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## **DIGITAL TECHNOLOGIES AND THEIR IMPACT ON THE EDUCATIONAL POLICY OF THE STATE**

**Abstract.** Digital technologies are becoming an increasingly prominent feature of modern education. The educational value of digital technologies has been reinforced by the widespread use of digital educational resources during the pandemic. Thus, the hope that digital technologies can transform education in the direction of empowerment and influence the economic efficiency and competitiveness of the country, despite their uneven history to date, is actively promoted. The purpose of the study is to identify the difficulties of introducing digital technologies into the domestic education system and the directions of their improvement. The article also presents the results of the analysis of the work on the introduction and use of digital technologies in the national education systems of the leading countries of Europe and the Republic of Kazakhstan in particular. This study allowed us to conclude that the introduction of digitalization into the domestic education system creates new difficulties, such as misunderstanding of the processes taking place, insufficient funding, and others. However, it should be noted that countries can reach a new level of digitalization of the economy only with the targeted support of the state.

**Keywords:** *digital technologies: innovations: innovative technologies: digital education: state competitiveness: digitalization: digitalization policy.*

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**Майра Дюсембекова, Еркебұлан Амантаев, Гулицзыи Байшань  
ЦИФРЛЫҚ ТЕХНОЛОГИЯЛАР ЖӘНЕ ОЛАРДЫҢ МЕМЛЕКЕТТІҢ  
БІЛІМ БЕРУ САЯСАТЫНА ЫҚПАЛЫ**

**Аңдатпа.** Цифрлық технологиялар қазіргі білім берудің көрнекті

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ерекшелігіне айналуға. Пандемия кезінде цифрлық білім беру ресурстарының кең таралуы цифрлық технологиялардың тәрбиелік маңызын күшейтті. Осылайша, цифрлық технологиялар білім беруді құқықтарды, мүмкіндіктерді кеңейту бағытында өзгерте алады және елдің экономикалық тиімділігі мен бәсекеге қабілеттілігіне әсер ете алады деген үміт, олардың бүгінгі күнгі біркелкі емес тарихына қарамастан, белсенді түрде ілгерілеп келеді. Зерттеудің мақсаты – отандық білім беру жүйесіне цифрлық технологияларды енгізудегі қиындықтарды және оларды жетілдіру бағыттарын анықтау. Мақалада сондай-ақ Еуропаның жетекші елдері мен Қазақстан Республикасының Ұлттық білім беру жүйелерінде цифрлық технологияларды енгізу және пайдалану бойынша жұмыстарды талдау нәтижелері ұсынылған. Бұл зерттеу отандық білім беру жүйесіне цифрландыруды енгізу болып жатқан процестерді түсінбеушілік, қаржыландырудың жеткіліксіздігі және т.б. сияқты жаңа қиындықтар туғызады деген қорытынды жасауға мүмкіндік берді. Алайда, елдер мақсатты саясат пен мемлекеттің атаулы қолдауымен ғана экономиканы цифрландырудың жаңа деңгейіне шыға алатынын атап өткен жөн.

***Түйін сөздер:** цифрлық технологиялар, инновациялар, инновациялық технологиялар, цифрлық білім, мемлекеттік бәсекеге қабілеттілік, цифрландыру, цифрландыру саясаты.*

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## **Майра Дюсембекова, Еркебұлан Амантаев, Гулицзын Байшань ЦИФРОВЫЕ ТЕХНОЛОГИИ И ИХ ВЛИЯНИЕ НА ОБРАЗОВАТЕЛЬНУЮ ПОЛИТИКУ ГОСУДАРСТВА**

**Аннотация.** Цифровые технологии становятся все более заметной чертой современного образования. Образовательное значение цифровых технологий было усилено широким распространением цифровых образовательных ресурсов во время пандемии. Таким образом, надежда на то, что цифровые технологии могут трансформировать образование в направлении расширения прав, возможностей и влиять на экономическую эффективность и конкурентоспособность страны, несмотря на их неравномерную историю на сегодняшний день, активно продвигается. Целью исследования является выявление трудности внедрения цифровых технологий в отечественную систему образования и направления их совершенствования. В статье также представлены результаты анализа работ по внедрению и использованию цифровых технологий в национальных системах образования ведущих стран Европы и Республики Казахстан, в частности. Данное исследование позволило сделать вывод о том, что внедрение цифровизации в отечественную систему образования порождает новые трудности, такие как непонимание происходящих процессов, недостаточное финансирование и другие. Однако следует отметить, что страны могут выйти на новый уровень цифровизации экономики только при целенаправленной политике и адресной поддержке государства.

