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Research paper

Analysis of Current Tools and Methods for Optimizing The Educa-Tional Process in The Context of Digital and Technological Development

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Abstract

The impact of technologies on educational programs and the role of new technologies in adapting educational models to the challenges of globalization and innovation are considered. Special attention is paid to the analysis of practices used in Albania and Kyrgyzstan. Key areas of digitalization of education are examined, including the introduction of cloud technologies that ensure the accessibility of educational materials from anywhere, the use of artificial intelligence for adaptive learning, which allows personalizing the educational process, and the use of virtual and augmented reality technologies for creating an interactive learning environment. The possibilities of mobile training to increase the flexibility of the educational process and use the analysis of large data for monitoring and improving educational systems are also considered. The paper focuses on a comparative analysis of the digitalization of education in Albania and Kyrgyzstan, identifying both common problems related to access to technologies and digital resources, and unique features, including differences in the level of infrastructure development, financial support, and training of teaching staff. The results of the study show that despite substantial differences in the level of digitalization, both countries are actively striving to improve the availability and quality of education through digital technologies. However, implementation processes face problems such as limited financial resources, insufficient teacher training, and unequal access to technology, especially in remote areas. Recommendations are proposed for improving the digitalization of educational processes in these countries, considering national characteristics and needs.

Keywords: *Adaptive Learning; Cloud Platforms; Educational Innovations; Online Education; Social Equality.*

1. Introduction

The modern stage of digital transformation sets the task of adapting to the new needs of a knowledge-based society for educational systems from different countries. In the context of rapid technological development, it is important not only to introduce digital technologies into the educational process but also to use them to increase its efficiency and accessibility. Albania and Kyrgyzstan are examples of countries that are at different stages of digitalisation. These countries, despite differences in the level of development, face common challenges associated with the introduction of digital tools and teaching methods, adaptation to new conditions, and solving infrastructure and pedagogical problems.

The relevance of the subject is due to the need to search for effective solutions to optimise the educational process, considering the specifics of countries with transition economies. Albania is actively developing the digital infrastructure in the educational area, trying to integrate modern technologies into schools and universities. Thereby, Kyrgyzstan faces a lack of digital resources and skills among teachers and students.

The problem of the study is the complexity of integrating digital technologies into the educational process. Firstly, there is a gap between the technological capabilities and the skills of users. Secondly, innovation requires substantial financial investments that may be insufficient in countries with limited resources.

The theoretical basis of the subject is based on studies in the field of digital education, such as the concepts of mixed learning, flexible writing, and a personalised approach to learning. Current methods include the use of artificial intelligence to analyse performance data, the implementation of distance learning platforms, and the creation of virtual laboratories.

The analysis of research in the field of implementing digital technologies in education allows for identifying many approaches that can be useful for solving problems typical of Albania and Kyrgyzstan. Rane et al. (2023) show that the use of artificial intelligence in an educational environment contributes to the creation of individualised learning pathways. On the example of universities in Eastern Europe, the authors demonstrate how the analysis of student achievement data increased their involvement in the educational process. Alajmi et al. (2019), in turn, paid attention to a cloud platform such as Google Classroom. This tool, according to the authors, was particularly effective in terms of limited physical infrastructure, providing for expanded access to educational services. In a study by Chen et al. (2019), the possibilities of mobile applications that substantially accelerated the development of languages and technical disciplines among rural youth were discussed. Results of the efficiency of virtual laboratories reviewed by Albanbaeva (2023) confirmed their importance for practical training. According to the author, these technologies reduced costs and made the educational process more applied and visual.

Alfiras et al. (2022) focused on improving the infrastructure. They noted that access to high-speed internet and modern devices has become the basis for the successful implementation of digital tools in universities. Müller & Mildenberger (2021) affirmed that the combination of traditional and digital teaching methods contributed to the creation of a more flexible system that can adapt to different conditions. Tan (2003) paid attention to the cultural aspects of the influence of technology. The author stressed that the perception of digitalisation is closely related to the social characteristics of regions, which means that the success of implementing educational innovations requires considering local specifics. Fischer et al. (2020), based on the technology of analysing large data, demonstrated how the personalisation of educational programmes allowed increasing their compliance with the real educational requests of students. Issues of digitalisation of professional training in Kyrgyzstan were examined by Sousa & Rocha (2019). They underlined those digital methods have become an important tool for improving the skills of specialists in remote regions. Similarly, Lythreatis et al. (2022) touched upon the digital divide, pointing to the risks associated with the lack of equal access to technologies. Research has shown that without solving this problem, digitalisation can worsen the existing social stratification.

Despite the wide range of studies devoted to the digitalisation of education, there are still aspects that require further research. There is no comprehensive comparison of the effectiveness of digital tools and methods used in countries with different levels of digital maturity, such as Albania and Kyrgyzstan. The integration of digital technologies into educational programmes aimed at developing professional skills, especially in conditions of limited access to resources, is also insufficiently understood.

