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MODERN APPROACHES TO EDUCATION MANAGEMENT USING DIGITAL TOOLS

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Abstract

This article examines modern approaches to the digitalization of education management aimed at improving the efficiency of educational processes. Key technologies are analyzed, including Learning Management Systems (LMS), cloud services, analytical platforms, and digital tools for remote interaction. Special attention is given to their impact on administrative processes, management transparency, and personalized learning. The main challenges of digitalization, such as insufficient funding, digital inequality, cybersecurity, and teachers' resistance to adopting new technologies, are considered. The importance of a comprehensive approach to the digital transformation of educational institutions is emphasized. Development prospects, including the use of artificial intelligence, the Internet of Things, and adaptive educational technologies, are discussed. The article concludes with recommendations for the effective implementation of digital solutions to enhance the quality, accessibility, and manageability of the educational process.

Keywords: education digitalization, education management, LMS systems, cloud technologies, educational analytics, distance learning, digital transformation.

Introduction

The rapid development of digital technologies has led to the transformation of various industries, including education. In today's information-driven world, the integration of digital tools into education management is no longer optional, but essential. These tools allow institutions to streamline administrative processes, improve communication, and enhance decision-making. In addition, they are in line with global trends in digital transformation, allowing educational organizations to remain competitive and relevant in a dynamic environment. The COVID-19 pandemic has further accelerated this shift, highlighting the urgent need for remote management solutions and digital resilience in education systems. Despite its potential, the introduction of digital tools also raises important questions regarding equitable access, effective implementation, and long-term sustainability [Kozlova N.Sh., 2019].

Modern education administration faces a number of challenges that make it difficult to effectively integrate digital tools. These include managing the vast amounts of data generated by educational processes, ensuring transparency and accountability in decision-making, and meeting the needs of distance and hybrid learning models. The digital divide remains a major obstacle, especially in underfunded or rural educational institutions where access to adequate infrastructure is limited. In addition, cybersecurity issues such as data leaks and unauthorized access pose risks to confidential information. Resistance to change among teachers and administrators, often caused by insufficient training or fear of disrupting established workflows, also hinders the implementation of digital technologies. Overcoming these challenges requires a strategic and inclusive approach to technology implementation [Kuklina L.V., Kuklin S.Y., 2021].

The purpose of the study: to study modern digital solutions and their impact on the management of educational processes, to assess the problems and prospects of digitalization.

Main body

Digitalization in education management is the integration of modern technologies and software solutions aimed at automation, control and optimization of educational processes. Modern digital tools include learning management systems (LMS), cloud services, online learning platforms, data analysis and artificial intelligence systems that transform traditional approaches to the administration

and organization of education. From a theoretical point of view, digitalization is not only a technological transformation, but also a conceptual shift in education management. It is aimed at increasing organizational flexibility, accelerating decision-making and implementing personalized educational strategies. The main aspects of digitalization in education management include: automation of administrative processes, data integration, personalized learning paths, digital analytics and forecasting [Khrustaleva N.V., 2023].

Historically, the digitalization of education management has gone through several main stages:

- Pre-digital era (before the 1980s) - education management was based on paper documents, accounting systems and manual reporting.
- Early digitalization (1980-1990s) - implementation of basic information systems, spreadsheets and student databases.
- Development of educational technologies (2000-2010s) - the emergence of electronic grade books, online courses, electronic libraries and integrated education management platforms.
- Intelligent Digital Solutions (2020s - present) - the use of artificial intelligence, adaptive learning platforms, chatbots and blockchain technology in education management.

Modern digital technologies play several key roles in education management:

- Monitoring and control - implementation of analytical dashboards to track academic performance and administrative indicators.
- Communication and coordination - using digital platforms to facilitate interaction between teachers, students, parents and administrators.
- Transformation of educational materials - expanding access to interactive content, online courses and virtual laboratories.
- Automation of administrative procedures - introduction of digital documents, automated scheduling and electronic portfolios of students [Guzeev M.S., Fasolya A.A., 2020].

