BIO Web of Conferences **150**, 0500874 (2024) https://doi.org/10.1051/bioconf/20241070500874
RGELN2024

The impact of digital technologies on the quality of education in the field of water transport management

Marina Khalilova[1,*], *Aizhan* Kurmanbekova[1], *Luiza* Sardalova[2]

[1]International University of Kyrgystan, Bishkek, Kyrgyz Republic
[2]Kadyrov Chechen State University, Grozny, Russsia

Abstract. The introduction of digital technologies in all sectors of the country's activities has led to the digitalization of the educational process, the COVID-19 pandemic has served as a catalyst. The implementation of the process of digitalization of education is carried out through the State policy in the field of digitalization and the concept of the Ministry of education and science of the Kyrgyz Republic. This article reveals the essence of the process of digitalization of educational activities. The authors considered the features of implementation, positive and negative aspects of digital technologies in education. The authors also describe the world experience of leading universities in the digitalization of the educational process.

1 Introduction

The development and modernization of the education system, effective training, and improvement of the quality of education directly depend on the use of digital opportunities. The problem of its development, implementation and use in the education system has become one of the priorities and important tasks of modern society [1]. Kyrgyzstan has adopted the National Development Strategy of the Kyrgyz Republic for 2018-2040, covering the educational sphere as one of the priority areas for improving the country's digital transformation.

The problem of digitalization of the economy in general, and the education system in particular, is particularly acute in many countries, including Kyrgyzstan [1, 2]. Meanwhile, the COVID-19 pandemic has significantly accelerated these processes and contributed to the fact that many industries that previously lagged behind in this regard have been digitalized. During the pandemic, the bulk of employees in the field of education switched to remote work using ICT.

The coronavirus has affected the educational sphere, affecting 1.6 billion students in almost 200 countries around the world. Children from poor families and living in rural areas were not able to continue studying due to the lack of Internet and technical equipment, in other words, the "coronacrisis" exacerbated the problem of inequality among

*Corresponding author: marina-smitt@mail.ru

students. The temporary shutdown of other areas affected the country's budget, which subsequently exacerbated the deficit of allocated funds for education. However, it should be taken into account that the pandemic has served as an incentive for digital advancement in many areas of activity [Ministry of Education and Science of the Kyrgyz Republic: https://edu.gov.kg/ru].

The Government has developed programs for distance learning and vocational training of students, applied innovative methods: broadcasting lessons, training in educational platforms, providing electronic material, etc.

As can be seen in the diagram, 1301,141 students studied in distance education throughout the country. In 2020, a large coverage of remote students is observed in Chui – 31% and Osh regions - 25%.

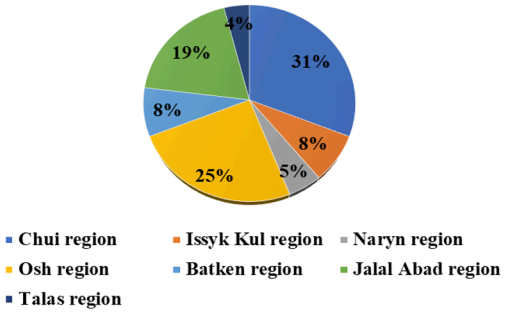

Fig. 1. Coverage of distance learners in Kyrgyzstan during the pandemic in 2020

In connection with epidemiological situation in the country in March 2020, the Ministry of education and science of the Kyrgyz Republic in the shortest possible time rebuilt the educational process in schools of the republic and organized a distance learning format. Also, the country's universities were forced to adapt to new realities.

2 Materials and Methods

One of the main priorities of the educational process at all levels was the organization of students' feedback, which was provided through such platforms as WhatsApp, ZOOM, Google Classroom, Skype, Google Hangouts, Google Meet and MOODLE [1]. Control over the quality of training and providing feedback to students was carried out through monitoring the work of both the educational institution and the students themselves, through the analysis of the control and test papers, the presence of a student portfolio. In order to organize distance learning and maximize the quality of education, the Ministry has developed the following educational resources:

1. Portal oku.edu.gov.kg which hosts more than 6500 video tutorials in all subjects, for all levels of education, in two languages, as well as e-books, additional literature, tasks, video tutorials for parents and teachers.

2. Electronic library kitap.edu.gov.kg, contains about 1000 textbooks and educational materials for students of 1-11 grades with Kyrgyz, Russian, Uzbek and Tajik languages of instruction. In this library, e-books are available for download and online acquaintance.