The study focuses on the digitalisation of educational processes across various levels of education, including primary, secondary, and higher education, in Albania and Kyrgyzstan. This comprehensive approach is essential to address the diverse challenges and opportunities presented by digital transformation in educational systems. By encompassing all educational levels, the study aims to provide a holistic view of how digital technologies are integrated and utilised to enhance learning outcomes and accessibility. The purpose of this study was to assess the effectiveness of digital tools and methods for optimising the educational process, considering the specific features of Albania and Kyrgyzstan, for developing universal recommendations for their use. The objectives of the study were to conduct a comparative analysis of approaches to the implementation of digital technologies in the educational systems of Albania and Kyrgyzstan and identify key barriers and restrictions affecting the use of digital learning tools.

2. Materials and methods

This study considered the approaches and methods used to analyse the digitalisation of educational processes in the context of technological progress, with a special emphasis on Albania and Kyrgyzstan. A comparative analysis was conducted to determine how the two countries can cope with such challenges as internet availability and financing of digital initiatives. This approach allowed identifying key differences and common features in digitalisation strategies and assessing the impact of international organisations on the development of digital education. Special attention was paid to programmes aimed at reducing the digital gap between urban and rural areas.

The comparative analysis concentrated on differences in the availability of technologies, the level of digitalisation of educational institutions, and the infrastructure capabilities of both countries. Data on internet access, the provision of digital tools to educational institutions, and the willingness of teachers to use technologies in the educational process were analysed.

In addition, the study examined the barriers to digital technology implementation, including a lack of technical equipment and qualified teachers, and limited access to a stable internet. Data from surveys and interviews conducted with participants in the educational process, including teachers, students, and administrative staff, were used for the study (UNESCO International Institute for Educational Planning 2024, Dean et al. 2021, Kubitsky 2019). This study on the digitalisation of educational processes in Albania and Kyrgyzstan relied on secondary data sources, including reports from reputable international organisations like UNESCO and the World Bank, as well as surveys and interviews conducted by other researchers.

The selection of these sources was based on their relevance to the topic, the credibility and rigor of the organisations involved, the recency of the data to ensure current insights, and the comprehensiveness of the information provided, which allowed for a detailed comparative analysis. The framework used for comparing the two countries included evaluating the availability and integration of digital technologies in educational settings, the infrastructure capabilities in both urban and rural areas, the level of teacher training and preparedness, and the effectiveness of educational platforms. Additionally, the study assessed barriers to implementation, the impact of international support, and the use of advanced technologies such as AI and VR in education. This approach facilitated a thorough understanding of the digital education landscape in both countries, enabling the formulation of recommendations tailored to their specific conditions and needs. This data helped understand in depth how digital platforms, artificial intelligence, and other technologies are applied in practice, as well as identify their impact on the educational process. The results of the interview indicated the main barriers, such as a lack of technical training for teachers and insufficient funding for large-scale implementation of technologies. This empirical data substantially affected the results of the study, enabling the recommendations that consider the real conditions and needs of both countries.

The term effectiveness of digital tools refers to their impact on improving learning outcomes, increasing student engagement, enhancing access to education, and improving satisfaction among teachers and students. Effectiveness is measured using a combination of quantitative methods, such as analysing academic performance and platform usage statistics, and qualitative methods, including surveys and interviews to gather user feedback and experiences. This approach allows for a comprehensive evaluation of how digital tools enhance educational processes.

Special attention was paid to the use of methods for analysing the availability of educational technologies for various social groups, which is especially important for countries with limited infrastructure. The use of mobile learning (m-learning) as a means of overcoming barriers in access to educational resources, especially in remote areas, was considered. The study included an analysis of the capabilities of educational platforms such as Moodle, Google Classroom, and Microsoft Teams, which provide access to educational materials, promote interaction between teachers and students, and allow organising the educational process even in hard-to-reach regions.

A major component of the study was the investigation of artificial intelligence methods for creating personalised learning paths, assessing knowledge, and analysing students' academic performance. Such approaches provide for organising a more effective educational process, accounting for the individual needs of students.
Virtual and augmented reality (VR/AR) technologies used for modelling educational processes, such as chemical experiments, engineering tasks, and historical reconstructions, were also assessed. These technologies contribute to the involvement of students and simplify the study of complex disciplines. The research methodology included an evaluation of the social impact of digital technologies on education, especially in the context of their role in reducing educational inequality and ensuring equal access to high-quality education.
Thus, the study used a comprehensive approach, including comparative analysis, examination of trends, use of statistical data, review of adaptive learning and VR/AR technologies, and socio-economic aspects of digitalisation. This provided a comprehensive understanding of the state of digitalisation of education in Albania and Kyrgyzstan and formed the basis for further recommendations.

