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DIGITAL TRANSFORMATION OF HIGHER EDUCATION: CHALLENGES OF THE TIME

The presented article is the result of scientific work, which explores the key aspects and characteristics of the process of digital transformation in the modern higher education system. Since 2018, the Republic of Kazakhstan has been implementing the "Digital Kazakhstan" program, which focuses on five main areas: "Digitalization of economic sectors," "Transition to a digital state," "Implementation of the Digital Silk Road," "Development of human capital," and "Creation of an innovation ecosystem."

The review of scientific and theoretical literature has helped to underscore the role of information technology in the digital transformation of higher education N.Yu. Ignatova pointed out this role, where education is one of the basic areas of human life. These include 1. Digital advantage – building intellectual capital. 2. Problems of IT education. 3. Pandemic and digital transformation in education. 4. Cluster principles of education development.

The primary aim of our research is to examine the role of information technology in the digital transformation of higher education. The primary materials for the study included scientific and theoretical resources, university accounting records, and completed forms with respondents' answers gathered through socio-pedagogical diagnostics. Research methods include analyzing psychological, pedagogical, socio-economic, and technical literature related to the research problem; conducting comparative and system-structural analyses; and utilizing sociological surveys and questionnaires.

The results include a description of the transformational processes occurring within the higher education system, the terminology framework of didactics in the modern educational process in light of digital transformation, and findings from a sociological survey of students and faculty at the Pedagogical Department of K. Zhubanov Aktobe Regional University.

Key words: digital transformation, higher education, didactics, transformational processes, IT-education.

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Жоғары білім берудің цифрлық трансформациясы: уақыт талабы

Ұсынылған мақала заманауи жоғары білім жүйесіндегі цифрлық трансформация процесінің негізгі аспектілері мен сипаттамаларын зерттейтін ғылыми жұмыстың нәтижесі болып табылады. Қазақстан Республикасында «Цифрлық Қазақстан» жүйесі 2018 жылдан бері жұмыс істеп келеді, оның бес негізгі бағыты бар: «Экономикалық секторларды цифрландыру», «Цифрлық жағдайға көшу», «Цифрлық Жібек жолын жүзеге асыру», «Адам капиталының дамуы», «Инновациялық экожүйені қалыптастыру».

Ғылыми-теориялық әдебиеттерді талдау жоғары білімнің цифрлық трансформациясындағы ақпараттық технологиялардың рөлін көрсетуге мүмкіндік берді. Н.Ю. Игнатова бұл рөлді атап өтті, мұнда білім беру адам өмірінің негізгі салаларының бірі болып табылады. Оларға жатады: 1. Цифрлық артықшылық – зияткерлік капиталды құру. 2. IT білім беру мәселелері. 3. Пандемия және білім берудегі цифрлық трансформация. 4. Білім беруді дамытудың кластерлік принциптері.

Біздің зерттеу жұмысымыздың басты мақсаты – жоғары білім берудің цифрлық трансформациясындағы ақпараттық технологиялардың рөлін зерттеу. Зерттеуге арналған негізгі материалдар ғылыми-теориялық ақпараттар, университеттің есептік құжаттамасы, әлеуметтік-педагогикалық диагностика аясында респонденттердің жауаптарымен алынған бланкілер

Зерттеу әдістері: зерттеу мәселесі бойынша психологиялық-педагогикалық, әлеуметтік-экономикалық және техникалық әдебиеттерді талдау; салыстырмалы-салыстырмалы және жүйелік-құрылымдық талдау; социологиялық сауалнама және сауалнама.

Нәтижелер жоғары білім беру жүйесінде болып жатқан сипатталған трансформациялық процестер, цифрлық трансформацияны ескере отырып, қазіргі білім беру үдерісі дидактикасының терминологиялық аппараты, Қ. Жұбанов атындағы Ақтөбе өңірлік университетінің педагогикалық факультетінің студенттері мен оқытушылары арасында жүргізілген социологиялық сауалнама нәтижелері.

Түйін сөздер: цифрлық трансформация, жоғары білім, дидактика, трансформациялық процестер, IT-білім беру.

