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The Influence of Information Technologies on Modern Teaching Methods

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Abstract

The research focuses on analysing the transformation of traditional approaches to education in response to modern challenges and the needs of the global labour market. The study aims to determine the main trends and prospects for the use of information technologies in education and assess their impact on the formation of qualified personnel capable of functioning effectively in the digital economy. The study emphasises the importance of innovative teaching methods for preparing students to work in an intercultural and multidisciplinary environment. The study results testify to the importance of integrating information technologies in the educational process to improve the quality of education and the formation of professional competencies of the teaching staff. The main prospects for developing educational technologies are characterised, and recommendations are offered for optimising the use of digital tools in the educational process, taking into account the current trends in the development of global education and the challenges of the labour market.

Keywords: *Information Technologies, Modern Teaching Methods, Digitisation of Education, E-Learning, Digital Literacy, Innovative Technologies, Innovative Potential, Innovative Thinking, Innovative Activity.*

INTRODUCTION

Traditional teaching methods have long been the backbone of educational systems worldwide, including lectures, seminars, written assignments, and standardised exams. Educational methods rely on direct interaction between the teacher and students in the physical classroom, where the main form of interaction occurs as the transfer of knowledge from the teacher to the student. This approach to learning has its advantages due to its structure and direct control over the learning process. However, it has limitations in the form of low flexibility and individualisation of the learning process. The development of technology and changing educational needs have prompted the search for new approaches, which has led to the transition to digital learning methods. Digitisation of education has opened the way to electronic textbooks, online courses, interactive webinars and virtual laboratories, which offer students greater freedom in choosing the pace, learning style, and access to the latest research materials from anywhere in the world. The change in the conditions of the global labour market, caused by the development of technologies, the globalisation of the economy and the growing importance of knowledge in all spheres of activity, requires training a new generation of specialists from educational systems. The modern labour market requires in-depth professional knowledge, digital skills, the ability to work in a multicultural environment, adaptability and readiness for continuous self-development. Labour migration and the integration of economies create a need for language skills and an understanding of cultural differences. Information technologies provide tools for effective and targeted learning, allowing educational programs to quickly adapt to changes in the labour market and prepare students for the challenges of a globalised world. Educational institutions, including universities, colleges and alternative education platforms, are actively

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implementing new teaching methods to meet the growing needs of students and the labour market. The use of interactive platforms, gamification of the educational process, introduction of courses in programming, digital design, cyber security and other modern disciplines reflects the strategy of educational institutions to provide students with the necessary knowledge and skills. The growing popularity of massive open online courses (MOOCs) and other forms of distance learning indicates a gradual transition from a traditional education model to a flexible and accessible one. Educational transformation expands opportunities for learning and development, requiring educational institutions to constantly update approaches to ensure the relevance of the formation of skills that meet the needs of the global labour market.

LITERATURE REVIEW

The impact of information technologies on modern teaching methods is the subject of active research in the scientific community, which studies how the change in teaching paradigms is moving towards digitalisation. The author (Hasanah, 2023) examines the integration of digital technologies into educational processes, pointing to a significant increase in accessibility and individualisation of education through online courses, mobile applications, and virtual classrooms. The study (Sangrà, 2023) emphasises that information technologies contribute to the effectiveness of learning and forming new skills in students. The article (Srimanechai, 2023) confirms that digital literacy and self-education are critically important in today's information society. Scientific statements (Džanić, 2020) highlight potential problems related to digital learning, including the digital divide and cybersecurity issues, which require additional efforts to address. A scholar (Lianhong, 2022) describes the global transition to distance education accelerated by the COVID-19 pandemic, accompanied by challenges for digital infrastructure. An analysis (Alnasib, 2023) showed that distance learning can provide high flexibility and accessibility but requires direct investment in technical infrastructure and teacher training. Research (Roick, 2023) indicates the importance of developing a new methodology for evaluating and verifying knowledge of online learning, as the communication of the new educational space is significantly differentiated from the traditional one.