*Ключевые слова: цифровые технологии, инновации, инновационные технологии, цифровое образование, конкурентоспособность государства, цифровизация, политика цифровизации.*

## **Introduction**

In the modern world, the most important direction for increasing the economic efficiency and competitiveness of the country in the world markets is the advanced development of high-tech industry [1]. Scientific and practical research in the field of the digital economy is carried out on an ongoing basis and is necessary for the deepening and development of technologies, as well as for increasing the efficiency of the Kazakh economy. The problem of the development of the digital economy and the introduction of technologies remains actively discussed, since a unified theoretical and methodological base for the study of this area is only being formed and has not been fully worked out. The purpose of this article is to consider the problem of digitalization, mainly in the field of education and how it can contribute to the development of the state and its promotion and competitiveness in the world arena. It should be noted that digital education is any learning practice that effectively uses technology to enhance a student's educational experience. It emphasizes excellence in learning and provides access to challenging content, feedback through formative assessment, anytime, anywhere learning opportunities, and one-to-one learning to provide all students with the full potential for college success in their future careers.

## **Methodological base and methods of research work**

Education in the context of digitalization is part of the region's economy. Depending on the region, its special qualities can become the main source of income. Digital technologies provided many jobs, developed regional infrastructure and, as a result, increased the popularity of the region [15]. Like any branch of economic activity, the education industry requires constant development. Naturally, development can not do without research. The article uses a descriptive approach based on the analysis of various studies. Data gathering procedure is based on various methods like library method. Internet, books and experts papers of library were used in the data-gathering step. After data classifying by means of descriptive approach data were used. Also, as sources of information were used data on statistics, state programs of the Republic of Kazakhstan, and internet resources. Analysis and comparative methods were used to achieve the goal.

## **Investigation degree**

Many researchers, including domestic ones, have devoted a lot of work on digitalization in the field of education. These are the works of Ziyadin S., Dauliyeva G., Kalymbekova Zh., Turlybekova A. “Key Aspects of Digital Tourism Modernization” (2017); Ordov K., Madiyarova A., Ermilov V., Tovms N., Murzagulova M. “New trends in education as the aspect of digital technologies” (2019). An interesting article by researchers Ziyadin and Kabaeva (2018) in which the authors consider

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specific processes of innovative development in the economy of Kazakhstan. The authors analyze the level of technological and industrial-innovative development of Kazakhstan, which is a share of the cost of Kazakhstani goods, services and labor used in the implementation of the enterprise on the territory of the Republic of Kazakhstan. They also focus on the need to develop local content in the context of innovative development of the national structure.

The study of the theory and practice of digitalization is based on the works of foreign researchers such as Larina E.B. and Orekhova E.A. “Digitalization as a factor in increasing the competitiveness of the national economy in world markets”; Pakhomov Iu. “Building a digital economy: what can a professional education system give?”; Stefanova N.A. and Rakhmanova T.E. “Evaluation of the effectiveness of the digital economy”; Conrads J. “Digital Education Policies in Europe and Beyond”; Shmel'kova L.V. “Human resources for the digital economy: a look into the future” and so on.

### **Main part**

Digitalization of education consists in using modern digital technologies that radically change the economy, social sphere, business, and other spheres, to comprehensively rethink educational activities [12].

Digital education promotes school reform by increasing equity and access to educational opportunities, improving the efficiency and productivity of teachers and administrators, providing student-centered education to ensure that all students are ready for college and careers, and recognizing teachers as education designers.

