

## ANALYSIS OF THE EFFECTIVENESS OF TECHNOLOGY INTEGRATION (INTERACTIVE WHITEBOARDS, ONLINE PLATFORMS, ETC.) IN MODERN EDUCATION

*ANÁLISE DA EFICÁCIA DA INTEGRAÇÃO TECNOLÓGICA (QUADROS INTERATIVOS,  
PLATAFORMAS ONLINE, ETC.) NA EDUCAÇÃO MODERNA*

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**Abstract.** The role of technology in modern education is crucial, as it enhances the quality of education and facilitates learning. Integration technologies are being actively introduced in modern education to resolve the contradictions between the traditional system and the needs for a qualitatively new education. The article aims to analyse the effectiveness of integration technologies, such as interactive whiteboards and online platforms, in modern education. These technologies increase children's interest in learning and act as a source of ideas that help to resolve various contradictions in education. The introduction of innovative technologies in education is primarily driven by the processes taking place in society. The aim of the modern education sector is to educate a competent, comprehensively developed, erudite, and progressive individual. The contemporary education system employs various innovative technologies that not only impact pupil development but also foster critical thinking, imagination, creativity, and other skills. The most effective approach is to integrate modern innovative technologies with traditional teaching methods. The main aim of implementing new technologies is to produce favourable results and generate enthusiasm for learning. The article examines the influence of their integration on education and the significance of the competence-based approach. It is noted that digital tools such as interactive whiteboards and online platforms have become essential in modern education. The article identifies the advantages and disadvantages of incorporating interactive learning into the educational process. It is concluded that digital tools contribute to the formation of an innovative digital environment in the field of education. They also make learning more flexible, adaptive, and accessible.

**Keywords:** innovation, integration technologies, education, online platform.

**Resumo.** O papel da tecnologia na educação moderna é crucial, pois melhora a qualidade da educação e facilita a aprendizagem. As tecnologias de integração estão a ser ativamente introduzidas na educação moderna para resolver as contradições entre o sistema tradicional e as necessidades de uma educação qualitativamente nova. O artigo tem como objetivo analisar a eficácia das tecnologias de integração, como lousas interativas e plataformas online, na educação moderna. Essas tecnologias aumentam o interesse das crianças pela aprendizagem e funcionam como fonte de ideias que ajudam a resolver diversas contradições na educação. A introdução de tecnologias inovadoras na educação é impulsionada principalmente pelos processos que ocorrem na sociedade. O objetivo do setor educacional moderno é educar um indivíduo competente, amplamente desenvolvido, erudito e progressista. O sistema educativo contemporâneo emprega várias tecnologias inovadoras que não só têm impacto no desenvolvimento dos alunos, mas também promovem o pensamento crítico, a imaginação, a criatividade e outras competências. A abordagem mais eficaz é integrar tecnologias modernas e inovadoras com métodos de ensino tradicionais. O principal objetivo da implementação de novas tecnologias é produzir resultados favoráveis e gerar entusiasmo pela aprendizagem. O artigo examina a influência da sua integração na educação e a importância da abordagem baseada em competências. Observa-se que ferramentas digitais como lousas interativas e plataformas



online tornaram-se essenciais na educação moderna. O artigo identifica as vantagens e desvantagens de incorporar a aprendizagem interativa no processo educacional. Conclui-se que as ferramentas digitais contribuem para a formação de um ambiente digital inovador no campo da educação. Eles também tornam o aprendizado mais flexível, adaptativo e acessível.

**Palavras-chave:** inovação, tecnologias de integração, educação, plataforma online.

## 1. INTRODUCTION

The contemporary education system involves the transfer of knowledge and identifies effective ways to facilitate it as well as successful assimilation by pupils. One way to enhance the learning process is through the active use of interactive communication technologies. The digital environment in education comprises various components, such as web applications, the Internet, mobile applications, augmented and virtual reality technologies. In general, integration technologies contribute not only to the implementation of the educational process but also require the acquisition and development of digital competence.

It should be noted that the state is currently implementing integrated teaching tools. This has several advantages, including a significant reduction in the time spent on lesson preparation and increased interest in learning among pupils. The COVID-19 pandemic has accelerated the need to apply various teaching implements and methods to deliver educational material. As with any process, the integration of learning tools in education has both advantages and disadvantages. This study will discuss these in detail.