The author (García-Hernández, 2023) investigated the impact of information technology on the development of professional skills, finding that e-learning and virtual training significantly increase the effectiveness of corporate education, allowing companies to quickly adapt to changes in the demands of the labour market. The publication (Vassievna, 2021) devotes the issue to the study of international experience in using information technologies in education and integrating specialised platforms for it. The scientist (Veber, 2022) analyses the successful practices of Asian countries in implementing digital tools to improve the quality of education, as they are based on encouraging joint projects. Studies (Gleiß, 2023) emphasise the importance of global cooperation and knowledge exchange between countries to develop effective strategies for integrating information technologies into educational processes. The scientist (Shieh, 2016) points to the need to consider each country's cultural and socioeconomic characteristics when planning and implementing educational initiatives. According to research results (Jiang, 2022), the influence of information technologies on modern teaching methods is dominant and requires the integration of digital tools and platforms. Research (Liu, 2022) indicates the significant impact of online courses and electronic resources on self-directed learning, allowing students to plan their educational path personally. Scientific work (Zhao,2021) notes the importance of a balance between technological innovations and the need to preserve direct communication and practical experience in learning. From the point of view of innovation, the author (Kornienko, 2023) examines the role of cloud technologies in disseminating digital learning systems for the availability of many students. The article (Parra-Domínguez, 2023) examines the challenges related to cyber security and protection of personal data due to the growing use of online platforms and specialised services, with the development of which a monitoring and support mechanism should be developed. Based on (Yan, 2023), it was found that the renewal of teaching methods requires educational institutions to adapt the teaching staff to new technological trends quickly. The scientist (Jensen, 2023) studies strategies for developing digital literacy among teachers, which is a critical factor for successfully integrating IT into the educational process. The authors (Bojic, 2023) examine the impact of massive open online courses on the differentiation of education, providing students worldwide with access to high-quality educational resources with reduced learning times. Thus, the literature review emphasises the rapid development and impact of information technologies on modern teaching methods while pointing to the

importance of solving challenges related to cybersecurity, maintaining the quality of education, and developing digital literacy.

RESEARCH GOALS

The study aims to determine the impact of information technologies on modern teaching methods and to update the analysis of changes in approaches to education caused by the rapid development of digital tools and platforms. The problem of the research is to identify the positive and negative aspects of the integration of technologies in the educational process due to the impact on the quality of education, the availability of education and the development of skills needed in the modern labour market. The main task of the research includes the collection and analysis of data on the latest trends in the use of IT in education, the evaluation of the effectiveness of innovative methods, and the development of recommendations for educational institutions. The research direction is determined by the need to adapt educational programs to the requirements of the globalised world and the labour market. The practical value of the research lies in the contribution to the improvement of educational processes through the introduction of effective information technologies, promotion of the improvement of teachers' qualifications and the development of students' competencies that meet the needs of modern society and the economy.

MATERIALS AND METHODS

To conduct the research, a comprehensive analysis of the experience of educational practices in America, Europe and Asian countries was carried out, which made it possible to determine the main trends and innovative teaching tools used in modern institutions. An analysis of the implementation of digital technologies was applied to ensure adequate global learning for the personalisation of the educational process. The sample of the educational experience of Europe, America and Asia countries was formed based on a review of scientific publications, reports of international educational organisations, analytical materials, independent research centres and official documents of educational institutions. The article uses statistical information and forecasting methods to assess trends in the development of the information technology market in education. Based on the analysis of data on investments in the field of EdTech, the dynamics of the growth of demand for information technologies in education, forecasting changes in the needs of the labour market, and effective training methods have been identified. The study covered the experience of leading universities and the corporate educational sector in integrating the latest technologies into the educational process. The methodology uses a deductive method to outline specific examples of the successful integration of information technologies into the educational process. Empirical methods made it possible to assess the current state and prospects for the development of education in the spread of IT infrastructure to determine the best practices and strategies that can be recommended for further implementation in educational institutions of the global world. The results of surveys in American educational institutions made it possible to process primary data on user satisfaction with innovative educational tools, demand for digital platforms and their impact on student's motivation and educational results. Users face potential barriers and difficulties when integrating new technologies, which is the object of research in the article. The proposed research methodology makes it possible to present the results consistently, considering the needs of developers of educational programs and technologies, teachers in improving teaching methods and conducting pedagogical activities, and contributing to the further improvement of ensuring high-quality education.