The development of digital technologies is changing the economics of education. Even the most prestigious universities in the world must implement them if they want to be competitive. It is expected that more than 1 billion new students will enroll in universities soon, which will have a positive impact on the prosperity of many economies. Thanks to digital technologies, access to the best educational practices will significantly expand, among students from developing countries. Higher education is becoming available not only to students attending classes at the university. Digital education offers non-traditional teaching methods for already working students, single parents and those who want to completely change their profession but continue to work in their main specialty.

Digital education is more flexible and more adapted to the specific needs of a person: which courses, when and how to study - everyone chooses independently. This allows you to make the learning process more efficient, faster, and also establish feedback with the student. Digital education is promoted by the development of new opportunities in mobile devices, management systems, cloud systems, video, and other technological fields.

The education sector is one of the key and most promising platforms for the global competition of states for economic power and political influence in the 21st century. The practical implementation of a model of science-based or practice-oriented education requires taking into account processes that determine the development trends of both the education system in particular and society as a whole. The world

has entered an era of accelerating technological change, which is accompanied by a radical transformation of the content of many professions, the withering away of some of them, the appearance of completely new ones [2].

Today, in technologically advanced segments, the lifetime of a profession is already becoming shorter than the lifetime of a professional, and this period continues to shrink [3]. As L.V. Shmelkova notes, the most important feature of a person adequate to the digital economy, is that this person owns digital technologies, uses them in everyday and professional activities, wherever and whenever they are useful and necessary [4].

In solving the problem of providing the economy with personnel who own digital technologies, the education system plays a special role. Children quickly adapt to the digital environment before they reach school age and acquire certain skills; accordingly, in general education, these skills must be consolidated and developed. To ensure a high level of digital literacy, it becomes necessary to change the forms, methods, training technologies, introduce new approaches in the general education system.

In the process of digitalization, the very structure of learning and the organization of the educational process are fundamentally changing. These changes will require both the choice of material for creating courses and their organization, and for managing an educational institution. The resulting educational environment can be implemented in accordance with several algorithms, each of which has the right to exist. Among the most significant can be distinguished: the use of free development of specialized Internet resources; the use of paid platforms for the implementation of educational content; the use of off-the-shelf platform solutions located in the cloud; creation of hybrid resources, based on several platforms, etc. [5].

Today, universities mostly use a two-component information and educational environment. It combines the publicly available resources of international educational platforms with the content of their own developments. The most commonly used platform is Coursera. Moreover, quite a lot of large IT companies are developing their own platforms that have both a direct and immediate relationship with education, as well as indirect, specialized. These developers include Facebook, iTunes, eBay, Amazon, LinkedIn, Airbnb, Tencent; VKontakte, Yandex, Avito, OZON. The information and educational environment of digital education includes technical resources: computers, tablets, mobile devices, networks, video systems, interactive screens; educational resources: software, e-educational resources, information and educational portals, distance learning systems, electronic libraries, cloud resources, webinars, newsgroups; process management: distance learning, e-mail, social networks, personal account in the cloud, the form of training [6].

Digitalization of education leads to changes in the labor market, in educational standards, the identification of needs for the formation of new competencies of the population and is focused on the reorganization of the educational process, rethinking the role of the teacher. On the one hand, digitalization undermines the school's methodological foundation inherited from the past, and on the other hand, it creates the availability of information in its various forms, not only textual, but

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also sound and visual. The availability of information will require constant search and selection of relevant and interesting content, high speeds of its processing. Consequently, the digitalization of education leads to its fundamental, qualitative restructuring. The teacher must learn to use new technological tools and almost unlimited information resources.

Virtual reality technologies create the possibility of using digital simulators that are not tied to one workplace, which expands the range of technologies studied. Mobile learning technologies let you learn anytime, anywhere. Today, information and knowledge are the basis of economic progress, to which traditional concepts and models are not applicable. L. V. Shmelkova emphasizes that the most important feature of a person adequate to the digital economy is that this person owns digital technologies and applies them in professional activities [7].