Thus, digitalization in education management represents a comprehensive transformation of the educational system aimed at increasing efficiency, flexibility and adaptability to modern challenges.

The digitalization of education has led to the emergence of a number of innovative tools and solutions that increase the efficiency, flexibility and accessibility of educational process management. These tools play a key role in transforming traditional teaching practices, allowing educational institutions to centralize, control and optimize various aspects of the educational process (Figure 1).

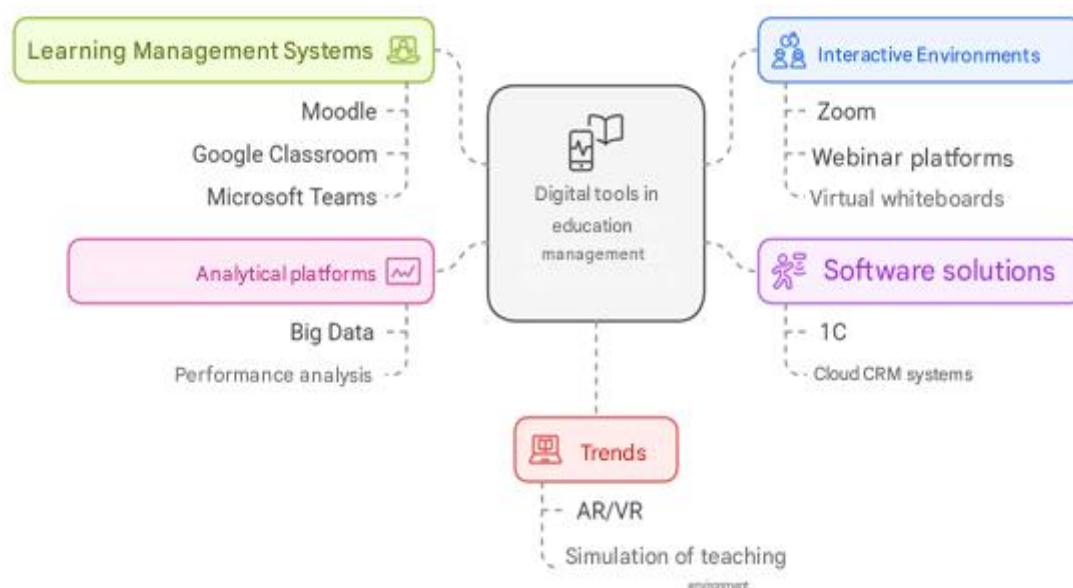


Figure 1. Innovative tools in education management

Among the most important digital solutions are learning management systems (LMS) such as

Moodle, Google Classroom, and Microsoft Teams, which centralize course content, facilitate online assessments, automate grading, and provide real-time feedback. These platforms allow teachers to track student progress, personalize the learning experience, and promote collaboration through discussion boards and interactive assignments.

In addition to LMS, educational institutions use administrative and planning software, including 1C: Education Management and cloud-based customer relationship management (CRM) systems, which allow for the optimization of scheduling, enrollment, budgeting, and resource allocation, ensuring the smooth operation of the educational institution [Degtyareva V.V., 2021].

Another key area of (AI) digitalization is data analytics and artificial intelligence (AI), which help educational institutions analyze student performance, identify learning gaps, predict learning trends, and develop targeted interventions. AI-powered tools personalize the learning experience by adapting content to individual needs, increasing retention rates and academic outcomes. Interactive collaboration platforms such as Zoom, virtual whiteboards (Miro, Padlet), and webinar tools support remote and hybrid learning by enabling real-time communication, shared workspaces, and group project management. These platforms enable educational institutions to maintain high levels of student engagement regardless of their location.

The rapid development of new technologies such as augmented reality (AR) and virtual reality (VR) is further changing the education system. AR and VR create immersive learning environments where students can explore complex scientific models, conduct virtual lab experiments, and interact with historical or real-life scenarios, which helps to retain knowledge and develop practical skills. These technologies reduce the gap between theoretical knowledge and practical experience, making education more dynamic and engaging. The constant evolution of digital tools allows educational institutions to remain adaptive, data-driven, and student-focused, transforming traditional educational models into highly effective, interactive, and technologically advanced ecosystems [Hrytsenchuk O.O., Trubachev S.I., 2021].