RESULTS

The digital revolution in recent decades has catalysed profound changes in many aspects of human life, including how we communicate, work, play, and learn. The modern world cannot be imagined without the widespread use of the Internet, mobile applications, cloud services, and digital infrastructure, which have become convenient tools for developing new approaches in various fields. In education, e-books, online courses, virtual classes, interactive platforms for independent learning and simulation programs that allow you to acquire knowledge and skills in a game form is spreading. Digital technologies provide access to unlimited information, promote a personalised form of the educational process, and allow students to work with accurate data and solve complex practical tasks, making learning more effective and exciting.

Integrating information technologies into traditional teaching practice and modernising the general education system opens up new horizons for teachers and students. Electronic whiteboards, interactive textbooks, online libraries, learning platforms that use cloud technologies and specialised software are becoming the norm. Teachers get the opportunity to use flexible and innovative teaching methods, which helps attract students' attention and increase the efficiency of the educational process. Modern professional competence consists of skills such as critical thinking, working with information, teamwork, and self-education, which are the driving factors of the information society.

The growth of investments in electronic education and the formation of progressive business models based on information technologies stimulate the creation of innovative educational platforms, courses and materials. New forms of universities offer flexible online learning programs, certification courses, massive open online courses (MOOCs), and specialised platforms for teaching programming, design, business skills and other specialisations. Ensuring the democratisation of access to quality education opens the potential for technological development for entrepreneurs and startups in educational technology. Cooperation between educational institutions, technology companies and government organisations allows to scale innovative educational projects, improve the quality of education and make them accessible to broad segments of the population worldwide. The outlook for EdTech market development is depicted in Chart 1, taking into account the potential of today's investors and their interest in market development.

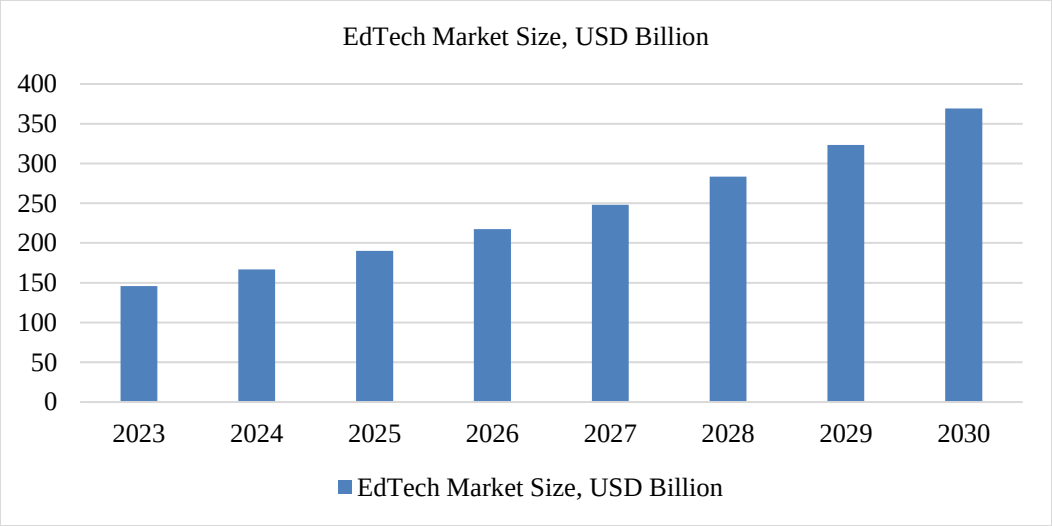

Figure 1. Forecast to Global EdTech Market (USD Billion).