3. Results

Digitalisation of educational processes is becoming a key direction in the development of a modern learning system aimed at adapting to the challenges of globalisation and technological progress. Modern approaches to digitalisation include several strategic areas, each of which has its characteristics and scope of application.
Digital platforms such as Google Classroom, Microsoft Teams, and Moodle integrate all stages of learning, from providing materials to interacting with teachers and students. They are especially useful in countries with limited infrastructure, such as Kyrgyzstan, where access to high-quality education remains a challenge. These platforms allow organising distance learning, minimising infrastructure costs, and providing educational resources at any time. The effectiveness of these tools is determined by their versatility and intuitive interface. For example, Google Classroom is widely used due to its accessibility and integration with other Google services. Moodle provides advanced features to manage the learning process, which makes it popular in Albania. In urban settings, particularly in larger cities and educational institutions such as universities, the adoption of platforms like Google Classroom and Moodle is more prevalent. In contrast, rural areas may face challenges such as limited internet connectivity and fewer technological resources, which can hinder the widespread adoption of these platforms. While initiatives are in place to bridge this digital divide, the extent of usage of platforms like Google Classroom and Moodle in rural regions is likely less pervasive and more sporadic, depending on local infrastructure and resource availability. Therefore, while these platforms are utilized across the country, their adoption is more consistent and widespread in urban educational institutions.
An important approach is the introduction of them for adaptive learning. It is used for creating personalised trajectories, automating knowledge assessment, and analysing student achievement data. Examples of such systems include intellectual tutors who analyse the strengths and weaknesses of students, offering them individual tasks (Kabudi et al. 2021).
They are actively implemented in educational systems, providing adaptive solutions for personalised learning. It helps to analyse students' academic performance, automate knowledge assessment, and create individual educational trajectories. For example, in Albania, intelligent tutors are used to analyse the strengths and weaknesses of students, offering them personalised tasks. A key reason for the popularity of AI is its ability to adapt to the needs of each student. This makes the learning process more productive and motivating. In Kyrgyzstan, large data analysis systems help monitor attendance and exam results, which allows educational institutions to develop strategic improvements.
The use of virtual and augmented reality (VR/AR) is another promising area (Kadenko et al. 2024). These technologies allow modelling complex processes that are inaccessible to traditional teaching methods, such as chemical experiments, engineering projects, and historical reconstructions (Papanastasiou et al. 2018; Kerimkhulle et al. 2021). The use of VR/AR helps to increase student engagement and makes it easier to master complex disciplines.
Virtual and augmented reality open up new horizons in learning, enabling the modelling of complex processes that are not available for traditional methods (Mariukhnich & Mokliak, 2024). These technologies are actively used in engineering and medical disciplines. For example, in Albania, VR is used to simulate chemical experiments and historical reconstructions, which makes learning more interactive. The use of VR/AR helps not only to visualise complex concepts but also increases students' involvement, especially in disciplines that require practical skills (Kiurchev et al. 2023; Smailova et al. 2018). This makes these tools particularly effective in areas where security and process visualisation are important.
M-learning is also gaining popularity due to the availability of smartphones and tablets. The use of educational mobile apps makes the learning process more flexible, allowing students to learn at any time and in any place (Zinchenko & Lavdanska, 2022). These tools are especially relevant for countries with limited educational infrastructure. In the context of Kyrgyzstan, the assertion that mobile learning (m-learning) and the use of mobile apps are gaining popularity is supported by recent data from the Digital 2025: Kyrgyzstan (2025). According to the report, there were 6.41 million internet users in Kyrgyzstan at the start of 2025, with internet penetration standing at 88.5 percent of the total population. This widespread internet access, coupled with the fact that 11.5 million cellular mobile connections were active, suggests a robust infrastructure supporting mobile technology usage. Furthermore, the report highlights those mobile connections in Kyrgyzstan were equivalent to 159 percent of the total population, indicating that many individuals likely use multiple mobile devices. This environment facilitates the increased adoption of mobile learning and educational apps, as a significant portion of the population has access to the necessary technology. Additionally, the median mobile internet download speed in Kyrgyzstan was reported at 39.71 Mbps, which is conducive to engaging with online educational content and applications effectively. These statistics underscore the growing trend and feasibility of m-learning and mobile app usage in the country.
With the development of mobile technologies, learning has become more accessible. Applications such as Duolingo and Coursera allow students to gain knowledge at any time and place. In Kyrgyzstan, the use of mobile apps has become particularly popular due to the high level of smartphone penetration. These tools offer learning flexibility, which makes them ideal for countries with limited educational infrastructure. Gamification elements in applications such as Duolingo further motivate students.
No less important is the implementation of big data analysis for monitoring educational processes. Analysis of attendance data, exam results, and involvement allows educational institutions to develop strategic decisions aimed at improving the effectiveness of training. Mixed blended learning is becoming increasingly popular, as it combines traditional teaching methods with digital tools. This is especially true in conditions where a balance between full-time and distance learning is necessary.
The criterion of availability of digital technologies reflects the level of provision of students and teachers with the necessary resources, such as the internet, computers, tablets, smartphones, and other devices. The analysis was conducted considering the availability of platforms and tools for various social and economic groups, including remote and rural areas. High accessibility ensures inclusivity and wide coverage of the educational process, minimising barriers to technology implementation. It also allows you to consider regional differences,

which is especially important for countries with limited infrastructure (Kurt 2019). The availability analysis can be supplemented by evaluating the quality of the resources provided, such as the stability of the internet connection or support for technical services.

