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DIGITIZATION OF EDUCATION AND THE INFORMATION ENVIRONMENT AS A BASIS FOR DIGITAL SERVICES: A CASE STUDY

LA DIGITALIZACIÓN DE LA EDUCACIÓN Y EL ENTORNO DE LA INFORMACIÓN COMO BASE DE LOS SERVICIOS DIGITALES: UN ESTUDIO DE CASO

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ABSTRACT

The article aims to explore the concept, content, and nature of the "information environment" as the foundation (platform) for providing digital services, as well as to identify the challenges of education digitalization in the modern world. The primary method employed was the deductive approach, which enabled the study of the legal and social nature and the dynamics of digitalization processes in education. This method also facilitated the analysis of the impact of the ongoing transformation of forms and methods of delivering digital services in education in the modern world. Additionally, the inductive method, systematic scientific analysis, comparative-legal, and historical methods were used. A key approach underpinning the resolution of digitalization challenges in education was the comparative-legal method, which examined digitalization processes in education. The article classifies and analyzes the processes of education digitalization and related social processes of the present day. It.

Explores the primary directions of service digitalization in the context of digital reality.

Keywords:

Digitalization, information environment, digital services, digital reality, education digitalization, digital law, educational environment, legislation, european union.

RESUMEN

El artículo pretende explorar el concepto, el contenido y la naturaleza del «entorno de información» como base (plataforma) para la prestación de servicios digitales, así como identificar los retos de la digitalización de la educación en el mundo moderno. El principal método empleado fue el enfoque deductivo, que permitió estudiar la naturaleza jurídica y social y la dinámica de los procesos de digitalización de la educación. Este método también facilitó el análisis del impacto de la transformación en curso de las formas y métodos de prestación de servicios digitales en la educación en el mundo moderno. Además, se utilizaron el método inductivo, el análisis científico sistemático, el método comparativo-jurídico y el método histórico. Un enfoque clave para la resolución de los retos de la digitalización en la educación fue el método jurídico-comparativo, que examinó los procesos de digitalización en la

educación. El artículo clasifica y analiza los procesos de digitalización de la educación y los procesos sociales relacionados de la actualidad. Explora las principales direcciones de la digitalización de los servicios en el contexto de la realidad digital. La importancia de las conclusiones radica en su énfasis en la necesidad de un enfoque integral de la digitalización de la educación, que incorpore aspectos técnicos, pedagógicos, sociales y psicológicos.

Palabras clave:

Digitalización, entorno de la información, servicios digitales, realidad digital, digitalización de la educación, derecho digital, entorno educativo, legislación, unión europea.

INTRODUCTION

Education digitalization is a critical topic because it significantly affects the quality and accessibility of educational services (Sukhov et al., 2021; Gribkova, 2022; Malika et al., 2022). Introducing digital technologies into the educational process enhances learning outcomes, increases student motivation, and expands opportunities for personalized learning (Saliyeva et al., 2016; Togaibayeva et al., 2023). However, despite its clear advantages, education digitalization is not without contradictions. First, unequal access to digital resources can exacerbate social inequality. Second, excessive use of digital technologies may negatively impact students' health. Third, inadequate preparation of educators to use digital tools may reduce the efficiency of the educational process (Kirillova et al., 2021). This study addresses the problem of finding optimal ways to integrate digital technologies into education while accounting for these contradictions.

The topic of education digitalization has been well-researched, with diverse perspectives among scholars. Chudinovskikh (2019), emphasizes that "education digitalization is a critical topic because it significantly affects the quality and accessibility of educational services" (p. 78). Gil & Morozov (2019), note that the introduction of digital technologies improves learning outcomes and enhances student motivation. Lyakh (2021), highlights the need to develop digital competencies among both students and educators. Makashina (2024), points out that digitalization allows for the selection of optimal educational and career trajectories. Thus, the relevance of studying education digitalization arises from the need to balance the advantages and disadvantages of digital technologies and develop strategies for their effective implementation in education.

The significance of the findings lies in their emphasis on the necessity of a comprehensive approach to education digitalization, incorporating technical, pedagogical, social, and psychological aspects. Future research could focus on developing new pedagogical approaches, integrating digital technologies into the learning process, and studying the long-term consequences of education digitalization. It is crucial to continue analyzing and adapting legislative and regulatory frameworks to create favorable conditions for education digitalization, which will maximize the potential of digital technologies to enhance the quality of education.