Methods

This study uses a mixed-methods approach to comprehensively examine the impact and challenges of digitalization in education management. The following methods were used: system analysis, theoretical analysis, generalization method, forecasting method. The combined methods allow for a holistic understanding of digitalization in education and provide valuable insights into the current state and future direction of digital tools in education management. Using both qualitative and quantitative data, this study aims to offer a comprehensive analysis of the challenges and opportunities that digitalization presents to education systems worldwide [Mialkovska L. et al., 2023].

Results

The integration of digital tools into the educational process significantly improves both the efficiency of management and learning outcomes. For example, the use of electronic grade books and student diaries in schools increases the transparency of the educational process, allowing parents and students to access information on academic performance and attendance in real time. This helps to strengthen collaboration between schools and families, and increases students' sense of responsibility for their own learning. Similarly, online learning platforms in higher education provide students with flexible access to course materials, allowing them to study at their own pace. Such flexibility is especially important for distance and blended learning formats, where students can independently manage their schedule and choose the most appropriate learning resources.

Digitalization also automates administrative processes such as student registration, attendance, and reporting, reducing the workload of administrative staff and improving data accuracy. Automating these tasks allows institutions to spend more time on curriculum development, student engagement, and faculty support. In addition, real-time performance tracking systems allow educators to identify student problem areas early on and take appropriate action in a timely manner. Data analytics plays a vital role in predicting student successes and challenges, facilitating a more personalized approach

to learning based on individual needs.

In addition to simplifying administrative functions, digital platforms facilitate instant feedback between teachers and students, leading to improved understanding and motivation. Regular feedback, personalized recommendations, and interactive assessments help students realize their mistakes and hone their skills. Engaging multimedia content, including videos, simulations, and educational games, increases student motivation by making learning more interactive and stimulating. This variety of content formats maintains student attention and deepens interest in the subject matter. Additionally, automated grading, scheduling, and reporting systems free teachers from repetitive administrative tasks, allowing them to focus on teaching, mentoring, and individualized support for students. As a result, the adoption of digital tools contributes to increased efficiency, transparency, and quality of education, as well as to the smooth interaction between all stakeholders in the learning process.

The digital transformation of education offers many benefits, including increased accessibility, efficiency, and engagement. However, the implementation of digital tools in education management faces a number of significant challenges that hinder progress. These challenges range from technical and financial limitations to pedagogical and security issues, all of which must be addressed to ensure the effective integration of digital solutions into educational institutions (Figure 2).



Figure 2. Challenges and barriers to digitalization in education management

Insufficient funding and digital divide. One of the major barriers to digitalization of education management is insufficient funding for the acquisition and maintenance of digital tools, infrastructure, and internet connectivity. Many educational institutions, especially in rural areas, face the challenge of outdated equipment, unstable internet connections, and limited access to modern software solutions. This financial gap contributes to the emergence of a digital divide, with students and teachers in well-funded schools benefiting from advanced technologies while others are left behind. This results in disparities in learning experiences and academic achievement, widening the gap between different socio-economic groups. Geographical inequalities also exacerbate the problem. Urban schools often have high-speed internet, interactive smart boards, and access to modern learning management systems (LMS), while many rural schools still rely on traditional teaching methods due to poor internet access and a lack of digital devices. These disparities create unequal learning opportunities, making it difficult to implement standardized digital education policies across regions. To address this issue, significant public and private investment in infrastructure, equipment, and accessible internet solutions is needed to ensure that all students have equal access to digital educational environments [Mitsyk N.M., Prishlyak M.I., 2022].