Source: Compiled based on HolonIQ Report (HolonIQ, 2024)

In the modern pedagogical practice of using information technologies, new methods of teaching and learning are used, which are aimed at increasing the efficiency of the educational process and developing students' analytical skills. Among innovative methods, it is worth highlighting the flipped classroom, where students learn new material at home through video lectures and interactive tasks. Class time is also used for in-depth study of the topic through discussions, project work, and solving practical problems. Applications of gamified learning elements include game mechanics and rewards to increase student motivation and engagement (Rusakova et al., 2023). Encouraging students to learn independently through digital technologies is becoming one of the critical aspects of modern education. With the availability of online resources in the form of e-libraries, educational videos, specialised websites and online course platforms, students are mastering academic disciplines at a rapid pace. Digital technologies contribute to developing skills in independent information search, critical analysis of sources and effective use of acquired knowledge to solve real problems. An essential element is the implementation of learning management systems (LMS), which allows you to track your progress, receive feedback from teachers and adjust your learning process depending on individual needs and goals.

Learning platforms and cultural aspects of global learning create a unique opportunity to acquire knowledge in an intercultural environment. Platforms Coursera, EdX, and Khan Academy provide access to courses from the world's leading universities and promote interaction of students from different countries through forums, group projects and online seminars. Through educational cooperation, the problems of intercultural communication and respect for cultural differences are solved. Global training is valuable as it enables specialists to work effectively in international teams, understand global trends, and adapt to the changing global labour market. Integrating digital technologies into pedagogical practice transforms teaching and learning methods and contributes to forming an open, global educational space; the main ones are shown in Table 1.

Table 1. Teaching methods and their application based on information technologies

Teaching method	Appointment	Technologies
Blended learning	Combines traditional classroom lessons with online modules, increases the flexibility of learning.	Moodle, Blackboard, Google Classroom
Flipped learning	Students learn new material at home, and class time is used for practice.	Khan Academy, YouTube, Coursera
Self-study	Technology provides resources for self-paced learning.	Duolingo (languages), SoloLearn (programming), Kindle (reading)
Collaborative learning	Facilitates collaboration between students through online tools.	Google Docs, Slack, Trello
Game methods of learning	Uses game elements to increase engagement and motivation.	Minecraft Education Edition, Kahoot!, Quizizz
Project training	IT provides tools for project planning, development and presentation.	Microsoft PowerPoint, Adobe Creative Cloud, and GitHub for joint development of projects
Adaptive learning	Artificial intelligence adapts the educational material to the needs of each student.	Smart Sparrow, DreamBox Learning, ALEKS
Distance Learning	Allows to learn without physical presence in the classroom.	Zoom, Microsoft Teams, and Google Meet for video conferences; Canvas for managing educational materials

Source: Developed by the authors

The impact of information technologies on modern methods of educating learners is not limited to distancing the educational process and skills of self-planning, time management, and self-control. Modern educational technologies based on contemporary tools, including artificial intelligence, provide the opportunity to enhance the efficiency and effectiveness of the educational process significantly.

Innovations in educational activities are driven by the active formation, dissemination, and improvement of approaches and means to address didactic tasks in the training of specialists, in harmonious synergy with creative search, the application of unconventional, progressive technologies, original didactic ideas, and innovative formats for ensuring the educational process. Non-standard theoretical and practical tasks, modern modelling, individualisation of educational tools, multimedia technologies, educational and methodological support, and new-generation assessment systems form the foundational vector of modern teaching methods. Among these, one can distinguish personalised, integrative, collective action, informational, distance, creative, and modular developmental methods based on their specific impact on learners. A practical approach to the educational process involves using methods that ensure mastery of the subject matter, stimulate and motivate educational and scientific activities, and intensify the modernisation of control and self-control in educational activities.

Within educational practice, the diversification of teaching technologies allows for their active and effective combination through the modernisation of the traditional educational process. This emphasises the personal development of future professionals and the ability to acquire new experiences in creative and critical thinking, role-playing, and simulation modelling for solving educational tasks.

The growing popularity of information technology in education has brought significant benefits but also created new threats to an effective system. Digitisation of the educational process has made education accessible and individualised. It allows students to study the material independently, using online resources, video lectures, interactive courses and virtual laboratories. Developing independent learning and critical thinking skills is necessary for successful adaptation in the labour market and requires implementing digital infrastructure. However, reliance on technology can reduce students' interpersonal communication and physical activity and create data and privacy issues. There is a risk of increasing social inequality, as not all students have the same

access to high-quality technology and the Internet. Therefore, government policy should find a balance between the use of technology in education and the preservation of personal through the development of social skills and emotional intelligence.