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Цифровая трансформация высшего образования: вызовы времени

Статья представляет обзорное исследование по ключевым аспектам и характеристики процесса цифровой трансформации в современной системе высшего образования. В Республике Казахстан с 2018 года действует программа «Цифровой Казахстан», включающая пять основных направлений: «Цифровизация экономических отраслей», «Переход к цифровому государству», «Внедрение цифрового Шелкового пути», «Развитие человеческого потенциала» и «Формирование инновационной экосистемы». Анализ научно-теоретической литературы позволил выделить роль информационных технологий в цифровой трансформации высшего образования. Н.Ю. Игнатова указывала на роль образования как одной из базовых сфер жизни человека. Это: 1. Цифровое преимущество – формирование интеллектуального капитала. 2. Проблемы IT-образования. 3. Пандемия и цифровая трансформация в образовании. 4. Кластерные принципы развития образования.

Цель исследования – определение роли информационных технологий в цифровой трансформации высшего образования. Основные материалы для исследования включают научно-теоретические источники, отчетные документы университета, а также заполненные анкеты с ответами респондентов, собранные в рамках социально-педагогической диагностики. Методы исследования включают анализ психолого-педагогической, социально-экономической и технической литературы по теме исследования; сравнительно-сопоставительный и системно-структурный анализ; социологические опросы и анкетирование.

Результатами исследования являются описанные трансформационные процессы, происходящие в системе высшего образования, терминологический аппарат дидактики современного образовательного процесса с учетом цифровой трансформации, результаты социологического опроса студентов и преподавателей педагогического факультета Актюбинского регионального университета имени К. Жубанова.

Ключевые слова: цифровая трансформация, высшая школа, дидактика, трансформационные процессы, IT-образование.

Introduction

Amid recent global shifts within the world community, significant attention is being directed toward the digital economy, which is increasingly becoming part of the global landscape.

Humanity recognizes information as a vital resource and a key driver of competitiveness and successful societal development. The scientific world conducts various and comprehensive studies to identify specific instrumental capabilities of the virtual environment as a carrier of a large amount of information, techniques for its processing and application in life situations. In this case, digital technologies and their huge potential act as auxiliary techniques. Highlighting digital technologies as socially important, we are witnessing their large-scale and rapid development. They also play a significant role in shaping established models in business, consumer services, economics, as well as social and community life.

A major outcome of digital transformation and development is the rise of "third platform" technologies. This category includes mobile devices,

applications, mobile internet, social networks, cloud computing, big data, smart solutions, and various other technologies. It is important to highlight that these technologies have been effectively integrated into both global education and the education system in the Republic of Kazakhstan. Since 2018, the "Digital Kazakhstan" initiative has been in place, focusing on five key areas: "Digitalization of economic sectors," "Transition to a digital state," "Implementation of the Digital Silk Road," "Development of human capital," and "Creation of an innovation ecosystem" (State program, 2018-2022). Within the education sector, the development of human capital is a top priority. This approach aims to foster a productive society where future knowledge and skills are nurtured from an early age, business efficiency and speed are enhanced through automation and innovative technologies, and communication between citizens and the government becomes open and direct.

Research methods

In this study, we used a variety of information sources and methodological approaches to more fully explore the problem of digital transformation in the modern education system. The main sources of data and information were:

1. Scientific and theoretical information: we have conducted an extensive analysis of academic articles, books and scientific publications related to education and digital transformation. This allowed us to deepen our understanding of the concepts and theoretical foundations of this topic.

2. University reporting documentation: We reviewed documents and reports provided by the university to gain an understanding of current practices and changes related to digital transformation within the educational organization.

3. Forms with the answers of respondents: To conduct socio-pedagogical diagnostics, respondents' questionnaires were collected and analyzed, which allowed us to get direct opinions and data from the participants of the educational process.

In terms of research methodology, we utilized several methods: literature review, comparative analysis to explore various aspects of education before and after the implementation of digital technologies, system-structural analysis, as well as sociological surveys and questionnaires.

The combination of these methods and data sources allowed us to better understand and investigate the processes of digital transformation in the modern education system and assess their impact on the learning process and the actors of this system.

