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DIGITALIZATION OF THE EDUCATION SYSTEM IN KAZAKHSTAN: EXPERIENCE, PROBLEMS, AND PERSPECTIVES

Zhanat Nurbekova
Abai Kazakh National Pedagogical University
Bakyt Nurbekov
L.N. Gumilyov Eurasian National University

Abstract. Digitalization of the education system in Kazakhstan, as well as in other countries, is a global trend in education development that aims to expand access, improve quality, and increase efficiency. Despite some similarities in the digitalization process with other countries, Kazakhstan has unique challenges related to unequal access and quality control measures. The international project HIEDTEC, which was implemented from 2018 – 2022 with the support of the EU Erasmus+ program, had a significant influence and importance. The project accomplished five major tasks, which will be highlighted in this report.

However, problems such as unequal access, teacher training, quality control of educational content, and the adequacy of quality control measures to ensure accurate and effective content still exist. This report will present a forecast for the development of education through digital transformation.

Keywords: digitalization; digital transformation; education system; quality control of educational content.

Introduction

In the context of the digital transformation of all sectors of the economy, when there is a real revolution of platforms (Uber, Alibaba, Booking, etc.), the traditional model of higher education is also gradually moving into the platform business (Coursera, Udemy, etc.) and becomes one of the most important branches of the economy (Parker Geoffrey, Van Alstyne Marshall et al. 2017).

However, digitalization should not be carried out for the sake of digitalization, and this is not a tribute to fashion, the digitalization of education should lead to the optimization and efficiency of educational processes. The global trend in the development of education through digitalization is aimed primarily at

– expanding access to education;
– improving the quality of educational content and results;
– improving the efficiency of education.

These areas of digitalization exist due to certain problems in the education system, such as unequal access, insufficient development of quality control measures, the need for research and development of EdTech, and scaling the best world practices.

Despite some similarities in the digitalization process between Kazakhstan and the rest of the world, Kazakhstan has some experience and still faces some unique digitalization challenges.

Double digitalization is an obstacle to digital transformation and concerns two streams of digitalization: education, and educational subjects. To overcome this obstacle, it is necessary to harmonize digital education and digital subjects, which in turn provides the technical basis for the development of education through interactions and integrations (Bygstad, Øvrelid, Ludvigsen & Dæhlen 2022).

Studies have shown that the problem of double digitalization also takes place in the universities of Kazakhstan. The flow of digitalization of education is focused on the process and management, teaching logistics, including LMS, LCMS, social networks, and the mechanism for organizing and providing MOOCs. The flow of digitalization of subjects is focused on knowledge in the subject area, covers training and learning analytics in the educational subject, and includes various software products, as well as pedagogical aspects of teaching in the subject.

Today we see how quickly technology is changing. Reuters statistics show that ChatGPT reached 100 million users in just 2 months (Reuters 2023). At the same time, digitalization is not a momentary process.

How to be in this case? What are the ways of digitalization of the education system? How to resolve the contradictions between the existing education system and the specifics of the constant development of end-to-end digital technologies? These research questions are taken as the basis for comparative analysis, and synthesis of data from sources and own experience.

Content

The modernization of education in Kazakhstan through digitalization has been going on for several years. However, the COVID-19 pandemic exposed the existing problems and accelerated the introduction of digital technologies, pointing out their role and importance in the education system. Today, distance learning has become a necessity for millions of students around the world due to the pandemic. This experience has demonstrated the potential of digital technology in education, allowing students to learn from anywhere with an internet connection.

Unequal access to education exists due to two factors. Firstly, since Kazakhstan has geographically remote settlements, the correspondingly incomplete high-speed Internet coverage has an acute impact on the availability of modern education and educational technologies, especially in small-class schools. The second factor is related to the language barrier of students and the localization of high-quality content since there is a shortage of modern sources in their native language.

Kazakhstan has some experience in creating massive open online courses. However, during the pandemic, along with the popularity of these massive online open courses, associated with high-quality education at a lower cost and access to global digital content, there was also a problem with content localization.

There is an experience in creating e-learning platforms that provide access to electronic textbooks, video content, and digital educational resources both in the system of secondary education and higher education.

Schools in Kazakhstan use Kundelik mobile applications: Kundelik. School, Kundelik.Teacher, Kundelik. Student. These applications and the www.kundelik.kz website provide parents and students with access to all student assessments, homework assignments, and educational content free of charge. Students can check their grades through mobile applications, and parents can, if desired, receive analytical data on their child's rating on request.