The ease of integration also evaluates the possibility of implementing digital technologies in educational institutions. Important aspects in this case are the volume of costs for equipment and training of teachers, the complexity of mastering new systems, and the time required to implement them. The simpler and more intuitive the interface, the more successful the integration is, which reduces user resistance (Lazar et al. 2020). Ease of integration includes analysing the readiness of educational institutions to use new tools and the availability of necessary resources for the initial stage of implementation. In addition, the availability of technical support and training materials that help speed up the process of adapting users to new technologies should be accounted for (Khrulov 2025; Zhetenbayev et al. 2022).

Educational performance focuses on improving learning outcomes, such as student achievement, involvement in the learning process, and skill development. This also includes aspects of personalising learning, such as the use of adaptive systems for an individual approach to each student. Such systems provide better assimilation of the material and contribute to increasing satisfaction with the educational process (Yu et al. 2021). Moreover, educational performance can be analysed from the standpoint of long-term effects, such as the success of graduates in the labour market, their professional training, and satisfaction with career prospects.

Economic justification included an analysis of the costs of implementing digital technologies and their impact on the quality of educational processes (Ginters et al. 2018; Nekrasov et al. 2022). The ratio of investments and results obtained is evaluated, which allows determining the long-term benefits from using technologies, including reducing costs and improving the effectiveness of learning. An important aspect is also the assessment of hidden costs, such as updating equipment, licensing software, or unspecified maintenance costs. Economic efficiency enables identifying the most cost-effective solutions and optimising the resources of educational institutions (Mustapha et al. 2021).

Social impact was also evaluated as a role of technology in reducing educational inequality and increasing equal access to education. Tools that promote inclusivity and overcome barriers for poorly protected groups of the population are of high social importance (Ronzhes 2023). The contribution of technology to improving educational conditions in remote regions is also considered. Social impact includes not only overcoming barriers but also creating opportunities for professional growth of students from dysfunctional families and improving their prospects for further education and employment.

The sustainability and scalability criterion evaluates how effectively digital tools can function in the long term, including their adaptation to changing educational standards. Scalability shows how easily these technologies can be implemented in other institutions and regions, which is especially important for the development of international educational programmes (Mian et al. 2020). Sustainability also includes the ability of technologies to cope with external challenges, such as changes in legislation, the development of competitive solutions, or changes in user requests. Scalability implies the flexibility of tools and the possibility of modifying them for different educational systems and cultural contexts.

The degree of involvement of students included an assessment of interactivity and the possibility of active participation in the educational process through digital technologies. Platforms that encourage teamwork, provide simulations or educational games, substantially increase the level of motivation and involvement, which contributes to a deeper assimilation of the material. In addition, digital technologies contribute to the creation of an environment in which students can interact with each other and teachers, creating effective feedback channels. This allows for improving the quality of training and increasing students' interest in the subjects studied (Serrano et al. 2019). Thus, the proposed criteria allow comprehensive evaluation of digital tools and determining their effectiveness in educational processes, as well as identifying directions for their further improvement. An in-depth analysis of criteria allows for adapting existing technologies to the needs of educational institutions and creating strategies for more effective use.

The digitalisation of education is an integral part of the modernisation of educational systems around the world (Beisenbi et al. 2021). Albania and Kyrgyzstan, despite different levels of economic development, are actively implementing digital technologies in educational processes, trying to improve the availability and quality of education. In Albania, the digitalisation process is supported by several European initiatives and programmes aimed at improving the infrastructure and training teachers. Special attention is paid to the creation of digital platforms and online courses that allow expanding access to educational materials for students and teachers across the country (Dahan et al. 2025). Kyrgyzstan, in turn, faces more complex challenges in the field of digitalisation of education, including insufficient infrastructure and problems with access to internet resources in remote areas of the country. However, in recent years, the country has been actively implementing projects aimed at implementing digital technologies in the educational process, such as creating online courses and teaching teachers how to use digital tools.

One of the most important steps in the field of digitalisation of medical education in Kyrgyzstan is the implementation of the Digital Medical Education System (DIMEDUS). This software and hardware system substantially improves the training of future doctors, providing opportunities for virtual modelling of clinical situations and simulation training. Using DIMEDUS is especially useful in terms of limited access to medical institutions for practical training, as the platform creates a realistic environment for performing manipulations. Thus, DIMEDUS contributes to improving the quality of medical education in Kyrgyzstan and allows students to develop practical skills in conditions close to real clinical practice (Bugubaeva et al. 2023).

In addition, both countries receive assistance from international organisations such as the World Bank and UNESCO, which help them develop and implement digital technologies in educational processes. However, the approaches and results of these initiatives differ substantially, which explains the need for comparative analysis. Table 1 provides a comparative analysis of approaches to digitalisation of education in Albania and Kyrgyzstan, based on up-to-date reports from international organisations and research, which allows for a deeper understanding of the specifics of implementing digital tools and technologies in these countries.