Cybersecurity threats and data protection. As educational systems increasingly rely on cloud platforms, student information systems, and online collaboration tools, the risk of cybersecurity threats increases. Schools and universities collect vast amounts of sensitive data, including student

records, personal information, and academic performance. Without proper security protocols, this data becomes vulnerable to hacking, phishing attacks, and unauthorized access. To prevent data breaches, educational institutions must implement robust cybersecurity policies, including encryption, multi-factor authentication, and regular security audits. Faculty and administrators must also be trained in cyber hygiene to avoid falling victim to malware, ransomware, or phishing scams. Additionally, many countries today have strict data protection regulations, such as GDPR in Europe or FERPA in the United States, which require educational institutions to comply with privacy laws to protect students and staff.

Lack of digital literacy among teachers and administration. One of the most significant non-technical barriers to digitalization is the lack of digital literacy among teachers and school administrators. Many teachers were trained in traditional teaching methods and may find it difficult to adapt to digital platforms, interactive content, and AI-powered educational tools. Even when digital solutions are available, teachers may not use them effectively due to insufficient technical training and pedagogical support. Professional development programs should focus on developing teachers' digital competencies by providing them with hands-on training in the use of LMS platforms (Moodle, Google Classroom, Microsoft Teams), virtual learning tools (Zoom, Miro, Padlet), and data analytics dashboards. Without proper training, even the most advanced educational technologies will be used ineffectively, reducing their potential impact on learning outcomes and administrative efficiency.

Resistance to change and institutional bureaucracy. Many educational institutions operate within rigid bureaucratic structures, making the transition to digital systems a slow and complex process. School administrators, teachers, and policymakers may resist change due to a lack of awareness, fears for job security, or an unwillingness to adapt existing workflows. In some cases, digitalization requires rethinking entire administrative processes, which may be met with skepticism and reluctance from stakeholders accustomed to traditional paper-based methods. To overcome this resistance, schools must develop clear implementation strategies that highlight the long-term benefits of digitalization, such as time savings, improved data accuracy, and student engagement. Leaders must also ensure that all stakeholders - teachers, students, parents, and policymakers - are involved in the decision-making process, making the transition more inclusive and effective.

Problems of adaptation of teaching methods. The transition to a digital learning environment requires a change in teaching methods. Many traditional pedagogical approaches rely on face-to-face interactions, printed textbooks, and standardized assessments, which do not always translate well to a digital environment. The introduction of blended learning models, adaptive learning platforms, and interactive simulations requires curriculum revisions and teacher retraining. In addition, educators must develop new strategies for keeping students engaged in online or hybrid classrooms. Digital tools such as gamification, augmented reality (AR), and artificial intelligence (AI) can enhance learning, but they require a deep understanding of how to effectively integrate them into lesson plans. Schools must invest in ongoing research and development to ensure that digital education remains pedagogically sound, not just technologically advanced.

The need to develop policies and legal frameworks. Digital transformation of education cannot be successful without a strong policy framework and government support. Many countries lack clear regulations on data privacy, e-learning accreditation, and technology procurement, leading to inconsistencies in the implementation of digital education. Without standardized policies, educational institutions may implement ineffective systems, face legal challenges, or struggle with interoperability issues across platforms. Governments and education ministries must work closely with technology providers, educators, and researchers to develop digital education guidelines that ensure solutions are equitable, scalable, and sustainable. Public-private partnerships can also play a critical role in accelerating digital adoption by providing funding, expertise, and infrastructure support. Решение этих проблем требует комплексного подхода, включающего инвестиции в инфраструктуру, обучение персонала, меры по обеспечению безопасности данных и разработку новых педагогических стратегий. Преодоление этих барьеров необходимо для обеспечения эффективной цифровизации образовательного процесса и повышения качества

образования [Laptev V.A. et al., 2022].

Discussion

Digitalization of education opens up new horizons for the introduction of innovative tools and methods aimed at increasing the efficiency and accessibility of educational processes. Modern digital technologies make it possible to create personalized educational trajectories taking into account the individual needs and pace of development of students, promoting deeper assimilation of material and increasing motivation. In addition, digital tools help automate routine administrative tasks, such as tracking academic performance, scheduling classes, and assessing students' knowledge. Such automation frees up the time of teachers and administrative staff, allowing them to focus on more important aspects of the educational process.