Literature review

The analysis of scientific and theoretical literature has shown us how important is the process of digital transformation in higher education. As Ignatova N.(2017) notes, education plays a fundamental role in the life of every person. It is a key component of personality formation and an integral part of successful socialization. Moreover, it is essential to highlight that the professional development of students in higher education continues to be a critical aspect in shaping young professionals. It involves not only the acquisition of specialized knowledge and skills, but also the ability to apply digital technologies in the professional sphere. Today, for a successful career, employers expect from graduates not only traditional qualities, but also the ability to integrate digital tools into the workflow.

In light of today's rapidly changing reality, it is important to be able to adapt to constant change. An effective mastery of digital technologies allows not only to cope with current challenges, but also to be prepared for future changes. This ability to adapt is an important criterion for employers, which emphasizes the need to integrate digital skills into the educational process.

Thus, digital transformation in higher education is not just a relevant topic; it becomes a key factor in ensuring successful socialization, professional development and readiness for rapid adaptation in the modern world (Afanas'eva G.,2018). In this context, we have identified the characteristics that demonstrate the role of information technology in the digital transformation of higher education.

1. High information competence of students in the framework of their future profession. Two directions for the application of digital technologies in the educational process should be noted:

1) Digital professional and personal competencies of students;

2) Teaching of academic disciplines with the support of digital technologies.

Y.N. Gambeeva, E.I. Sorokina(2020) identified the terminological apparatus of didactics of modern educational process taking into account digital transformation in Table 1 below:

The presented terminology reflects the modern paradigm of education, in which digital transformation plays a key role in improving and enhancing the educational process.

Table 1 – Terminological apparatus of didactics of modern educational process

Term	Author	Definition
Computer didactics	V.A.Pozdnyakov(2004)	A framework of scientifically supported hypotheses regarding the principles of computer-based learning, the advancement of theoretical and methodological foundations for new information technologies, and the identification of practical measures aimed at maximizing the development of individual learner qualities
	A.I. Bashmakov (2003)	Computer didactics lies at the intersection of traditional didactics and IT, the subject of its development is teaching methods in the context of their computer implementation
Electronic didactics multimedia	E.V.Ospennikova(2005)	Theory of learning based on the application of a set of means and methods of virtual information exchange
E-didactics	M.A. Choshanov (2013)	The science, art, and engineering of learning .
	I.N. Frolov (2011)	The domain of contemporary didactics that examines the laws, principles, and methods of e-learning designed for the remote attainment of competencies
Electronic didactics	A.D. Gartsov (2013)	Innovative didactics that are realized in the e-learning environment
	L.N. Chirkova, L.N. Borshchik (2014)	Didactics of the learning process functioning by placing the learner in an informational educational environment...
Didactics of the information society	G.I. Ibragimov (2018)	A new stage in the development of the learning process in the information and educational environment, associated with an increase in the activity of the cognitive subject, independently building learning activities
Digital didactics	V.M.Monakhov (2018)	An innovative approach to learning theory that operates and adapts alongside digital technologies, quickly interpreting and leveraging the latest advancements in IT and technology

Let's highlight the significant positive impact of digital technologies on the education system. Socio-digital technologies are reshaping classrooms and learning environments, influencing the entire educational journey from elementary school to university graduation. The digital shift now touches every aspect of the learning experience. For instance, elementary school students utilize tablets for both classwork and homework. Teachers in teaching schoolchildren – electronic panels that serve to explain a new topic. Middle and high school students work on IT-supported research projects. The usual textbooks are being replaced by interactive IT-services. According to statistics, the approach to presenting SIW and SIWLG, along with homework in the university educational process, has shifted from traditional methods to a system-based service model, where students upload their work to specialized digital learning platforms. Parents can monitor their children's progress through cloud platforms hosted on the websites of educational organization. Scholars have increasingly turned to searching for relevant information through digital libraries, PDF magazines and E-books.

The system of learning new professional skills, self-development and professional development is undergoing a new process. The coronovirus pandemic has accelerated the digital transformation – massive open online platforms that help educators improve their skills have become active. Currently, the most popular are Coursera (https://www.coursera.org), Khan Academy (https://ru.khanacademy.org), Udemy (https://www.udemy.com), edX (https://www.edx.org), Future Learn (https://www.futurelearn.com), and others.