The presented analysis of approaches to digitalisation of education in Albania and Kyrgyzstan demonstrates the main problems and achievements of these countries. Both states are actively working on integrating digital technologies into educational processes, but their strategies differ in the aspects of financing, training of teaching staff, and access to technologies. Albania has made substantial progress in providing infrastructure and developing online learning platforms, while Kyrgyzstan faces challenges in ensuring equal access to technology for all regions of the country. This data is the basis for further research and development of recommendations for improving digitalisation processes in both countries.

Technological transformation of the educational sphere opens a wide range of opportunities for improving the quality of education, ensuring the availability of educational materials, and increasing the effectiveness of the educational process. However, its implementation is accompanied by many challenges, especially in countries with transition economies (Crittenden et al. 2019). In countries, digitalisation of the educational process faces many problems, including a lack of financial resources, limited access to technologies, insufficient training of teachers, and a scarcity of digital resources in national languages. These challenges complicate the process of integrating digital technologies into educational systems, making them less competitive in the international arena.

Albania, although it has made substantial steps in digitalising its economic processes, faces serious problems in the field of education. One of the critical problems remains the low level of digital skills among teachers and students, as well as the insufficient material and technical

base in rural schools. Therewith, the main obstacle in Kyrgyzstan is associated with the unequal distribution of technological infrastructure, especially in remote and mountainous regions. These differences emphasise the need for a comprehensive approach that accounts for the national characteristics of each country.

In addition, both countries face cultural barriers associated with the introduction of new technologies. In Albania, there is a lack of trust in digital tools in the educational environment, which slows down the process of their adaptation. In Kyrgyzstan, there is a strong attraction to traditional teaching methods, which complicates the integration of digital approaches into the educational process. However, these problems also open opportunities for implementing innovations and improving educational systems.

A comparative analysis of the problems and challenges of digitalisation of education in these countries allows identifying both general and unique aspects that require attention. This is important for understanding the current state of digitalisation, as well as for developing effective strategies and policies aimed at eliminating existing barriers. Table 2 presents the main problems and challenges that Albania and Kyrgyzstan face in the process of digitalising their educational systems.

Table 1: Comparative analysis of approaches to digitalisation of educational processes in Albania and Kyrgyzstan

Criteria	Albania	Kyrgyzstan
Degree of digitalisation	The average level of digitalisation, electronic platforms, and online courses is actively implemented	Low level of digitalisation, limited access in remote regions
Access to the internet and technologies	High access in cities, limited access in rural areas	Limited access in rural and remote areas, but improved with international programmes
State programmes	Programmes aimed at implementing digital technologies in schools and universities, with partial financing	Digitalisation programmes, support from international organisations, but limited financial resources
Training and education of teachers	Teachers take specialised courses, but access to resources is limited	Training teachers is difficult due to a lack of resources and infrastructure
Using educational platforms	The Moodle platform, electronic magazines, and online courses are widely used	Implementation of educational platforms only at the level of pilot projects
Infrastructure	Developed infrastructure in large cities, in rural areas – insufficient	The infrastructure is poorly developed, especially in remote regions
Inclusivity	Programmes for all students, including disabled people, via online platforms	The main attention is paid to urban regions, and programmes for rural schoolchildren are limited
Economic accessibility	Financing of digitalisation programmes is partially provided by the state and international funds	Limited funds, dependence on international grants and programmes
Implementation problems	Insufficient training of teachers, technical difficulties, low level of digital literacy in some groups of students	High dependence on external financing, lack of technical equipment, problems with internet access
Results and achievements	Successful implementation of digital tools in the educational process improves the quality of education in large cities	Limited achievements, first steps in the digitalisation of education, result in cities being better than in rural areas

Source: compiled by the authors based on Country Initiative on Education for Sustainable Development: Kyrgyzstan (2024) and Increasing Civic Engagement in the Digital Agenda (2022).

Table 2: Main problems and challenges of digitalisation of education in Albania and Kyrgyzstan

Problems and challenges	Description of the problem in Albania	Description of the problem in Kyrgyzstan
Internet access	In rural areas, there are still problems connecting to a stable internet, which restricts the use of digital platforms.	The absence of high-quality internet in remote areas, especially in mountainous regions, reduces the availability of online training.
Financing	Limited state investment and insufficient grant programmes to support the digitalisation of education.	Dependence on international financial organisations for the implementation of educational digitalisation projects.
Material and technical base	The high cost of digital devices limits students' access to technologies such as VR/AR and modern educational platforms.	Insufficient number of computers, tablets, and other devices in schools, which reduces the possibility of implementing technologies.
Qualification of teachers	Many teachers do not have the necessary skills to use AI, VR/AR, and cloud technologies in the educational process.	Lack of systematic training of teachers to work with new technologies delays their implementation.
Language availability	A limited number of educational materials in Albanian, especially in the context of specialised digital platforms.	Lack of digital educational resources in the Kyrgyz language limits the opportunities of local students.
Digital inequality	There is a substantial gap in access to technology between urban and rural schools, which exacerbates educational imbalances.	Strong inequality in access to digital educational technologies among different regions of the country.
Cultural resistance	Conservatism in the educational environment and traditional views on learning make it difficult to integrate AI, VR/AR, and mobile learning.	The involvement of traditional teaching methods in schools and universities limits the implementation of digital approaches.
Regulatory framework	Incomplete legislative regulation and a lack of clear standards for implementing technologies in the education system.	Lack of a national strategy for the digitalisation of the educational system and regulatory support for its implementation.