The key areas of development of digital tools in education management are presented in Figure 3.

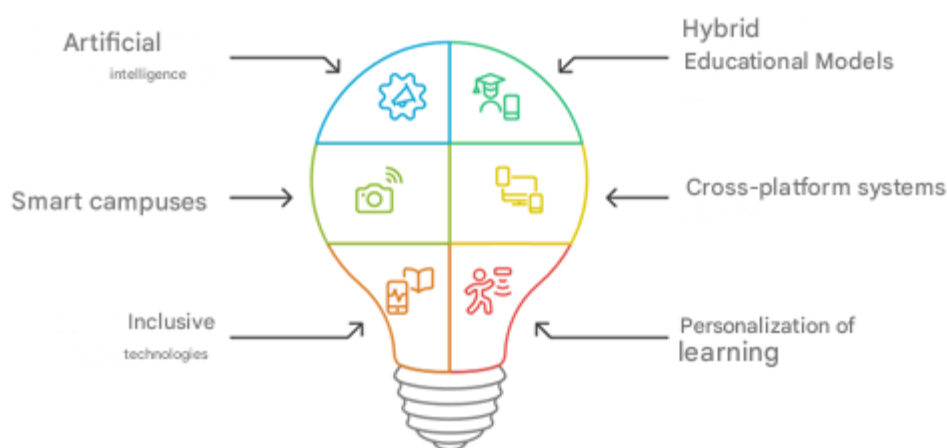


Figure 3. Key areas of development of digital tools in education management

Artificial Intelligence (AI). AI can significantly improve the educational process by automating routine tasks such as grading, analyzing academic performance, and even predicting learning outcomes. The integration of artificial intelligence will allow teachers to focus more on personalized learning, making the process more tailored to the needs of each student. It will also allow for more accurate identification of weaknesses in learning and provision of additional resources to improve results. As a result, the overall quality of education will improve [Makarchuk T.A. et al., 2018].

Hybrid learning. Integrating online and offline learning requires the development of a robust and effective digital infrastructure. Hybrid learning models that combine traditional methods with modern digital technologies provide greater flexibility, accessibility, and personalization. Such approaches effectively combine the strengths of different educational formats and expand learning opportunities, especially for students who require greater flexibility in scheduling and access to materials. Hybrid learning also expands access to education for different groups of students, including those who are unable to attend school regularly [Hesham A. et al., 2024].

Internet of Things (IoT). Using IoT to manage educational resources, scheduling, and student flow can significantly improve the efficiency of the educational environment. Smart campuses equipped with IoT devices will optimize space use, optimize resource consumption, improve classroom comfort, and increase the overall efficiency of the educational process. IoT also plays an important role in monitoring educational processes and ensuring security in educational institutions [Abramov V.I. et al., 2022].

Mobile and desktop platforms. Developing digital solutions that support both desktop and mobile devices will ensure constant access to educational materials and services anytime and anywhere. This approach will increase student engagement as they will be able to choose the most convenient learning formats, which will contribute to the flexibility of the learning process and increase learning

motivation. Mobility also allows students to study at any time, making the educational process more accessible to a wider range of students [Yarnykh V., 2021].

Adaptive technologies for students with special needs. Developing digital tools that are adapted for students with special educational needs ensures equal opportunities for all students. Adaptive technologies such as augmented reality will enable the creation of personalized learning paths that take into account the specific needs of each student. This will allow each student to receive support tailored to their unique circumstances, improving learning outcomes for all students, including those who face additional learning challenges.

Personalized learning. Personalized educational programs that take into account individual learning pace and needs contribute to a deeper understanding of the material and improved academic performance. These programs will be based on dynamic analysis of data received from students, which will allow teachers to adapt the learning process to each specific case. The introduction of personalized learning increases student motivation, since each student will feel that education meets their interests and needs. As a result, this increases the overall effectiveness of education [Bordovskaia N.V. et al., 2023; Alstete Jeffrey W., 2023].