2. The opportunities and challenges of modern education in the context of digital transformation are significant. It's important to recognize that this transformation process is often complex and demanding. For instance, when incorporating digital technologies in elementary school, teachers must consider the age and psychophysiological traits of young children. The teacher should carefully consider the tasks so that the work on any mobile device does not bring harm to their health, should take into account the sanitary norms, which include such work with a time period of 15-20 minutes. Practice shows that now in the world almost every first-grader has a personal cell phone, smart watches and so on. Doctors-psychotherapists note the growth of computer addiction of school-age children, growing into a deep mental disorder. The presence of cell

phones is often used improperly, and more often as a substitute for ordinary games, which leads to degradation of thinking activity of students.

The next challenge in the education system is the emphasis on visual learning methods of a digital nature. The most well known in the educational environment are slides, presentations, electronic environments, textbooks and even elementary mobile simulators. However, at the moment, there is still no reliable research confirming the durability of the material learned using IT technologies. The extensive use of digital technologies, both in school and at home, reduces handwriting practice, which in turn weakens students' fine motor skills and their ability to recognize written text. As a result, students may view spelling, punctuation, and grammar as less essential aspects of literacy, which can impact the quality of their thinking, reduce the clarity of their spoken language, and hinder their social interactions.

A key issue today is the informational competence of teachers and educators who can effectively and skillfully use IT technologies. The leading requirements are the following: qualitative structuring of educational information, compiling modern presentations, compiling learning tasks related to digital technologies, mobile applications and others. Therefore, as Professor M.M. Kovalev(2019) notes, "...it is necessary to focus on changing the work of institutes and teacher training centers, which should be based on modern IT programs. The most important element in the realization of this priority is the horizontal integration of teachers of similar courses and the creation by joint efforts of online support, for example, on the basis of block chain technology.

Let us emphasize another important problem: digital inequality. Thus, according to the results of PISA 2018, only 9% of 600 thousand 15-year-olds did not have special places to do their homework (Schleicher,2020). Among the countries noted are Indonesia, the Philippines, Thailand. Notably, in countries such as Austria, Denmark, Iceland, Lithuania, the Netherlands, Norway, Poland, Slovenia, and Switzerland, 95% of students have both a dedicated study space and a personal computer. In the United States, however, there is a significant disparity between socio-economic groups: nearly every teenager from an affluent family has access to a home computer, while only about three-quarters of those from lower-income families do. A similar trend is seen among Mexican students: 94% of teenagers from well-off families have mobile devices for studying at home, while 29% lack such resources,

largely among children from underprivileged families.

3. Pandemic and digital transformation in education. The viral revolution has heavily influenced one of the main social institutions – the education system – from pre-school to higher education. The COVID-19 pandemic led to the largest ever disruption of education systems, affecting nearly 1.6 billion students in more than 190 countries and on all continents. According to research conducted by the United Nations, in 2020, 94% of students across the globe were converted to remote learning in the second half of April, which includes preschool, school and college-aged children. Numerically, this equates to 1.58 billion learners and students from more than 200 countries (Ignatova, 2017). Students from countries with a low level of development are the most severely affected: for 86% of them remained without education at the elementary school level. In countries with a high Human Development Index, the figure was only 20 percent (according to https://www.oecd-ilibrary.org).

Among the 33 OECD countries, schools were closed for an average of 70 days. However, the duration of closures varied significantly, from as few as 20 days in Denmark and Germany to over 150 days in Colombia and Costa Rica (OECD 2021). Comparative assessments, like PISA (OECD 2021), indicate that school closures tended to be longer in countries where students demonstrated lower levels of academic achievement. Data analysis also showed that even in remote learning settings, educators were teaching using social media, information technology and innovative techniques OECD (2021). Almost all educational organizations have switched to online learning using the Zoom system, which allows all participants in the educational process to conduct classes. For the university environment, the choice fell on distance and blended learning. The teacher himself should create a personal educational and information field consisting of not only slide presentations and e-textbooks, but also a YouTube channel, IT simulators, Instagram, WhatsApp and telegram communities fluent in all the functions of the Zoom platform and other similar systems. On the one hand it complicates the work of the teacher, on the other hand, by bringing everything into an organized system; in the future he will have an excellent methodological base, which will serve him for many years to carry out teaching. Supporting this perspective, UNESCO introduces the concept of "knowledge platform delivery," grounded in IT technologies. This concept emphasizes an