## 2. LITERATURE REVIEW

Considerable research has been dedicated to analysing the integration of technology in modern education. This is because society is constantly evolving, and as a result, the education sector must also develop. The fast pace of technological advancements necessitates the introduction of tools that facilitate rapid and effective learning of educational material. The use of various technologies can aid in adapting educational programmes to meet the demands of modern society. In a collaborative study, researchers T. V. Dedilova, Ya. V. Kononenko and S. L. Andrukhov discuss the use of interactive online whiteboards as a means of implementing the activity component of the educational process to enhance learning efficiency. M. Mandrona, a national researcher, reveals the issue of applying modern information technologies in higher education, specifically using interactive whiteboards in the educational process. Meanwhile, M. Hladun and M. Sablina's research focuses on modern online interactive learning tools as collaborative technologies.

The integration of technology, such as interactive whiteboards and online platforms, into modern education remains an unresolved issue due to the significant number of research papers on the topic.

The purpose of the study is to characterize the role of integration technologies (interactive whiteboards, online platforms, etc.) in modern education.

Research methods. The method of scientific and pedagogical research involves studying national, methodological, and didactic literature related to the research problem. Integration technologies in modern education are studied using the method of analysis and synthesis. The method of comparison is applied to evaluate different types of integration technologies that are currently employed in modern education, including interactive whiteboards, online platforms, and various Internet resources.

## 3. RESULTS

Since independence, the educational process in Ukraine has undergone significant changes. The main reasons for reforming this sector are the separation from Soviet teaching methods,



social necessity, and the development of Ukrainian education towards the European level. Educational institutions desire to introduce new interactive technologies due to the rapid development and constant modernization of science. These teaching methods enable more efficient classes and communication between participants in the learning process, even after it is completed. The introduction of integrative interactive learning technologies is important for the training of competitive specialists (Mandrone, Stashevskiy, Buriak, 2022).

S. B. Shylo defines the concept of "integration" as having two meanings:

- a) formation of schoolchildren's holistic view of the world around them. In this aspect, integration is defined as the goal of education.
- b) focus on finding a common platform for knowledge convergence. Considering this aspect, integration is defined as a means of learning.

In general, the researcher suggests that integrated learning technology involves an active co-creation process among teachers who aim to change their attitudes towards educational process organization (Shylo, 2022).

Contemporary understanding of integrated learning is based on a comprehensive approach that considers education as a holistic picture. Integrated learning is viewed through the lens of the overall picture, rather than being divided into separate disciplines. Subject boundaries are blurred and replaced by thematic teaching, where multiple subjects are combined under a single theme. The traditional boundaries between these concepts disappear with the integration of several subjects around a common theme.

It is important to note that integration is a process that leads to the formation of a new unity. This unity is the learning process itself, which is intriguing and filled with various innovative features. According to Z. Shatska and T. Babina (2020), the integration of teaching methods and the educational process can improve knowledge assimilation and enhance research activity.

In recent times, educators have been increasingly inclined to seek new ways of implementing integrative processes in the educational field due to changes in society. The transition to remote learning and subsequent full-scale intrusion events have posed obstacles to full-fledged learning. Initially, students carried out learning independently, and in some cases, remotely. Remote learning was the catalyst for implementing integrative technologies using innovative approaches.

In Ukraine, distance education offers several advantages. It provides accessibility for a wide range of education seekers, does not require physical attendance at lectures and seminars, and fosters the individualization of the learning process. Additionally, it allows for 24/7 communication between the teacher and the learner. The aim of this project is to introduce interactive tools that facilitate and stimulate interest in the study of various subjects (Distance Education, 2022).

Modern pedagogy suggests that integrated learning can enhance pupils' intellectual development and facilitate the assimilation of educational material more effectively than traditional methods. Integrated learning creates new conditions for teachers and learners, promoting intellectual engagement and the development of innovative teaching methods. Integration involves using various teaching methods to improve the efficiency of material perception and assimilation. It is effective for all participants in the educational process, including teachers, pupils, and parents. The implementation of distance learning has shown that the integration of technology can help balance the learning process and assess the assimilation of knowledge more efficiently.

Integrated learning has proven effective for preschool, secondary, and higher education. Dedilova, Kononenko, and Andrukhov emphasize that the use of interactive technologies in remote work requires teachers to be proficient in transforming traditional visual aids into dynamic, multimedia, and/or interactive elements of the educational process. Overall,

interactive online boards are recommended for organizing the provision of the learning process in a remote mode, as they are convenient and beneficial for both teachers and learners (Dedilova, Kononenko, Andrukhov, 2022).

V. Kremen argues that the development of progressive individuals requires not only the improvement of teacher competence and qualifications but also the enhancement of the quality of educational and research institutions (Kremen, Luhovyi, Saukh, 2020).

The development of a highly educated individual is primarily influenced by a competency-based approach that encompasses various teaching methods and tools. Integrated learning is introduced within the framework of a competency-based approach to develop pupil' motivational sphere, appropriate thinking styles, and general learning skills. In adulthood, such an individual should be able to apply acquired knowledge in practice and derive results from it.