Source: compiled by the authors based on Increasing Civic Engagement in the Digital Agenda (2022), Chen et al. (2020), and Harden-Wolfson (2024).

The presented analysis demonstrates that, despite the similarity of some shortcomings, Albania and Kyrgyzstan have their own specific features in the process of digitalisation of education. For example, in Albania, the digital disparity is more pronounced between economic sectors, while in Kyrgyzstan, the main obstacle remains infrastructure insufficiency in remote regions. Both states experience a lack of digital resources in national languages, which slows down the introduction of technologies in educational processes. Considering such issues allows you to identify key priorities, including infrastructure development, improving teacher training, and increasing technology availability. This will serve as the basis for subsequent recommendations and the development of effective strategies for the digitalisation of the educational system in these countries.

In the context of digitalisation and technological development, it is important not only to integrate new tools into the educational process but also to adapt pedagogical practices to new realities. One of the main areas is the development of methods to support students who may not have access to modern technologies and have limited knowledge in this area. The problems of digital inequality are becoming particularly relevant in countries with limited access to high-speed internet and modern devices (Dudar et al. 2025). Therefore, it is important to implement policies that ensure equal access to all digital educational materials for all students.

Another important component is the role of artificial intelligence in optimising the educational process (Alieksieieva 2024; Semenenko et al. 2024). Machine learning algorithms can be used to personalise learning, adapt the course to the needs of each student, and automatically change the complexity of the material. Technologies allow students to receive exactly the information that corresponds to their level of knowledge and learning needs, which substantially increases the effectiveness of the educational process (Diachuk 2024). In addition, the importance of data analytics in educational systems is notable. The collection and analysis of data on students' achievements allows them to predict their further progress, identify weaknesses, and quickly adjust their learning methods. This makes the process of planning educational activities more effective and helps to improve the quality of education, considering the individual characteristics of students.

Thereby, the adaptation of educational programmes to rapidly changing technological conditions requires constant updating of the content of training. Programmes must meet not only current labour market requirements but also integrate the latest technologies and teaching methods. It is especially important to implement disciplines related to digital technologies, such as programming, cybersecurity, and big data processing, which become necessary to prepare students for modern challenges (Annenkov et al. 2023; Yermolenko et al. 2024). Special attention should be paid to the professional development of teachers. Teachers must constantly improve their skills to effectively use new technologies in teaching. This requires advanced training programmes and access to resources that help teachers learn new tools and techniques.

Although digital tools provide various advantages to educational processes, they also present considerable hurdles and unexpected consequences related to their application. One notable downside is the difficulty some teachers face in adapting to new technologies, which can hinder the effective integration of digital tools into the curriculum. This resistance or inability to adapt can stem from insufficient training or a lack of familiarity with digital platforms, leading to underutilization of available resources. Additionally, there can be instances of student disengagement, where the introduction of digital tools does not necessarily translate into increased student interest or participation. This disengagement might occur if the tools are not aligned with the students' learning preferences or if they are not integrated in a pedagogically sound manner. Moreover, the adoption of digital technologies can inadvertently increase disparities within the educational system. For example, students in urban areas or those from higher socioeconomic backgrounds may have better access to digital devices and high-speed internet, thereby benefiting more from digital education initiatives compared to their rural or less privileged counterparts. This digital divide can exacerbate existing inequalities, making it crucial for educational policies to address access and equity issues comprehensively. Negative feedback from users, including both teachers and students, often highlights these challenges, pointing to issues such as technical difficulties, lack of support, or the impersonal nature of digital interactions. Addressing these downsides is essential for ensuring that the benefits of digital tools are fully realized across all segments of the educational landscape.

A comprehensive approach will be required to improve the effectiveness of learning in the context of digitalisation in Albania and Kyrgyzstan, considering technological and pedagogical aspects. In Albania, where there are problems with access to high-quality infrastructure and internet in rural areas, it is recommended to develop m-learning using offline applications and implement Moodle with local servers to ensure stable access to educational materials. The use of them will allow creating personalised learning paths, and VR/AR technologies, such as virtual laboratories and historical reconstructions, will improve the study of complex disciplines, making the process more exciting. It is also important to organise courses for teachers to improve their digital literacy and skills in working with new tools. For Albania, it is recommended to enhance digital infrastructure in rural areas to ensure that digital educational tools are accessible to all students, regardless of their geographic location. Implementing comprehensive training programs for teachers, particularly in rural regions, will enhance their digital literacy and ability to effectively use digital platforms, maximizing the potential of these tools in the educational process. Albania should continue to leverage European initiatives and funding aimed at digital education to provide additional resources and support for integrating advanced technologies into the educational system.