The universities of Kazakhstan use and develop various domestic systems and platforms (e-Learning CDT, Univer, Platonus, SmartUnivercity, etc.), as well as well-known world-class vendors (LMS Moodle, Canvas, etc.).

For example, under the guidance and co-authorship of the authors of this article, the e-Learning CDT Information System has been developed. e-Learning CDT contains 25 automated control subsystems, which include functions and services for automating university management, automating the credit system of education, distance learning, and informatization of organizational and educational processes. This system was launched at Toraigyrov University (Pavlodar, Kazakhstan) in 2008 and is currently the core of a digital ecosystem that includes educational, intellectual, cultural, software, methodological, and technical resources (see Figure 1).

Figure 1. Information system e-Learning CDT

The development and comparative research of traditional educational material and digital educational resources in 37 disciplines have shown the possibilities of digital educational resources to optimize the learning process.

As an example, for lecture material, which takes 50 minutes to read (in the volume of 8 – 10 pages of A4 format), it is possible to reduce the time for submitting material to 8 – 10 minutes by structuring and visualizing didactic learning units in digital content. Comparative infographics of traditional and digital educational content about the Kazakh language and fragments of the national games Kokserek, Togyzqumalaq, and AsykAtu are shown in Figure 2.

Figure 2. Research and Development of traditional educational material and digital educational resources (2011 – 2020)

Lifelong professional development of teachers through various educational activities enables timely updating of knowledge both among teachers and educational content and technologies for the educational process.

Since the beginning of the COVID-19 pandemic, more than 700 teachers in Kazakhstan have completed advanced training courses through interactive online courses on innovative educational technologies as part of the Erasmus + HIEDTEC project.

Of interest is one of such events as dual classes with the involvement of external experts for current classes. At Abai Kazakh National Pedagogical University, dual classes are practiced by undergraduates with the participation of external experts from the fields of science and industry.

There is an experience in the development of digital content and digital infrastructure of the secondary education system: the government has invested in the creation and localization of digital educational resources, video lessons, the development of digital infrastructure to support e-learning, including improving Internet connectivity and providing schools with computers and tablets.

Regarding Kazakhstan's experience in international partnerships in the field of digitalization, it has established partnerships in recent years with international

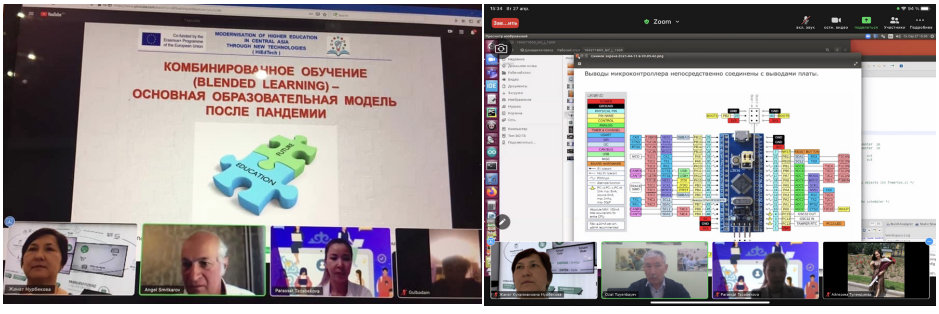

Figure 4. Fragments of HIEDTEC online courses
and a dual session with the involvement of external experts

organizations such as UNESCO, World Bank, Microsoft, Coursera, etc. to support the digital transformation of education.

The great influence and significance of the international project HIEDTEC, implemented in 2018 – 2022 with the support of the EU Erasmus + program should be noted. The coordinator of this project is Ruse University, Bulgaria. Within the framework of this project, five major tasks were implemented, which became a new starting point in terms of the digitalization of universities:

1. 1A sustainable academic network has been created to exchange experiences and best practices in innovative educational technologies and didactic models.
2. The concept of adapting the higher and postgraduate education system to the digital generation has been developed.
3. Centers for innovative educational technologies have been created.
4. Courses for trainers and teachers to acquire digital skills and teaching methods.
5. A cloud virtual library of digital educational resources has been created.

The primary task of adapting the education system to the digital generation should be to maintain the key role of the teacher in an interactive learning process focused on the needs of students (Conception 2019). The developed Conception of adapting the higher and postgraduate education system for the digital generation is system-forming in its structure and content and will eliminate the obstacle of digital transformation, such as double digitalization (Conception 2019).

Despite this, there are problems such as unequal access, timely training of teachers, quality control of educational content, and the adequacy of quality control measures to ensure the accuracy and effectiveness of the content.