Successful implementation of these areas requires a comprehensive approach, including investments in digital infrastructure, training of teachers and administrative staff, ensuring data security and developing new pedagogical strategies. The integration of these technologies into educational processes will contribute to significant progress in the digitalization of education and improving the quality of educational practices. This will open up new opportunities for students and teachers, creating a more flexible, inclusive and personalized educational environment accessible to all students, regardless of their location and educational needs [Ajat R. et al, 2024; Kociuk M.M. et al., 2023].

Conclusion

Digitalization in education serves as a powerful tool for improving the quality of educational process management. Through the use of digital technologies, education becomes more accessible, inclusive, and responsive to the diverse needs of students. Digitalization helps expand access to a huge number of educational resources, facilitates individualization of the learning process, stimulates independent learning, and increases student motivation through personalized content. In addition, digital tools automate routine administrative tasks, allowing teachers and administrative staff to focus more on interactive teaching methods and student engagement.

One of the major benefits of digitalization is its ability to break down geographic and social barriers, making education accessible to a wider audience. Rural and remote areas that have traditionally had limited access to quality education are now able to participate in the learning process through digital platforms. This increased access not only promotes equity in education, but also creates a more inclusive and diverse learning environment in which learners from different backgrounds can thrive. However, successful integration and widespread adoption of digital tools requires systematic training and ongoing professional development of teachers and administrators. Digital literacy has become a core skill for educators, as it enables them to effectively use technology in the classroom and in various administrative functions. In addition, equipping educators with the necessary knowledge and skills ensures the effective use of digital tools and their seamless integration into the educational process.

To ensure effective implementation of digital technologies in education management, several key recommendations need to be taken into account:

- *Provision of necessary resources.* Educational institutions must be equipped with the necessary technological infrastructure, including computers, smart devices and a stable internet connection. In addition, technical support must be provided to resolve any issues that may arise during the integration of new digital tools.
- *Development of digital educational platforms.* It is essential to develop and implement digital

platforms that meet the specific needs of the educational process. These platforms should be user-friendly, scalable and able to support various teaching methods, allowing for the integration of multimedia content, online assessments and real-time interaction between teachers and students.

- *Regulation and data protection.* Developing comprehensive rules governing the use of digital technologies in education is vital. This includes protecting the personal data of students and teachers, ensuring privacy, and providing clear guidelines for the protection of intellectual property. A clear policy will help reduce potential risks associated with data leakage and unauthorized use of educational materials.

- *Teacher and administrator training programs.* Ongoing training and professional development for teachers and administrators is necessary to create an environment in which technology is effectively integrated into the learning process. Specialized programs should be implemented to improve digital literacy, pedagogical approaches to online and hybrid learning, and the use of digital tools in curriculum development.

- *Support technological innovation.* Educational institutions must remain open to new technologies such as artificial intelligence, virtual and augmented reality, and machine learning. These innovations have the potential to further personalize learning, increase engagement, and improve learning outcomes.

By following these recommendations, educational institutions will be able to effectively integrate digital tools into their management processes. This will not only improve the quality of education, but also ensure equal access to knowledge for every student, regardless of their location or background. As we continue to embrace the digital age, education will become more flexible, inclusive, and better prepared to meet the challenges of the future.

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Сандық құралдар арқылы білім беруді басқарудың заманауи тәсілдері