The diversity of approaches to education in different parts of the world reflects the cultural, economic, and social differences between regions, particularly in Europe, Asia, and the Americas, where each region has developed a unique education system that has adapted to its needs and goals. In Europe, education systems emphasise a deep understanding of the fundamental sciences, languages, and humanities, strongly emphasising critical thinking and student-centred learning (Tamozhska et al., 2023). Asian countries, such as South Korea and Japan, focus on high competition, early talent detection, and intensive preparation for entrance exams that open doors to universities. The American educational system is distinguished by its flexibility and diversity in comprehensive personality development. It offers a wide range of academic and professional programs covering students' various interests and ambitions, from traditional sciences to modern disciplines. The US education system actively integrates information technology into the educational process, promoting the development of skills necessary for successful careers in the 21st century and providing students access to a global network of knowledge and resources. The most popular platforms in the US are depicted in Chart 2, which shape today's digital education infrastructure.

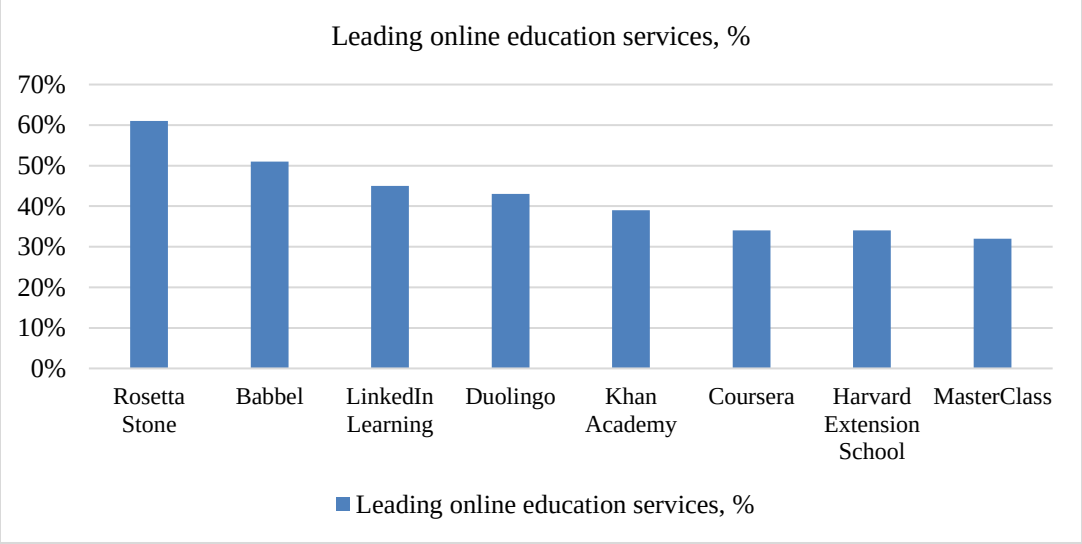

Figure 2. Leading online education services ranked by brand awareness in the United States in 2023, %

Source: Compiled based on Statista (2023)

The role of the corporate sector and the state in integrating information technologies into the educational process is crucial. The business invests in developing the latest educational technologies and platforms and cooperates with educational institutions to train specialists capable of meeting the needs of the modern labour market. Creating scholarships, internship programs, and professional development courses builds a foundation between academic knowledge and practical skills. The state plays a crucial role in regulating the educational sphere, ensuring equal access to quality education for all segments of the population, and protecting the rights of students. Public investment in education infrastructure is critical to reducing the digital divide and transforming learning methods. Interaction between all stakeholders is the key to creating an inclusive, adaptive and innovative education system that can meet future challenges.

Competition for educational personnel in information technologies and modernisation of education methods is one of the critical trends of the modern educational space, which requires universities, colleges and other educational institutions to reform teaching methods actively. Universities must provide deep theoretical knowledge, development of practical skills, critical thinking and the ability to learn quickly, which are indispensable for success in the IT field (Kryshtanovych et al., 2024). The demand for digital skills pushes

educational institutions to modernise educational programs, integrate the latest technologies into the learning process, and create laboratories and innovative research centres. The role of highly qualified teachers, capable of imparting relevant knowledge and implementing innovative teaching methods that contribute to deeper assimilation of the material and development of skills necessary for work in the modern technological world, is growing. Existing competition stimulates educational institutions, students and teachers to constant self-development and innovation to modern requirements while increasing the quality of education and opening new opportunities for career growth in the field of information technologies.