alternative form of education—online and distance learning. Such approaches rely on cloud-based applications, virtual classrooms, video conferencing, learning management systems, streaming tools, and platforms that foster interaction among learners, as well as between students and teachers. During the pandemic, popular online platforms like Scholastic, Coursera, and Open Culture provided free access to educational resources. UNESCO's website also shared lists of free online resources for students in quarantine. The pandemic has enabled researchers to differentiate between two primary types of learning: online and distance learning. In this context, we understand distance learning as a form of independent student work guided by a teacher. For instance, researchers like E.S. Polat (2005) have examined this mode of education. Educational materials could be delivered via email, and lectures could be viewed on a computer. E-learning had already been evolving but gained widespread popularity during the pandemic alongside advancements in internet capabilities. Learners were able to watch recorded webinars, listen to lectures, ask questions live, consult with teachers and peers in online chats, take interactive tests, submit assignments to tutors, and participate in virtual quests. Thus, online learning represents a new educational format that can function independently or as part of distance learning.

Researcher A. Korol et al.(2020) highlights the opportunities and advantages of remote learning. These benefits encompass a flexible work format, the ability to choose the time and location for training, the option to select instructors and subjects, virtualization of departments with participation from top foreign specialists, the use of high-speed telecommunications to deliver high-quality multimedia content, multipoint videoconferencing, tools that automate certain tasks for teachers, and the application of artificial intelligence systems to analyze students' current performance. Most importantly, these aspects facilitate the integration of remote technologies within distance learning.

In a 2018 social survey conducted by Times Higher Education, 200 professors from top universities across 45 countries participated. The findings revealed that most respondents were skeptical about distance digital learning as the primary mode of education. However, 63% of those surveyed believed that prestigious universities would provide online higher education by 2030. Only 24% of faculty members felt that massive open online courses (MOOCs) were more effective for degree comple-

tion compared to traditional courses. Notably, a small group of respondents (19%) expressed the view that digital technologies would eliminate the traditional classroom by 2030 (Matthews,2020).

Social constraints and distance learning allowed for a different view of the learning system and interpersonal interaction processes, which allowed for the development of soft skills (creativity and empathy) in pupils and students. Distance learning has also enabled teachers to learn and apply active learning methods such as group work, brainstorming, collaboration, and online projects.

The period of active social covidal distancing coincided with the equipping of society with 5G technology. This will help in the future to realize the concept of "learning anywhere, anytime" and in international formats. The changes are also related to the technical equipment of classrooms: simulators related to virtual reality, training airwaves and others. In this case, we see how the crisis situation helped the society to accept the new technology.

4. Cluster principles of educational development. Digitalization of the educational space has introduced transformational processes of social technologies, where the issue of its cluster principles is actualized. This allowed establishing the issues of interaction between business and educational and scientific organizations. This allows to perform in a new way the integration of business support of individual scientific directions, expand the labor market, research mobility, and solve issues of social character.

The educational cluster is created based on integration of educational institutions and employers. It allows organizing and coordinating pedagogical activity, to carry out continuous work on professional self-improvement, to perform quality management. According to Pozdnjakov V.A., Shlyk V.V.(2004), such a cluster includes both manufacturing organizations. As well as services, technical companies, educational organizations, financial institutions, and others.

The education cluster allows the introduction of integration processes between teaching and research, practice and production organizations. The digital transformation opens up great opportunities for educational organizations, especially for higher education.

Teachers of Aktobe Regional University named after K. Zhubanov adhere to the following technological trends aimed at digitalization of the educational process (Table 2) (Matonin,2017).