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Аннотация

Мақалада білім беру процестерінің тиімділігін арттыруға бағытталған білім беруді басқаруды цифрландырудың заманауи тәсілдері қарастырылады. Оқытуды басқару жүйелері (LMS), бұлттық қызметтер, аналитикалық платформалар және қашықтықтан өзара әрекеттесуге арналған сандық құралдарды қоса алғанда, негізгі технологиялар талданады. Олардың әкімшілік процестерге, басқарудың ашықтығына және оқытуды жекелендіруге әсеріне ерекше назар аударылады. Қаржыландырудың жеткіліксіздігі, цифрлық теңсіздік, киберқауіпсіздік және мұғалімдердің жаңа технологияларды енгізуге қарсылығы сияқты цифрландырудың негізгі мәселелері қарастырылады. Білім беру мекемелерін цифрлық трансформациялауға кешенді көзқарастың маңыздылығы атап өтіледі. Жасанды интеллект, Заттар интернеті және адаптивті білім беру технологияларын қолдануды қоса алғанда, даму перспективалары талқыланады. Қорытындылай келе, білім беру процесінің сапасын, қолжетімділігін және басқарылуын арттыру үшін цифрлық шешімдерді тиімді енгізу бойынша ұсыныстар ұсынылады.

Түйін сөздер: білім беруді цифрландыру, білім беруді басқару, LMS жүйелері, бұлтты технологиялар, білім беру аналитикасы, қашықтықтан оқыту, цифрлық трансформация.

Современные подходы к управлению образованием с помощью цифровых инструментов

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Аннотация

В статье рассматриваются современные подходы к цифровизации управления образованием, направленные на повышение эффективности образовательных процессов. Анализируются ключевые технологии, включая системы управления обучением (LMS), облачные сервисы, аналитические платформы и цифровые инструменты для дистанционного взаимодействия. Особое внимание уделяется их влиянию на административные процессы, прозрачность управления и персонализацию обучения. Рассматриваются основные проблемы цифровизации, такие как недостаточное финансирование, цифровое неравенство, кибербезопасность и сопротивление педагогов к внедрению новых технологий. Подчеркивается значимость комплексного подхода к цифровой трансформации образовательных учреждений. Обсуждаются перспективы развития, включая использование искусственного интеллекта, Интернета вещей и адаптивных образовательных технологий. В заключение предлагаются рекомендации по эффективному внедрению цифровых решений для повышения качества, доступности и управляемости образовательного процесса.

Ключевые слова: цифровизация образования, управление образованием, системы LMS, облачные технологии, образовательная аналитика, дистанционное обучение, цифровая трансформация.

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ЖАСӨСПІРІМДЕРДЕГІ ЛУДОМАНИЯ ЖӘНЕ ОНЫҢ АЛДЫН АЛУ

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Аңдатпа

Мақалада жасөспірімдердің лудоманияға қызығушылығы мен тәуелділігінің мәселесі анықталып және оның алдын алу жұмыстары қарастырылған. Жасөспірімдердегі лудоманияға тәуелділіктің алдын-алудың педагогикалық-психологиялық шарттарын теориялық негізделіп, оның педагогикалық шарттары, алдын алудың құрылымы, өлшемдері мен көрсеткіштері айқындалған. Зерттеу жұмысының мақсаты жасөспірімдердегі лудоманияға тәуелділіктің алдын алу жолдарын теориялық негіздеу, әдістемесін жасау және эксперименталды түрде тексеру болып белгіленген. Зерттеу барысында лудоманияның қоғамда даму қарқыны қарастырылып, соның ішінде жасөспірімдер арасындағы үлесі айқындалуы, жастар арасындағы лудоманияның негізгі бастауы ретінде көрінетін социологиялық факторлар анықталып, оның алдын алу бойынша психологиялық қызметтер тізбегі жасақталуы зерттеудің жаңалығын құрайды. Мақалада жасөспірімдер арасында лудоманияның (құмар ойындарға тәуелділік) алдын алу, қауіп факторларын түсіндіру, салауатты өмір салтын қалыптастыру және психологиялық тұрақтылықты нығайту іс-шараларды қолданудың маңыздылығы көрсетілген. Қорытындылай келе, жасөспірімдер арасындағы лудомания құбылысының қоғамға алып келер зияны туралы қорытынды жасалып, оның алдын алу бойынша әрекеттер тізбегі тәжірибеден өткізілді.

Түйін сөздер: жасөспірімдер, лудомания, құмар ойын, лудоманияға тәуелділіктің алдын алу, «Такер» тесті, түзету әрекеттері тізбегі.