In Kyrgyzstan, the focus should be on developing offline-capable mobile learning solutions to ensure continuous access to educational materials without relying on consistent internet connectivity, addressing challenges in remote and rural areas. Strengthening international partnerships will be crucial for securing funding and resources to improve digital infrastructure and access to technology across the country. Additionally, investing in creating and translating digital educational content into the Kyrgyz language will make it more accessible and relevant to local students, enhancing engagement and learning outcomes. Thus, for both countries, promoting digital literacy programs for students and educators is vital to ensure that all users can effectively navigate and utilize digital tools and platforms. Investing in scalable and sustainable technologies that are effective, maintainable, and updatable is also important. Encouraging blended learning approaches that combine traditional teaching methods with digital tools can create flexible and resilient educational systems that adapt to various learning environments and needs.

4. Discussion

Digitalisation of educational processes has become a critical topic in adapting educational systems to globalisation and technological changes. In particular, the integration of digital tools and platforms into the educational environment has led to the transformation of traditional teaching methods, providing previously unreleased opportunities for both students and teachers.

The process of digitalisation of education in different countries, including Albania and Kyrgyzstan, takes place at different stages. Despite differences in the level of economic development and technological infrastructure, both countries are taking steps to integrate digital technologies into the education system, although the scale and results of these technologies are increasingly different. In Albania, due to a higher level of digital infrastructure, platforms such as Moodle and Google Classroom have been successfully integrated, as well as various online courses that benefit both teachers and students, especially in cities. Xhomara (2024) focused on the successful integration of digital platforms in Albania, which is confirmed by successful results in large cities. However, the problem remains in rural areas, where access to the internet is limited. This coincides with the current results, which also note the difference between urban and rural areas and highlight the importance of technology availability. However, problems remain, first, in rural areas, where access to technology and the internet remains limited. In contrast, digitalisation will come with more serious infrastructure and financial restrictions in Kyrgyzstan, and access to digital tools, especially in remote areas, is restricted.

A crucial factor in the success of digitalisation is the availability and implementation of digital tools (Karymsakova et al. 2020; Tkachenko et al. 2025). In Albania, the government has made substantial strides in developing online platforms and teaching teachers. However, the lack of resources and digital skills among teachers, especially in rural areas, remains a serious problem. The effectiveness of these technologies is further complicated by the digital division between the city and the village. In Kyrgyzstan, despite international funding for digital initiatives, a lack of infrastructure and a substantial digital divide make it difficult to fully integrate technologies across the country. These problems are compounded by limited access to digital content in local languages, which affects the quality and inclusivity of the education provided. Similarly, Brunetti et al. (2020) conducted a more detailed analysis of the difficulties, emphasising that despite