Table 2 – Educational technological trends towards digital transformation

№	Trend name	Contents
1	Cloud technologies	technologies that store an unlimited amount of information; have convenient network access
2	Massive open online courses	online courses for professional development and self-education; involve mass use
3	«Mobile» learning	Mobile learning involves using devices such as tablets, smartphones, netbooks, and mini-computers for educational purposes. More broadly, it refers to a learning approach that allows students to independently select the time, location, pace, and resources for their learning experience (Tatarinov,2019)
4	Adaptive learning	optimized training model, taking into account individual abilities and needs of the learner, integrating information and pedagogical technologies, providing interactivity of interaction between the subjects of education
5	Virtual Reality	expansion of human physical and living space with objects created with the help of digital devices
6	Gamification	adding task-related computer game elements to the learning process

The digital and technological transformation of the learning process primarily focuses on enhancing the current pedagogical potential. Equipping with mobile technology facilitates the functioning of e-learning platforms, network pedagogical interaction. This provides an opportunity to introduce into the educational process the global changes that the world community has recently encountered.

Results and discussion

Let's examine the findings from independent sociological research conducted by faculty at Aktobe Regional University named after K. Zhubanov, focusing on first- and second-year students as well as teachers of psychological and pedagogical disciplines. The study involved 121 students and 30 teachers. It's important to note that this article presents results from a single university and marks the initial phase of the pedagogical research. The second phase will include a sociological survey at two other universities in the Aktobe region: Baishev University and Kazakh-Russian International University.

The survey aims to assess the perspectives of students and teachers regarding the digital transformation processes in society.

The questionnaire comprised 20 questions, but the authors will highlight the results of three key questions:

1. How do you define the term "Digitalization of society"?

- the application of IT devices across all sectors and areas of activity to enhance the quality of life in society;
- the utilization of information technologies by youth and schoolchildren to achieve quality education;
- the social adjustment of society to the new realities of life;
- other.

2 Do digital technologies allow you to gain quality knowledge?
- yes;
- no.

3. Do you believe that having a sufficient level of IT competencies is essential in today's society?
-yes;
-no.

When asked to define the concept of "Digitalization of society," over half of the respondents (49.4%) at Aktobe Regional University named after K. Zhubanov identified it as "the use of IT devices across all sectors and areas of activity to enhance the quality of life in society." One-third (31.7%) viewed it as "the social adaptation of society to new realities," while a smaller portion of respondents expressed that it refers to "the use of information technology by youth and schoolchildren to obtain quality education" (9.8%) and "another interpretation of the concept" (9.1%).

The following groups of students were al"o identified (Figure 1):
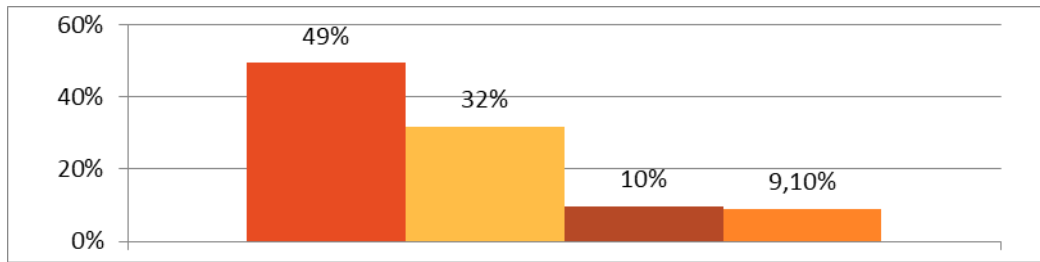
Figure 1 – Results of the survey on the choice of the characteristic
of the concept «Digitalization of society»

The results from the other two questions indicate that approximately 82% of respondents had a positive outlook regarding the idea that using digital technologies enables them to acquire quality knowledge, and that having a sufficient level of IT competencies is essential in today's society. Additionally, three groups of teachers were identified, each with varying degrees of IT competencies:

- Those who use new technologies sporadically (about 13%);

- Those who are compelled to use ICT technologies (about 75%);

- Groups of innovative teachers (around 12%). (Figure 2).