The integration and innovative use of digital technologies in education has become a policy priority across Europe. The European Union and its Member States have adopted a range of measures to support the digitalization of education. It is also a key priority for several of the Europe Strategy flagship programmes, in particular the Agenda for New Skills and Jobs, Youth on the Move, the Digital Agenda and the Innovation Agenda [8]

In Europe, the rationale for the innovative use of digital technologies in education is based on the belief that it will support learners' competence to achieve in the knowledge economy, allowing European states to remain competitive and integrated with the global economy. The Europe 2020 Strategy, for examples, cites the strategic role of Engineering and Technology, highlighting digital technologies as key drivers of educational innovation. The integration of digital technologies to support E&T received further high-level support as a major component of the European Commission's strategy for opening up and modernising E&T systems.

Since 2011 all countries had formulated national policies for ICT in education, either as standalone policies or as part of a wider national ICT strategy. The strategic emphasis of these policies, by and large, remained on fostering students' digital competence, justified by future economic benefits. Operational aspects of the policies focused mainly on training for teachers and the provision of up-to-date technology and infrastructure for schools, with a focus on primary and secondary general education. Policy direction and vision was found to be developed largely by national administrations, while operational policy decisions were often taken in a decentralized way, allowing freedom for local administrations and schools to experiment with and shape their own policies within some top-down key parameters. The assessment also established that all European countries had some form of monitoring and evaluation system in place to investigate whether or not the implemented policies met their targeted objectives [9].

In general, experience shows that the use of digital technologies in the context of teaching support has strong support from national authorities in Europe. The authorities at the national level are striving to stimulate the increased use of digital technology by teachers in the "core curriculum". This, in turn, is punctuated by

a consensus that the role of teachers in education is as important as the current political trend. As a result, the existing policy has been revised. Today, the role of teachers in the integration of digital technologies is increasingly attracting the attention of both politicians and researchers [10]. Many national strategies of the European Union (adopted in 2010-2015) aim to equip students in educational institutions, schools, classrooms or age groups with portable devices such as laptop, netbook, tablet or smartphone for educational purposes. Experience also shows that so-called “1: 1” learning initiatives have had a positive impact on teaching and learning practice, contributing to the creation of a more student-centered learning environment [11]. Device mobility has allowed learners to create more learning opportunities and a more independent approach to content. From teachers and students, it was noted that the devices improved interaction and supported more personalized feedback and the development of personalized content. Finally, the most potent effects were increased student motivation and parental involvement. Most member states of the European Union have national or regional platforms or websites for school education that provide some digital content and resources relevant to their curricula and learning objectives. Learning resources have been converted to electronic format, which simplifies the work of teachers and students, as well as their parents, and also makes digital resources more accessible to them in general.

Kazakhstan also is having a rich education base, but it is still on the developing process. In the context of globalization of modern of the scientific world, we should consider the establishment and testing of expert activities centers of digitalization together with regional and Kazakhstan companies. Attention must be directed “to the development of processing and testing of teaching and learning complexes, training simulators, and simulators, virtual laboratories for in-depth teachings of mathematics, computer science, financial mathematics and digital economics. The development of digital higher education reference must be accompanied monitoring the needs of the modern production market, the introduction and the digitalization of educational programs of all levels in accordance with the requirements for key-digitalization competences for each level of education, ensuring their continuity. Speaking of digitalization of higher education institutions, we mean not only IT universities. Digitalization should fundamentally touch all universities: economic, legal, natural, scientific. Emphasis on the availability of the knowledge of the IT-technologies, an economist and a lawyer - skills in digitalization will allow Kazakhstan education at a qualitatively new high level. As technology transforms the means for creating and exchanging information, the challenges to copyright carry serious implications for education”[13, p. 1322-1323].

For instance, Nazarbayev University characterizing by an inadequate level of education development. “In June 2015, the first graduation ceremony was held at Nazarbayev University. 380 bachelors and 142 undergraduates received NU diplomas. In September 2015, the Nazarbayev University School of Medicine was opened with the first admission of students for the Doctor of Medicine program (M.D.)

December 24, 2015, in accordance with Article 3 of the Law of the Republic of Kazakhstan dated February 18, 2011 “On Science”, Decree of the President of the Republic of Kazakhstan dated December 7, 2010 No. 1118 “On Approval of the State Program for the Development of Education of the Republic of Kazakhstan for 2011–2020”. The Government of the Republic of Kazakhstan of the autonomous organization of education “Nazarbayev University” was granted the status of a research university, and also approved the Program of development of the research university of the autonomous organization of education “Nazarbayev University” for 2016-2020.