The real prospects for digitalization lie in expanding access to education, improving learning outcomes and increasing efficiency, reducing the need for traditional classrooms, and enriching educational content through digital innovative educational technologies.

Regarding the forecast for the digital development of education based on the

Figure 5. The concept of adapting the higher and postgraduate education system to the digital generation (2019)

materials of the annual exhibition Bett UK (2020 – 2023), the development of digital education will be carried out through the digital transformation of education, and the transfer of digital technologies (AR, VR, mixed reality, the introduction of artificial intelligence, blockchain technologies, and data science) into pedagogical science and practice.

In the era of generative AI, such as ChatGPT, the development of education through artificial intelligence will be carried out, firstly, as an auxiliary intelligence, it will situationally help the teacher, manager, and student in actions and decisions, secondly, it will be used to automate routine tasks, thirdly, how augmented intelligence automates decision making for the user in the digital environment, and fourthly, how autonomous intelligence adapts the digital environment to various situations without human assistance (Figure 6).

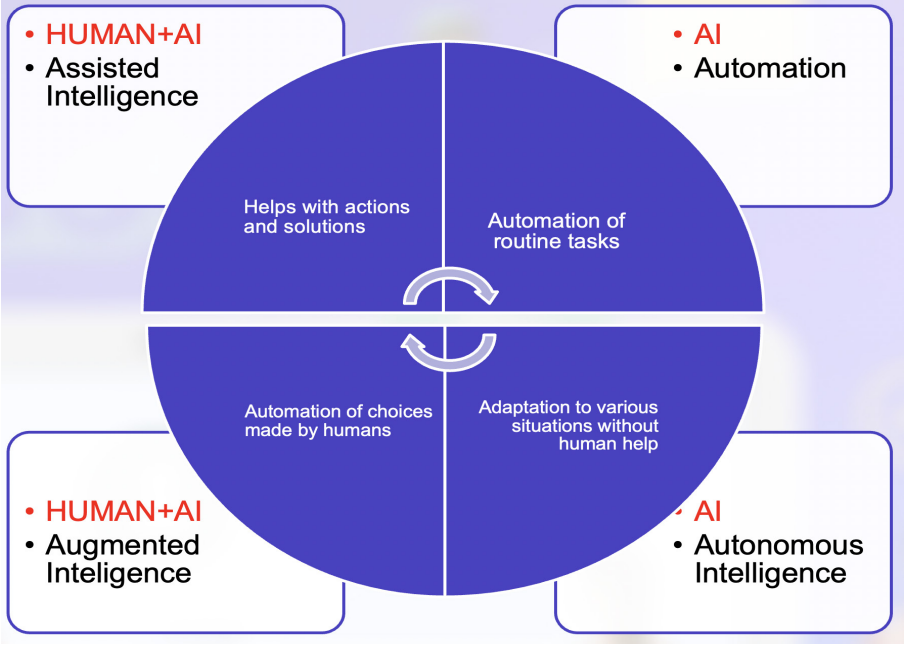

Figure 6. Directions of digital development of education through artificial intelligence

Conclusion

The contradictions between the current education system and the specifics of the continuous development of end-to-end digital technologies require, in turn, the systematization of approaches to the entire methodological system of education at a

university and school (the purpose of education, the content of education, methods, and means of education, forms, and methods of organizing education), an adaptation of the entire system education for the digital generation. The academic policy of universities needs to provide fundamental and advanced training of students, multidisciplinary training, especially in the ICT direction and the "Education" direction, taking into account the Atlas of new professions.

Digitalization should be considered both from the position of covering business processes without duplication, with the addition of existing information systems and from the standpoint of usefulness and convenience for students and teachers. Create a digital footprint of business processes and visualize data from all available information systems at the university. Undoubtedly, staffing, timely updating of the regulatory framework and technical infrastructure, such as server equipment, and ensuring the security of personal data, along with staffing, is of strategic importance for the success of digitalization.

Thus, the existing problems of unequal access, teacher training, quality control of educational content, ensuring the adequacy of quality control measures, and the accuracy and effectiveness of content can be solved through opportunities to expand access to education, improve learning outcomes, increase efficiency, reduce the need for traditional classrooms and enrich educational content through digital innovative educational technologies.

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✉ **Prof. Zhanat Nurbekova, DSc.**
Abai Kazakh National Pedagogical University
E-mail: nurbekova_zhk@digitalexgroup.com

✉ **Bakyt Nurbekov**
L.N. Gumilyov Eurasian National University