3. The ibilim educational resource is a multimedia software and methodological complex of electronic learning materials intended for primary school in 7 subjects. The teaching materials are used in schools with Kyrgyz and Russian languages of instruction, meet educational standards and age characteristics of primary school students.

4. Educational resource "Bilim Bulagi" is a multimedia complex of educational materials in mathematics, physics, chemistry, biology, geography, history, world and Kyrgyz literature, English, created within the standards for 5-9 grades.

5. MEGA 24 is an application based on which video tutorials and digitized textbooks are published in the Sanarip Mektep section, which are available for viewing live on the country's TV channels.

6. mozaBook Classroom and mozaWeb Premium – a system of DL and free access to Mozaik Education resources, organized by the companies "Handicraft" and Mozaik Education. This system contains more than 1300 digital lessons, more than 1000 educational videos, hundreds of educational tools such as task editor, tests, games, etc.

7. 7000 video tutorials and videos, made with the support of donors, were shown on TV channels and posted on educational platforms.

3 Result

There is a steady trend towards an increase in the number of Internet users in Kyrgyzstan, this is due to many factors, including the transition of the education system during the pandemic to online learning and an increase in the use of PCs.

Table 1. Number of Internet users in Kyrgyzstan for 2017-2022 (%)

Year	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Number of users in %	38,2%	39,1%	40,3%	70%	110,3%	111%

According to Table 1, it can be noted that the number of Internet users increased by 72.8% from 2017 to 2022, this is due to an increase in the literacy of the population in the use of digital platforms [According to the World Bank. Number of Internet users: https://data.worldbank.org/indicator/IT.NET.USER.ZS].

For more information, let's consider the data on the number of personal computers in Kyrgyzstan. According to Table 2. In Kyrgyzstan, the number of PCs increased by 30% from 2017 to 2021, which indicates the development of the use of remote platforms in the country [National Statistical Committee of the Kyrgyz Republic. Information and communication technologies. Number of personal computers: http://www.stat.kg/ru/statistics/informacionno-kommunikacionnye-tehnologii].

Table 2. Number of personal computers in Kyrgyzstan for 2017-2021

year	**2017**	**2018**	**2019**	**2020**	**2021**
Number of PCs	190 300	203 315	221 548	222 589	247 090

Let's consider the industries using these personal computers.

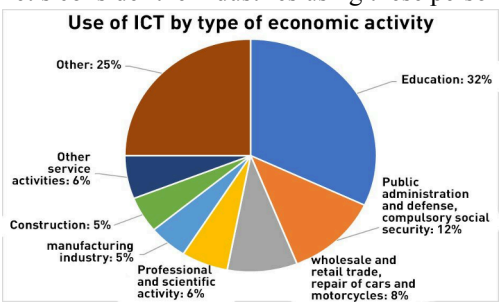

Fig. 2. Use of ICT in Kyrgyzstan in 2021

As can be seen from the diagram, a large amount of ICT is used in the field of education, which indicates the active process of digitalization of educational activities in

the country. The Ministry of Education and Science has done a lot of work in the transition to distance learning, providing educational organizations with personal computers, thereby maintaining the quality of education [Educational organizations are leading in the application of information and communication technologies in 2021: http://www.stat.kg].

During the transition to the forced online learning format, a number of problems were revealed in the educational sector: insufficient equipment with technical means and a weak level of proficiency in the use of new technologies by teachers and students, low material and technical base of educational institutions, difficulties in the transition from traditional teaching methods to innovative ones, etc. As a result of such difficulties, distance education had a negative impact on the quality of students' knowledge, since 40% of them did not have the opportunity to get in touch with the teacher, due to the lack of high-quality and high-speed Internet, a computer, their own gadget. However, there are advantages of online learning - improving and promoting the digital development of the younger generation, improving digital skills, convenience, mobility, fast communication with students and the availability of educational materials [4].

Digitalization has made adjustments not only to the learning process in the education sector, but also affected other processes of organizing educational activities. So, within the framework of the concept "Digital Kyrgyzstan 2019-2023" adopted by the Government of the Kyrgyz Republic today:

- online training seminars and webinars for teachers and teachers "EdTech – a new educational reality" are held;
- online registration to universities of the country "Online Applicant" is being implemented;
- online registration in the school "Electronic record" is being implemented;
- the country's universities are being connected to the Tunduk interdepartmental electronic interaction system, which allows online issuance of diplomas, certificates, certificates and licenses;

The process of passing accreditation and licensing of universities in the country was no exception in the implementation of the concept "Digital Kyrgyzstan 2019-2023". Thus, in 2020, during the full lockdown period, 38 educational programs were digitally accredited [Concepts of digital transformation "Digital Kyrgyzstan" 2019-2023. The State Committee of Information Technologies and Communications of the Kyrgyz Republic: https://www.adam.edu.kg/media/uploads/2022/04/15/sanarip_kyrgyzstan_koncepciya.pdf].