METHODOLOGY

The methodology for studying digitalization in education encompasses a variety of scientific approaches and methods, reflecting the multifaceted and complex nature of the topic. A review of the academic literature shows that researchers worldwide are actively exploring different aspects of education digitalization. Specifically, three main groups of scholars can be identified: the first focuses on the technical aspects of implementing digital technologies (t. V. Privalova, m. V. Karpov), the second on pedagogical approaches and methods (a. S. Loginova, a. V. Odinokova, v. E. Gavrilova), and the third on the social and psychological consequences of digitalization (v. N. Voronin, m. V. Iontseva, I. Yu. Shuraeva).

To achieve a comprehensive understanding of the issue, this study employs multiple methods. Analyzing legislative acts helps identify the regulatory and legal foundations of education digitalization in various countries. Comparative analysis of educational systems, based on the application of different research methods, helps pinpoint best practices and approaches for integrating digital technologies. Empirical research, including surveys and interviews with teachers and students, along with experimental studies, aims to assess the effectiveness of digital technologies in the educational process (Polovchenko, 2021; Novichkov et al., 2022).

The choice of scientific methods is driven by the need for a comprehensive approach to studying the problem. Data collection and analysis, conducting surveys and interviews with educators and students, and experimental research provide a holistic view of the impact of digitalization on the educational process. As noted by Chudinovskikh (2019), "education digitalization is a critical topic because it significantly affects the quality and accessibility of educational services" (p. 78). Thus, the use of diverse methods and approaches enables a deeper understanding of digitalization processes in education, revealing both their positive and negative aspects.

Pedagogical approaches to using digital technologies in education are varied and include active learning methods, blended learning, and individualized learning processes (Bobkov et al., 2020). As emphasized by y. A. Lyakh, the

development of digital competencies should involve both students and educators. Successful practices demonstrate that digitalization enhances learning outcomes and increases student motivation. Active learning, which engages students in the learning process through practical activities and interaction, becomes more effective with the use of digital tools. For example, interactive simulations and virtual laboratories allow students to apply theoretical knowledge in practice, leading to a deeper understanding of the material.

The technical aspects of education digitalization involve the use of various technologies such as e-textbooks, distance learning platforms, interactive whiteboards, and other digital tools. For instance, e-textbooks are digital versions of traditional printed textbooks that may include multimedia elements, interactive assignments, and links to additional resources. They provide students with access to learning materials anytime and anywhere, promoting flexibility and individualized learning.

DEVELOPMENT

The conducted study of education digitalization has revealed both positive and negative aspects of this process. The technical aspects, such as the use of e-textbooks, distance learning platforms, and interactive whiteboards, enhance flexibility and individualized learning, expand access to educational resources, and boost student motivation. However, as noted by Chudinovskikh (2019; Gil & Morozov, 2019), implementing digital technologies requires significant financial investment and the development of digital competencies among teachers and students in various countries.

An analysis of legislation in the european union and specific countries such as germany, france, and the united kingdom demonstrates that education digitalization is a priority for the development of educational systems. The introduction of digital technologies contributes to improving education quality and developing digital competencies among students and educators. However, the successful implementation of these initiatives necessitates consideration of both technical and pedagogical aspects, as well as ensuring equal access to digital resources for all participants in the educational process.

The study also concludes that the social and psychological aspects of education digitalization require special attention. Challenges such as digital inequality, impacts on student health, and digital dependency are significant issues that must be addressed when developing digitalization strategies. Makashina (2024), highlights that digitalization provides opportunities for selecting optimal educational and career trajectories, but the uneven distribution of these opportunities could exacerbate social inequality.

Digitalization of education is a complex and multifaceted process that requires careful analysis and a balanced approach. It is crucial to consider both the advantages and disadvantages of digital technologies to maximize their potential for improving the quality of education. Ensuring equal access to digital resources for all students and developing digital competencies among educators and students are key priorities. Additionally, it is necessary to implement programs aimed at maintaining the physical and psychological well-being of students while fostering skills for safe and responsible use of digital technologies. Social and psychological aspects of education digitalization, therefore, require careful analysis and the development of effective strategies to minimize negative consequences and maximize the positive impact of digital technologies on the educational process.

Blended learning, which combines traditional teaching methods with online resources, is gaining popularity. This approach allows for flexible organization of the learning process, enabling students to choose the time and place for studying material. As Gil & Morozov (2019), notes, “the introduction of digital technologies into the educational process improves learning outcomes, increases student motivation, and expands opportunities for individualized learning” (p. 129). Blended learning enables educators to use a variety of digital resources, such as video lectures, online quizzes, and interactive assignments, making the learning process more engaging and effective.

Platforms such as moodle, blackboard, and others provide the tools to organize the learning process in an online format. These platforms offer features for creating and managing courses, administering tests and exams, and facilitating interaction between educators and students. Their advantages include the ability to conduct remote learning, which is especially relevant during the covid-19 pandemic, and expanded access to educational resources for students in remote areas.

