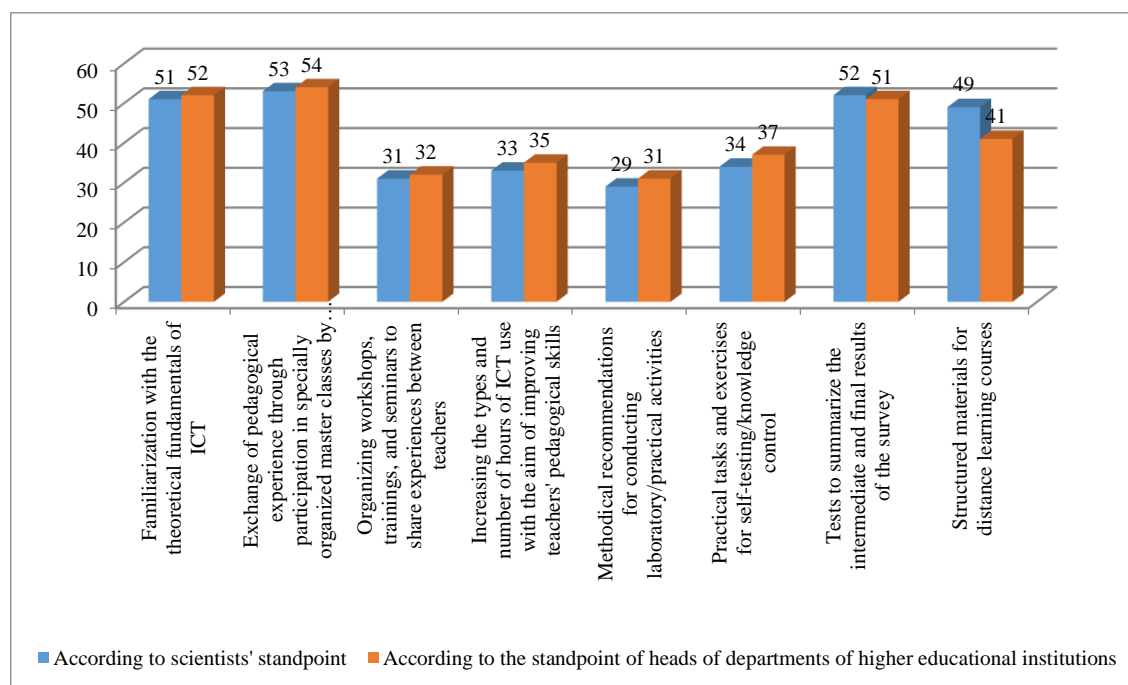


**Figure 4.** Key areas of study that have been particularly successful due to the active use of ICT in higher education, %.

Source: compiled by the authors.

By the way, the research participants consider it expedient to eliminate the difficulties of using

ICT in the educational process in several ways (Figure 5).



**Figure 5.** The basic ways to eliminate the shortcomings of using ICT in the educational process in higher education, %.

Source: compiled by the authors.

The survey revealed that the primary ways to eliminate the shortcomings arising in relation to using information technologies in higher education are familiarization with the theoretical fundamentals of ICT and the exchange of pedagogical experience through participating in

specially organized workshops of ICT developers and researchers.

### Discussion

Informatization of society is a promising way of its economic, social and educational



development. Computerization of education is aimed at forming and developing the intellectual potential of the nation, improving the forms and content of the educational process, introducing computer-based teaching and testing methods, which will make it possible to solve educational problems at the highest level, taking into account international requirements. The interactivity of the learning process and feedback are significant advantages of these technologies, which has led to the need for their use in various fields of activity, especially in the education sphere (Fuentes-Camacho et al., 2019; Lubicz-Nawrocka & Owen, 2022).

The degree of society's informatization as a global social process is directly related to the informatization degree of education, which directly depends on the relevant provision of educational institutions with the necessary equipment and software, as well as the effectiveness of their use. Achieving a high level of education informatization depends on mass computer literacy and the formation of information culture, that is, the ability to use information technology tools, the most common software products, knowledge of the specifics of data and information flows on the Internet (Stathopoulou et al., 2019).

Information and communication technologies are a crucial component of contemporary education since high-quality discipline teaching is no longer feasible without using computer technologies and the Internet. In our opinion, a modern teacher should be professionally competent in information technologies, technically educated, and aware of the importance of mobility of their own professional functions in the context of scientific and technological progress and competition (Lee et al., 2021; Røe, Wojniusz & Bjerke, 2022).

Competence and preparation for using information technologies in professional activities is a special type of activity. It requires not only mastery of teaching methods in the higher educational institution, pedagogical skills, knowledge of the basics of pedagogy, psychology, etc. but also skills that make it possible to practically interact with information (Martin & Padula, 2018; Okoye, 2022).

An important practical task of reforming and modernizing science and education is to inform the processes of pedagogical and scientific activity as a technological component of the organization of higher education institutions (Knoche, 2022; Lai, Saab & Admiraal, 2022).

## Conclusions

Thus, the analysis of scientific literature on the research topic and the survey results showed that using and applying modern information technologies in education is one of the most significant and sustainable trends in the development of the world's educational process. In recent years, computer equipment and other means of information technology have been increasingly used in mastering most subjects in higher educational institutions. Informatization has had a significant impact on the process of learning. New information and communication technologies make it possible to intensify the learning process, and increase the speed of perception, understanding and depth of assimilation of huge amounts of information.

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