international assistance, the country faces more problems associated with a low level of digital infrastructure and a lack of qualified personnel. Current results coincide with this conclusion, especially in terms of limited access to digital resources in remote areas.
The effectiveness of digital educational tools can be assessed by several criteria, including accessibility, ease of implementation, and the degree of student involvement (Amourah et al. 2024). In both countries, Albania and Kyrgyzstan, technologies such as artificial intelligence, virtual, and augmented reality, as well as mobile learning, are growing in popularity. These tools have the potential to improve personalised learning by providing adaptive educational conditions that meet the needs of each student. Yin (2022) considered the use of innovative educational technologies, such as artificial intelligence and virtual reality. The author concluded that there is a growing interest in these tools in countries, but their implementation is severely limited by the lack of qualified personnel and appropriate infrastructure. The author concentrated on the "potential" of technologies, while not considering the problems of infrastructure and digital division, unlike current analysis, which is more balanced and addresses the problems of inequality and access.
Zhao & Li (2022) investigated the use of artificial intelligence and the analysis of big data in educational systems, focusing on how these technologies can be used to improve the quality of education. The author assesses how artificial intelligence algorithms can be used to analyse educational data and adapt curricula to the needs of students. The current conclusions about the need to improve the skills of teachers echo the research of the author, who also focuses on the training of teachers for the effective use of new technologies. However, for these technologies to be effective, they must be supported by the necessary infrastructure, training of teachers, and solving the problem of digital inequality. Mobile education and cloud platforms have proven useful in providing access to education in remote areas where traditional educational resources are limited (Aviv et al. 2024).
In addition, the long-term sustainability of these technologies is another important factor. Albania and Kyrgyzstan should focus on creating scalable and adaptable systems that can be used in different regions, considering different levels of access to digital resources. Long-term sustainability will also depend on the continuous professional development of teachers, which will ensure their willingness to effectively use new technologies in teaching (Kiryanova 2024).
Similarly, Pettersson (2021) focused on how different countries adapt educational models with digitalisation in mind. The author pointed out that digital technologies are being integrated quickly, but the education system faces difficulties in adapting traditional teaching models. The adaptation process is substantially difficult due to financial and educational barriers. As in the current results, the author emphasises the importance of pedagogical adaptation to new technologies. Hashim et al. (2022) investigated the prospects for long-term sustainability of digital educational solutions. They emphasised that it is important not only to implement technologies but also to create stable and scalable systems that can work at different levels of education. The study highlights the role of continuous professional development of teachers as a key component of successful digital transformation. This includes not only technical training but also the formation of new pedagogical skills that help effectively use digital tools. The authors pay great attention to long-term sustainability and the scale of change, while the current study considered digitalisation as part of a broader social process, where sustainability is only one of the factors.
Finally, the social impact of digitalisation cannot be overestimated. Digital tools can substantially reduce educational inequality by providing equal access to educational materials and creating an inclusive environment for all students, including people with limited opportunities or those who live in remote areas (Vishnikina et al. 2024). The integration of digital technologies into education can play a substantial role in reducing educational inequalities, especially in developing countries. However, this requires coordinated work by governments, international organisations, and local communities to overcome infrastructure and social challenges. Lynch et al. (2024) examined the impact of digital technologies on reducing educational inequality, with an emphasis on the use of technologies to provide access to education to children with limited opportunities. They argued that digitalisation in countries with limited infrastructure can reduce inequality but requires more attention to content availability. The current results also emphasised that digitalisation can reduce educational inequality, especially among students with limited opportunities and from remote regions.
Zhang et al. (2020) investigated the problem of digital inequality faced by developing countries in the process of digitalisation of education. They analysed differences in access to technology between the city and the village, as well as educational opportunities for different social groups, especially for people with limited opportunities and students living in remote regions. This study echoes the current focus on the problem of digital inequality, especially in rural areas. The current study also mentioned barriers to access to digital technologies.
Although Albania and Kyrgyzstan have achieved certain success in digitalising education, the success of these initiatives depends on solving several problems, such as infrastructure gaps, financial constraints, and teacher training. It is necessary to adopt a comprehensive approach that combines technological integration with pedagogical adaptation to maximise the potential of digital tools in improving the quality and accessibility of education. Jamil (2021) argued that it is important to create stable and long-term educational systems for the successful implementation of technologies in education. Innovations in education can be successful if they are supported by the appropriate level of training of teachers and state investments in infrastructure (Salah 2024). The author focuses on creating "stable systems", rather than on specific problems of implementing technologies in different countries, which makes his approach somewhat narrower in comparison with current research, where attention is paid to adapting technologies to local conditions.
Digitalisation of educational processes becomes the basis for modernising learning systems, offering new tools for teaching, interacting, and evaluating knowledge. This is especially true for countries with developing economies, such as Albania and Kyrgyzstan, where digitalisation provides opportunities to overcome infrastructure and social barriers. Bygstad et al. (2022) reviewed the transformation of educational systems in the context of digitalisation. The researcher focused on cross-cultural features of implementing digital technologies. The author also focused on adapting educational systems to technological challenges and their impact on the availability of training.
Despite the overall goal of improving the quality and accessibility of education through digitalisation, the approaches, pace, and results of digital technology implementation in Albania and Kyrgyzstan are substantially different. Analysis of the works of various authors has shown that success depends on the combination of infrastructure capabilities, pedagogical training, financial support, and cross-cultural features.

5. Conclusion

Digitalisation of education remains the most important challenge and at the same time an opportunity for modern societies. The rapid development of technologies dictates the need to adapt educational processes to new conditions, where the integration of digital tools becomes the basis for improving their efficiency. Changes in teaching approaches are related both to the requirements of the modern labour market and to the growing needs of students for flexibility, accessibility, and individualisation of the educational process.
Cloud platforms such as Google Classroom, Microsoft Teams, and Moodle play a fundamental role in digitalisation. These tools provide access to educational resources and simplify interaction between participants in the educational process. However, their successful use depends on the availability of high-quality infrastructure and the level of digital literacy.

AI is becoming an increasingly important component of educational technologies. It allows automating routine tasks, such as checking tasks and personalising training. Systems based on AI analyse students' academic performance, adapt materials to individual needs, and identify knowledge gaps. These opportunities contribute to saving teachers' time by allowing them to focus on the development of creative and innovative teaching methods.

Augmented and virtual reality (VR/AR) opens new horizons, allowing students to immerse themselves in unique practical situations: from simulation of engineering processes to virtual excursions. However, their implementation is associated with high costs for equipment and software, which limits the availability of technologies, especially in countries with low levels of funding for education.

The experience of Albania and Kyrgyzstan demonstrates different approaches to digitalisation. Albania is actively developing infrastructure and training programmes aimed at implementing technologies. In Kyrgyzstan, despite restrictions on access to the internet and equipment, especially in rural areas, the implementation of platforms such as Moodle, Microsoft Teams, and Google Classroom helped to overcome the digital divide. In addition, AI and VR/AR can become key elements of educational strategies in both countries if efforts are made to improve infrastructure and digital literacy.

Despite the advantages of digitalisation, there are still substantial challenges: varying degrees of technology proficiency in regions, the low level of training of teachers, and limited localised educational resources. Solving these problems requires a systematic approach, including state support, investment in infrastructure, and programmes to improve the skills of teachers.

The limitation of this study was the insufficient research on the impact of digital educational technologies in remote regions. Future studies should be focused on analysing the effectiveness of digitalisation in various socio-economic conditions and identifying optimal methods of technology adaptation for regions with limited resources.

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