Successful practices in using digital technologies in education include projects focused on developing digital competencies among students and educators. Integrating digital technologies into the educational process requires not only technical infrastructure but also the preparation of teaching staff. As Iyakh (2021), emphasizes, “the development of digital competencies must encompass both students and educators” (p. 90). This involves training educators in the use of digital tools and methodologies, as well as fostering students’ skills in working with digital resources. Pedagogical approaches to digital technology use in education are diverse, encompassing active

learning, blended learning, and individualized learning processes. Successful practices demonstrate that digitalization enhances learning outcomes and increases student motivation, but it requires a thorough approach to preparing teaching staff and developing digital skills.

Interactive whiteboards are another important element of education digitalization. They enable educators to use multimedia materials, conduct interactive lessons, and engage students in the learning process. Interactive whiteboards enhance student motivation and improve learning outcomes by incorporating visual and audiovisual tools.

However, despite their clear advantages, education digitalization also has its drawbacks. One of the primary challenges is the significant financial investment required to purchase and maintain digital technologies. Furthermore, not all educators and students possess sufficient digital competencies to use these technologies effectively. The introduction of digital technologies can also increase the workload for educators, who are required to learn new tools and adapt their teaching materials to digital formats.

An analysis of european union legislation on education digitalization reveals key directions and approaches adopted by various countries to integrate digital technologies into the educational process. A critical aspect is the development and implementation of regulatory frameworks governing the use of digital tools and resources in educational institutions.

Germany provides a notable example with its digital school 2020 program, aimed at modernizing educational infrastructure and enhancing digital competencies among students and educators. This program includes funding for equipping schools with modern digital devices and software, as well as organizing professional development courses for teachers.

France has also been actively advancing education digitalization, reflected in the ***digital school law*** adopted in 2013. This law establishes a national educational platform that consolidates various digital resources and tools to support the learning process. The platform offers access to e-textbooks, interactive assignments, and other educational materials, facilitating individualized learning and improving its effectiveness.

The united kingdom, in turn, has implemented a ***digital literacy strategy*** focused on developing digital skills across all age groups. This strategy integrates digital technologies into curricula and establishes specialized digital learning centers where students can access advanced educational resources and tools.

European union legislation also plays a pivotal role in supporting education digitalization. In 2018, the european commission adopted the ***digital education action plan***, which outlines measures to enhance digital competencies, improve access to digital resources, and create favorable conditions for using digital technologies in educational institutions. As Gil & Morozov (2019), notes, "the introduction of digital technologies into the educational process improves learning outcomes, increases student motivation, and expands opportunities for individualized learning". (p. 129)

Thus, the analysis of eu and national legislation demonstrates that education digitalization is a priority in the development of educational systems. Integrating digital technologies contributes to improving education quality, broadening access to educational resources, and developing digital competencies among students and educators. However, the successful implementation of these initiatives requires addressing both technical and pedagogical aspects and ensuring equal access to digital resources for all participants in the educational process.

CONCLUSIONS

The impact of digitalization on the quality of education has become a focus of active scientific research.

Social and psychological aspects of education digitalization are crucial areas of study, as they address a broad range of issues related to the impact of digital technologies on society and the individual well-being of students. One of the key concerns is digital inequality, which arises from disparities in access to digital resources and technologies.

The impact of digital technologies on students health is another significant concern. Studies indicate that students who spend extensive time on screens may face difficulties with concentration and cognitive function. It is essential to develop strategies and programs aimed at preventing and addressing digital addiction while promoting healthy digital habits.Addressing these challenges necessitates a comprehensive approach that includes both technical and pedagogical measures. Ensuring equal access to digital resources for all students and fostering digital competencies among educators and learners are fundamental.

Additionally, programs to support the physical and psychological well-being of students and promote safe and mindful use of digital technologies should be implemented. Thus, the social and psychological aspects of education digitalization require thorough analysis and the development of effective strategies to minimize negative effects and maximize the positive impact of digital technologies on the educational process.

Digital platforms can tailor educational materials to the preparation level and learning pace of each student, facilitating more effective knowledge acquisition.

The significance of these findings lies in their emphasis on the need for a holistic approach to education digitalization, encompassing technical, pedagogical, social, and psychological aspects. Future research could focus on developing new pedagogical approaches, integrating digital technologies into the learning process, and examining the long-term effects of education digitalization. It is also important to continue analyzing and adapting legislative and regulatory frameworks to create favorable conditions for education digitalization, enabling the effective utilization of digital technologies to improve the quality of education.

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