DISCUSSION

Further studies of the influence of information technologies on modern teaching methods are analysed from the point of view of digital integration. The results differ from those (Sukri, 2023), as more attention is focused on developing digital literacy among teachers and strengthening the development of digital infrastructure. The hypothesis (Rossikhin, 2020) is confirmed by his analysis regarding the potential of innovative digital solutions in education and developing a personalised approach. According to (Neboga, 2023), the article emphasises the need to implement programs to expand digital literacy and to develop specific tools that will become effective for developing digital skills. Compared with (Buhl, 2023), the study examines the use of American and European experience in more detail, indicating the high integration of students in digital education. According to (Hu, 2022), the technological readiness of institutions and the availability of equipment are critical success factors, reflected in the article and the works of other researchers. As noted by (Alshammary, 2023), the results confirm the role of MOOCs in democratising education and the need to adapt courses to different cultural and educational contexts. Scientists (Hasanspahić, 2020) found a significant role of interactive technologies in the cooperation of students with globalised educational platforms. This approach is consistent with findings (Wardat, 2023), as the effectiveness of modern interactive tools is highly popular worldwide. Our results emphasise the opinion (Behar, 2023) that modern teaching methods aim to communicate and stimulate individual learning with optimal time management. The article (Nhung, 2022) on cyber security issues impacts the trust and acceptance of online learning, as the rational protection of web resources extends their implementation in educational institutes. The article (Pesek, 2022) emphasises the need to develop extensive data protection strategies in educational institutions, create individual platforms and build a reputational component of universities. Comparing the findings with (Degen, 2022), the understanding of the processes of digital literacy development among teachers is deepened, indicating specific areas where targeted training programs are needed. Therefore, the existing scientific discussion emphasises the unique contribution of research to the search for quality solutions through information technology, which should be integrated into education to improve its quality and accessibility.

CONCLUSION

Thus, the question of the influence of information technologies on modern teaching methods emphasises the profound transformation that is taking place in the world of education under the influence of digitalisation. Modern information technologies expand the possibilities for learning and teaching, offering new methods, tools and platforms for flexible, interactive and individualised learning. The evolution of education opens up access to knowledge for a broader range of people worldwide, promoting the development of critical thinking, independence and the ability for continuous self-development, which are essential qualities in today's fast-moving world. The process of transformation forces educational systems and institutions to constantly adapt and rethink their approaches to education to meet the current needs of society and the labour market.

Along with the advantages, integrating information technologies in education presents society and institutions with several problems and global challenges. One of the main ones is the widening digital divide, where many students do not have equal access to quality technological resources and the Internet, which can exacerbate social inequality. The current problem is ensuring cyber security and protecting the personal data of students and teachers in the e-learning process due to the aggravation of geopolitical conflicts. A reasonable challenge is maintaining the high quality of education and ensuring the relevance of educational materials in a world where knowledge quickly becomes obsolete. The need to develop emotional intelligence and social skills in students is no less critical, which can be complicated by too much dependence on technology in the educational process.

To overcome modern challenges, the necessary measures should cover the policy of reforming the activity of world governments and activating the corporate sector in education. It is crucial to ensure equal access to information technology for all students, which may require governments to increase investment in educational infrastructure, especially in remote and underserved regions. Adequate data protection and cyber security mechanisms must be developed and implemented to use electronic resources and platforms safely. Educational institutions must constantly update curricula and teaching methods, integrating the latest technologies and approaches that contribute to assimilating knowledge and developing essential life skills. Investments in collaborative projects between the public, private and non-profit sectors to support educational innovation and program development are capable of meeting future needs but require effective funding mechanisms. The outlined measures will make it possible to create an adaptive and innovative educational system capable of optimally responding to the challenges of the modern world.

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