It is important to note that developing competencies in learners does not negate the need for acquiring knowledge. At the same time, competency-based learning is a dynamic combination of knowledge, skills, and values that interact comprehensively to yield positive results. It is crucial not only to acquire knowledge and skills, but also to apply them in new situations. Such actions contribute to the development of valuable approaches to acquiring knowledge, skills, adaptation, and decision-making under different circumstances.

Regarding the effectiveness of integrating technology in modern education, it is essential to highlight that, in the current stage of societal and educational development, technology is not merely an auxiliary tool for coordinating the educational process. Interactive technologies are an integral part of the learning process with significant potential. The digitization of the education system is an inevitable trend in modern education. According to M. Hladun and M. Sablina, an interactive teaching model allows for equal participation between pupils and teachers. Under such conditions, learners understand what they are doing, reflect on what they know, can do, and achieve. Teaching with the use of integrative technologies promotes constant activation and interaction of participants in the educational process. Simultaneously, organizing interactive learning involves modelling real-life situations, using role-playing games, and jointly solving problems based on analysing circumstances and relevant situations (Sablina, 2018).

The implementation of innovative technologies and digitization have undoubtedly had a positive impact on all participants in the educational process. As T. Blyzniuk rightly emphasizes, incorporating multimedia electronic educational resources enriches lessons with interesting and unconventional forms and methods of work. It promotes creative independence, develops digital literacy, and cultivates research activities for pupils. This streamlines time spent and optimizes future lessons by enriching them with engaging and meaningful information (Blyzniuk, 2021).

The current educational landscape includes various platforms and messengers, such as Viber, WhatsApp, Facebook, and Telegram. Educators find it convenient to conduct lessons using online platforms, as they save time and effort in informing all participants and facilitate feedback. In addition to popular messengers, there are numerous tools adapted to the educational process in modern Ukrainian education. One such tool is the free educational platform Kahoot, which is actively used by educators for interactive sessions and homework checks through online testing. Kahoot is a digital tool used for creating educational games, quizzes, surveys, and facilitating discussions. It is beneficial for school administrators and teaching teams in educational institutions for various scientific, methodical, and organizational activities.

Mentimeter is also a noteworthy electronic educational resource used in modern education. MENTIMETER is an interactive service that enables polling of an entire class, providing instant feedback and demonstrating the obtained results to the target audience. It is a modern

and innovative way of interacting with the audience, effectively utilized in conferences, meetings, various clubs, or training sessions (Blyzniuk, 2021). Interactive whiteboards have also proven to be commendable tools, combining the capabilities of a regular board and a computer. The Smart Board interactive complex is a highly effective technical teaching tool that meets all the requirements for forming an individual's information culture. It facilitates the presentation and processing of pre-prepared information, the use of information from various applications, the combination of text and graphic elements, and the saving and reproduction of created materials when necessary. The interactive whiteboard serves multiple functions in education, including demonstration, education, instrumentation, and control (Khutorna, 2020). Systematic use of an interactive whiteboard helps to create a personalized educational approach for each child, develop their information culture, and perform other actions specified in the curriculum (Botuzova, Novikova, 2018).

It should be noted that interactive whiteboards in modern education have evolved into a means of displaying information using a digital signal. This is more convenient and engaging compared to traditional boards. These interactive tools have become active participants in the educational process, contributing to the creation of an atmosphere of collaboration and active pupil involvement during lessons. Integrating interactive whiteboards into the teaching process can significantly streamline the traditional way of presenting educational material for educators. This tool is convenient to use and allows for the preparation and demonstration of diverse information with the help of computer images and a digital projector (Interactive Whiteboards for Schools, 2018).

The online platform Flipgrid has proven to be effective for video demonstrations and remote communication with audiences. It allows for recording educational video messages, working with diverse audiences, creating video clips, and adjusting emotions and expressed information during humanities-oriented lessons. Flipgrid is beneficial for those involved in informal education both offline and online.

In researching the effectiveness of integrating technologies, it is essential to mention the Virtual Interactive Board Padlet. This board facilitates conducting distance learning sessions. To achieve this, the teacher defines the topic on Padlet, provides links to videos, presentations, tests, and learners, using a laptop or smartphone, perform the tasks assigned by the teacher. It is worth noting that Padlet can be used to create educational projects, as it is not only convenient but also straightforward (Kashyrkina, 2020).

The use of interactive technologies has both positive and negative effects. Interactive teaching methods are essential to the learning process as they promote internal motivation for learning, aid in comprehension, encourage self-expression, and foster self-development in pupils. However, interactive technologies can also affect the level of cognitive activity among learners (Maslova, Myrza-Sidenko, 2019).