In June 2016, the second edition took place 443 bachelor and 178 undergraduates received NU diplomas” [13, p. 1323].

Actually, new technologies in digitalization area changes other sectors too. The primary objectives are to guarantee the production of sufficient food and to ensure a fair standard of living for people engaged in agriculture sector. For example, this technology helps us to use new products more effectively than on previous time.

In the structure of the economy of Kazakhstan is increasing every year the share of the mining industry, leading to it so ne-sided development and reduce the overall competitiveness of Kazakhstan's economy. However, the mining industry would be a consumer of the products and services of enterprises belonging to other sectors of the economy and, thus, contribute to macroeconomic stability, economic modernization and social well-being of the people of Kazakhstan. Kazakhstan's content - an indicator of the level of technological and industrial-innovative development of Kazakhstan, which is a share of the value of Kazakh goods, services and labor used in the implementation of the enterprise in the territory of the Republic of Kazakhstan. The description discusses the need for the development of local content in terms of innovative development of the national economy of Kazakhstan [13, p.1326].

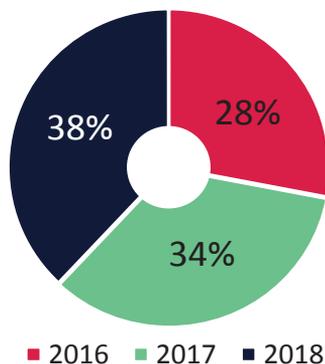
It is sufficient to consider the dynamics of new trends in education sphere in 2019 (Table 1).

**Table 1 The amount in % of quality VR (Virtual reality) and STEAM in Kazakhstan [13, p. 1326]**

Duration	VR (Virtual Reality)	STEAM
2016	15	13
2017	18	15
2018	20	17

Based on Table 1 the amount in % of quality VR and STEAM, it can be concluded that the main proportion is how these two directions grow up during three last years. There is a percentage base how VR become more popular in education sphere in 2018 (Fig.1).

## Percentage of using VR method in universities



The main goal is the progressive development of the digital ecosystem to achieve sustainable economic growth, improve the competitiveness of the economy and the nation, and improve the quality of life. According to Greenlight “Insights polls, 71% of consumers consider promising and modern brand, which uses VR technology. And Racounter names 10 areas that in the near future introduce virtual reality: sports, urban planning, the underwater world, engineering, psychological health, advertising, corporate events and meetings, tourism, security and an alternative lifestyle.

In 2016, the structure of the served users along professor staff and students: business and professional - 54,1%, scientific works - 45,6%, with other purposes - 0,3%, in 2013 the structure of the purposes looked as follows: business and professional - 60,0%, scientific works - 33,7%. It is noteworthy that compared to foreign users is growing up since the last three years (51.7%)” [13, p. 1327].

Thus, digital technologies in education sphere in Kazakhstan relies mainly on the local population, as well as on business and professional skills of users (scientists, PPS, students and other categories of people, who want to up their knowledge). Analyzing the change in the main economic indicators, we can conclude that the potential of Kazakhstan in education sphere is not fully realized, since the development of the last decade [13-14].

### Conclusion

Thus, as we can see, the developed policy of digital education in the country significantly affects the level of education, and therefore, its competitiveness in the world economy, in particular. The use of digital technologies also significantly affects the national economy, social, cultural and political life, in connection with which the states proclaim strategies and implement comprehensive national programs with the participation of political actors, business and society. Digital technologies are not only a tool, but also a new human environment. The digital educational environment provides completely new opportunities: to move from learning in a traditional classroom to learning in any space and time; develop an individual educational

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route that meets the educational needs of the student's personality; turn students not only into active consumers of electronic resources, but also into creators of new resources. This implies only one axiom, to enter the age of developed technologies and not to use them to the maximum at least erroneously, which leads to a slowdown in the spheres of state activity, including non-competitiveness in the world arena.

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