World experience. Literally 20 years ago, the World Wide Web seemed fantastic to us, but today, remote activity cannot exist without a global network. With its help, we get in touch, share information, study, work, earn, buy, learn new things. Many developed and developing countries have managed to transform educational activities into a distance learning format.

Since the beginning of 2000, a rapid digital transformation has been taking place in the world, the results of which have transformed a huge number of spheres, led to the creation of a new model for the development of a global system called the digital economy. The pandemic period has pushed the use of digital technologies to increase. Digitalization, in order to improve the quality of educational services, has covered the field of education. Universities around the world have introduced blended learning, and some have switched to an online work format altogether.

Let’s consider the top 10 distance universities, as well as the top ten universities in the world for 2023. According to this table, we see that University College London is the leader of online universities, and also ranks 8th among the best universities in the world ranking. Columbia University and the University of Edinburgh are among the top three universities providing distance education [Study portal masters. Best Universities in the

World Offering Online Degrees in 2023: https://www.mastersportal.com/articles/2795/best-universities-in-the-world-offering-online-degrees-in-2023.html]. The top 40% of online universities in the world are located in the United States of America, the same number in England and 20% in Australia. This situation proves the effective influence of distance education on its quality [Hot courses Russia. The best universities in the world 2023 in the QS ranking: https://www.hotcourses.ru/study/rankings/qs-world.html].

Table 3. World ranking of top 10 online universities 2023

№	Name of the university	A country
1	University College London	Great Britain
2	Columbia University	USA
3	University of Edinburgh	Great Britain
4	Johns Hopkins University	USA
5	Manchester University	Great Britain
6	Northwestern University	USA
7	King's College London	Great Britain
8	University of California	USA
9	University of Sydney	Australia
10	Monash University	Australia

Table 4. World ranking of the top 10 best universities of the world 2023

№	Name of the university	A country
1	Massachusetts Institute of Technology	USA
2	Cambridge University	Great Britain
3	Stanford University	USA
4	Oxford University	Great Britain
5	Harvard University	USA
6	California Institute of Technology	USA
7	Imperial College London	Great Britain
8	University College London	Great Britain
9	Higher Technical School of Zurich	Switzerland
10	University of Chicago	USA

The digitalization of educational institutions directly depends on the digitalization of the country as a whole, therefore, we need to consider the ranking of countries on digital competitiveness.

Table 5. World ranking on Digital competitiveness of countries for 2021-2022

№	A country	2021	2022
1	Denmark	4	1
2	USA	1	2
3	Sweden	3	3
4	Singapore	5	4
5	Switzerland	6	5
6	Netherlands	7	6
7	Finland	11	7
8	South Korea	12	8
9	Hong Kong	2	9
10	Canada	13	10
11	Australia	20	14
12	Great Britain	14	16

As can be seen from the table, for 2021-2022, the USA, Great Britain and Australia are among the top twenty countries in the world in digitalization out of 63. The USA in 2021 occupied the 1st position, and in 2022 it lost to Denmark. Australia has risen 6 positions higher over the year and ranks 14th, while the UK has dropped 2 positions lower and is in 16th place. Sweden closes the top three, retaining the 3rd place. Switzerland and the Netherlands are in the top five, and South Korea and Hong Kong are in the top ten [World ranking of countries on digital competitiveness: https://www.imd.org/centers/wcc/world-competitiveness-center/rankings/world-digital-competitiveness-ranking].

For full analysis of the quality of education in digital realities, we cannot do without analyzing the level of education in the countries under consideration.

Table 6. World ranking of countries by Education level Index for 2022

№	A country
1	Australia
2	New Zealand
3	Iceland
4	Sweden
5	Belgium
12	United Kingdom
17	USA

This table shows that in terms of education, Australia, the USA, and the UK also occupy leading positions out of 191 countries, which indicates the reliability of the quality of education in the distance format [Ranking of the countries of the world by the level of education: https://gtmarket.ru/ratings/education-index].

Turning to the international experience of modernizing the education system of the leading countries of the world, it is possible to significantly facilitate this process in Kyrgyzstan and acquire the necessary skills and technologies for transformation into digital content.