Interactive technologies are widely used in higher education institutions. They have a significant impact on the quality of education and the convenience of processing educational material and assessing knowledge, compared to traditional teaching methods. The selection of interactive technologies is influenced by various factors, such as the discipline being studied, the educational material, the time frame for studying a particular subject, the overall preparedness level of students, and the characteristics of the educational material base of the higher education institution. The selection of interactive tools for learning should align with the purpose of the session and the type of information being presented. When evaluating the effectiveness of using interactive technologies in the learning process, it is important to consider the level of knowledge attained (Vlasenko, 2018).

#### 4. DISCUSSION



It is important to note that integration technologies are used to meet the needs of all participants in the educational process. Currently, schools are actively using various interactive tools that have a significant impact on both the educational process and the level of knowledge of pupils. Independence, which is the foundation of learning, develops their personal skills and abilities and promotes additional research. The application of modern technologies in education is based on several defining principles:

- 1) emphasizing collaboration between pupils and teachers;
- 2) fostering personal growth through the acquisition of educational knowledge;
- 3) integrating theoretical concepts with practical skills;
- 4) promoting active participation in the learning process (Hlushakova, 2020).

In the current context of educational development, the introduction of digital technologies offers numerous opportunities for independent, collaborative, and creative activities for both teachers and learners. Simultaneously, the global Internet is an invaluable source of scientific, educational, and entertainment information. Its utilization in the educational process enhances the desire to discover new and interesting information. Digital technologies can heighten the educational process, making it more engaging and less stressful for students (Hurevych, 2023).

As N.Lazarenko (2016) notes, the successful assimilation of educational information depends on the ability to navigate, find relevant information, systematize, summarize, and apply it effectively.

It is important to mention that introducing organizational and methodological support for managing innovation activities in general education institutions is crucial for effective management using innovative technologies (Nikula, 2020).

Educational institutions select effective methods to implement innovative technologies, relying on the experience of colleagues and the effectiveness of pupils' comprehension of the material, using various innovative tools. During the pedagogic process, the teacher forms an appropriate electronic information environment based on recommendations. This involves the usage of electronic textbooks, dictionaries, visual aids, reference books, encyclopedias, and electronic libraries. Additionally, the teacher may apply various didactic materials, developed teaching aids, and electronic teaching and learning complexes in academic disciplines (Kozhemiakina, 2020).

Digital technologies are a crucial aspect of education development. They facilitate the rapid perception, comprehension, and assimilation of information. Interactive technologies make the learning process more mobile and convenient. The utilization of research and development work, the project method, and educational games with digital technologies in the classroom fosters a desire to learn. The lessons are filled with interesting and helpful information and actively apply interactive tools (Kovbasiuk, Panina, 2020).

In the current context of war in Ukraine, the use of interactive technologies is crucial to ensure the continuity of education. Online platforms can be applied to create a convenient educational process. Maintaining continuity of education is a fundamental requirement for modern education. In situations where educational institutions are unable to guarantee the safety of their learners, online platforms can provide a solution (Lokshyna, Hlushko, Dzhurylo, Kravchenko, Maksymenko, Nikolska, 2022).

The state is actively collaborating with educators to introduce new and effective tools for integration education. According to the Ministry of Digital Transformation, Ukraine aims to create an education system that produces both professional and content individuals. One area of education transformation should be the implementation of an effective educational management system. This system aims to improve the educational process by revising its format, methods, and teaching tools. The goal is to develop sociability, stress resistance,

curiosity, and emotional intelligence (Education in Ukraine is planned to be transformed using digital tools and AI, 2023).

Significant steps have been taken to improve the quality of education through the use of interactive technologies, including various online platforms. One such innovation in the education sector is the information and communication automated system called 'Single School'. This system enables teachers to organize learning activities from anywhere in the world. The implementation of the "Single School" system has yielded positive results in improving and developing teachers' digital competencies. The system is designed to ensure accessibility and continuity of the educational process (Development of the digital educational environment of general secondary education institutions discussed at the all-Ukrainian online conference, 2023).

## 5. CONCLUSION

The integration of various technologies into the educational process contributes to the development of society. Their usage should be encouraged to enhance the learning experience. It opens up a wide range of opportunities for pupils, students, and teachers. Online platforms, digital applications, and interactive whiteboards can be used to deliver and assess educational material. Digital technologies allow for flexible and continuous learning anytime, anywhere.

## ACKNOWLEDGMENT

The author team is grateful to all colleagues and reviewers for their professional assessment of the article.

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