Therefore, the results suggest that society currently has a positive response to the innovative processes associated with the digital transformation of both society and education, which are crucial for the development of human capital in the Republic of Kazakhstan.
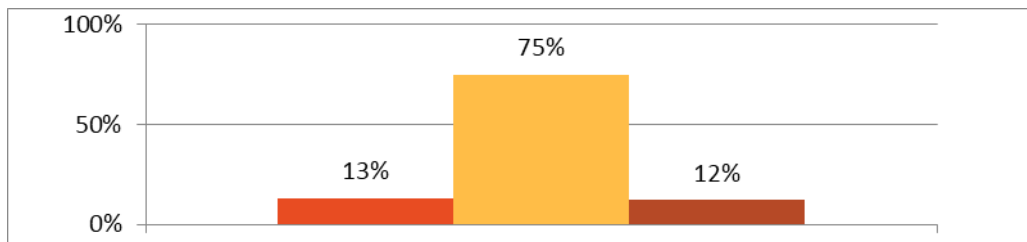

Figure 2 – Results of the survey of teachers to identify
the level of IT-competence formation

Shifting the perspective to the digital transformation of Kazakhstani education, it is important to emphasize the following aspects of digital transformation in the context of Kazakhstani education:

- Educator education and training: Successful digital transformation requires active investment in educator education and development. Teachers must be able to use digital tools and technologies effectively in the classroom. The professional development of teachers and educators is key to the successful integration of digital solutions.

- Curriculum adaptation: Kazakhstani teachers need to adapt curricula and teaching materials to meet the demands of the digital age. This includes creating relevant and interactive learning resources that promote the development of skills needed in the modern world.

- Cooperation with industry: Establishing partnerships with IT companies and enterprises can facilitate the introduction of modern technologies into the educational process. This allows students to gain practical skills and experience that meet the requirements of the labor market.

- Monitoring and evaluation: It is important to create a system of monitoring and evaluation of the effectiveness of digital transformation in education. This will make it possible to assess progress, identify problematic issues and adjust educational development strategies in accordance with real needs.

- Cybersecurity: With the increase in digital technologies, cybersecurity also needs to be emphasized. Privacy and information security are becoming key aspects in education and it is important to develop strategies and policies in this area.

- Hybrid learning models: Digital transformation also opens up opportunities to develop hybrid learning models that combine online and offline learning formats. This allows students to choose the best way to learn and flexibly adapt it to their needs. For example, students can study theoretical material online and conduct practical exercises in the classroom with a teacher. Such models can improve the quality of education and reduce the strain on physical infrastructure.

- Digital literacy: The development of digital literacy skills among students and educators is becoming more relevant. This includes the ability to evaluate and filter online information, think critically, protect their data and understand the ethical aspects of using digital technologies. Teaching digital literacy should be an important part of the education program.

- Inclusion: Digital transformation in education must be inclusive, i.e. provide equal opportunities for all learners, including children with special needs. Educational resources and platforms should be accessible and adaptable to the different needs of students.

- Research and Development: Supporting research and development in the field of digital transformation of education is key. Innovations and new approaches can significantly improve the educational process and prepare students for the modern world. Formation of scientific base and practical solutions helps to take into account the best practices and follow the changes in the educational sphere.

Taking into account the above aspects, the digital transformation of Kazakhstani education becomes a complex and multifaceted task, but it also provides many opportunities to improve the quality of education, training and development of the country as a whole. Understanding and active realization of these aspects can contribute to the effective integration of digital technologies into the educational sphere of Kazakhstan.

Conclusion

In conclusion, it is important to highlight that the modern education system is experiencing substantial changes. The digital transformation is driven by technological advancements. The digitalization of the educational process allows all participants in the pedagogical framework to utilize innovative technologies for learning. These technologies include massive online courses, mobile and adaptive learning, virtual reality, gamification, and more.

At the same time, along with digital transformation, we should take into account and actively introduce modern educational technologies into the learning process: group work, research projects, brainstorming, challenging questions, classroom research, watching educational videos, etc. Skillful combination of digital technologies with educational technologies allows us to conduct high-quality training and create a new format of the learning process, to develop information skills.

Recommendations

The brief overview of theoretical data and the sociological survey highlighted the beneficial aspects of digital transformation. This transformation enhances the scope of pedagogical interaction, both within and outside the learning process, thus increasing student engagement in cognition and education. Overall, the preliminary findings of the ongoing research indicate two primary approaches to utilizing digital technologies in Kazakhstani society and the global community:

1) A specialized information service designed to support and enhance existing teaching and learning methods;

2) An educational approach focused on the continuous development of IT competencies to remain "connected" with the rapidly evolving world.

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