Let's look at some of them.

The USA is one of the first countries to use online learning in the world. The Internet had not yet been invented, but in 1960, at the University of Illinois, students were engaged in computer terminals that were connected to each other in a network. In 1983, the Internet appeared, and online educational programs were introduced in 1989 at the University of Phoenix, using one of the first consumer online services. As of 2022, there are more than 1,700 online bachelor's and master's degree programs in the United States. Digital technologies are one of the main attributes of the quality of education, some of the key advantages of digital transformation in the education sector can be identified: fast and accurate tracking of student progress, co-education, saving time and money for both students and universities [5].

Australia joined the global Internet in 1989, however, digital education was officially launched only at the end of 2008. For 25 years, digital technologies in the field of education have gained momentum and contribute to improving the quality of education in Australia through remote teaching, communication speed in the classroom, versatility, automation and data storage [Tadviser 2020. The entire Australian public sector has switched to cloud services: https://www.tadviser.ru].

In 1991, network access to the Internet was implemented in the UK. The Open University of London was founded in 1969, and the first students enrolled in January 1971. The Open University in the UK was one of the first universities in the world to start online education in the early 1990s. To date, more than 150 universities in the UK offer distance

learning programs, since online courses are convenient with flexibility, accessibility and an individual approach to learning [6].

4 Discussion

The state policy in the field of improving the quality of education using digital technologies is a necessary aspect of the development of the educational sphere [1]. State coordination is necessary to accelerate digital transformation. Based on the experience of foreign countries, we see positive dynamics and the positive effect of digital technologies on the quality of education. Improving the quality of education in the digital age can be achieved by:

- equipping educational institutions, employees and students with modern technology;
- introduction to remote areas of the Internet, improving its quality and speed;
- retraining and advanced training of teachers;
- introduction of a mixed learning system;
- introduction of hybrid disciplines in the educational process [2, 3];
- application of blockchain technology in the field of education;
- increasing distance self-education [7, 8];
- training of specialists in demand in the new digital labor market;
- improving the relationship between educational institutions, the business community and government agencies [9].

5 Conclusions

Modernization of the educational process is of paramount importance in the digital economy.

Modernization of the educational sphere will have a positive impact on the future digital labor market when performing the following tasks:

- performance improvement;
- availability of highly qualified personnel;
- creating remote jobs;
- reduction of unemployment in the regions;
- increasing distance self-education;
- improving the quality of work by improving the skills of personnel remotely.

Such innovation of information platforms in the development of education meets the current challenges of the development of digital technologies in the country. This system opens up new horizons of interaction between industrial and scientific and educational organizations for the training of new, more qualified personnel.

References

1. I. Kulibaba, G. Hudayberdiyeva, BIO Web Conf., **83**, 03003 (2024) https://doi.org/10.1051/bioconf/20248303003
2. M.S. Logachev, Y.A. Laamarti, S.E. Rudneva, A.I. Ekimov, D.N. Zemlyakov, A. Barkov, International Journal of Instruction, **15(3)**, 429–450 (2022) https://doi.org/10.29333/iji.2022.15324a

3. N.I. Nikitina, E.Y. Romanova, I.N. Nikishina, V.M. Grebennikova, N. Avtionova, M. Danilova, Mathematics Education, **11(9)**, 3313-3328 (2016)
4. M.V. Khalilova, A.N. Bigalieva, K. Askarbek kyzy, Bulletin of the Kyrgyz-Russian Slavic University, **21(6)**, 162-167 (2021) https://doi.org/10.36979/1694-500X-2021-21-6-162-167
5. D.G. Kochergin, E.E. Zhernov, Vocational education in Russia and abroad, **2(34)**, 12-23 (2019)
6. N. Schelybskaya, MGIMO edition of the Ministry of Foreign Affairs of Russia, **4(46)**, 1-9 (2018)
7. I. Krasnikova, I. Kulibaba, BIO Web Conf., **93**, 03006 (2024) https://doi.org/10.1051/bioconf/20249303006
8. M. Logachev, V. Simonov, BIO Web Conf., **83**, 03002 (2024) https://doi.org/10.1051/bioconf/20248303002
9. M.S. Logachev, N.A. Orekhovskaya, T.N. Seregina, S. Shishov, S.F. Volvak, Journal of Open Innovation: Technology, Market, and Complexity, **7(1)**, 93 (2021) https://doi.org/10.3390/JOITMC7010093