

A. Ibrayeva  
S. Yegemberdiyeva

L.N. Gumilyov Eurasian National University, Astana, Kazakhstan  
(E-mail: alem\_ib@mail.ru, saule\_8@mail.ru)

---

## Assessment of digital transformation in the education system of Kazakhstan

---

**Abstract.** *Today, the issue of e-learning is very relevant. The concept of "informatics" has entered all spheres of our life, gradually transforming many processes of activity from mechanized to automated, with the help of information systems. In the modern world, we can no longer imagine many life cycles without informatization or digitalization.*

*Digital transformation is the introduction of modern technologies into the business processes of an enterprise. This approach implies not only the installation of modern equipment or software, but also fundamental changes in approaches to management, corporate culture, and external communications. Digitalization of processes is relevant not only at the level of individual enterprises, but entire industries choose this path of development for themselves as the only opportunity to meet the rapidly changing conditions of the surrounding world. Thanks to this, the digital transformation of industry, trade, public sector, education, and other spheres is already changing the life of every person and every company.*

*The article examines the current state of digital transformation in the education system based on the implementation of e-learning in the Republic of Kazakhstan, identifies the main problems in the implementation of state programs for digitalization of the national education system as a whole.*

*The purpose of the article is to outline measures for the development of the education system in the direction of digitalization of processes based on the assessment of the implementation of e-learning.*

**Keywords:** *economic evaluation, digital transformation, economic and mathematical model, gross domestic product, information technology, distance learning, internet, educational resources.*

DOI: <https://doi.org/10.32523/2789-4320-2022-4-152-160>

---

### Introduction

The era of globalization encourages most developed countries to continuously modernize and reform the education system in order to keep up with the times. Educational reforms in Kazakhstan are an adaptation of the international education system to the domestic socio-economic realities. In particular, improving the

digitalization of the Kazakh education system is one of the important aspects of the Republic's entry into the ranks of competitive countries in the world.

### Methodology

Today, the topic of digitalization of the economy, including the digitalization of the education system, is very relevant and discussed.

The report of the Ministry of Education and Science of the Republic of Kazakhstan reflects the problems of informatization of education in Kazakhstan and ways to solve them, taking into account the application of foreign experience [1].

The state has approved a program for the digitalization of the economy, where tasks are set for the implementation of an e-learning system [2, 3], the implementation of these programs is published on the websites and reports of state institutions [4, 5].

Many scientists around the world, together with IT specialists, are discussing the problems of e-learning and ways to solve them. Resta Paul, head of the UNESCO expert group on e-learning, director of the Center for Educational Technologies at the University of Texas (USA), in her speech at the international conference "UNESCO between the two stages of the World Summit on the Information Society" noted the insufficient level of knowledge of teachers and educators in the field of ICT, modern network technologies or lack of experience with modern electronic educational resources [6].

Scientists Ushakova K., Uvarov A. emphasize the need to strengthen the material and technical base of educational organizations, improve the quality of electronic materials, transfer all educational and pedagogical literature into digital electronic format with feedback and interactivity functions, followed by providing free access to foreign educational materials [7, 8].

## Discussion

These days gaps in the informatization of education are one of the most important strategic problems of Kazakhstan's development. World experience proves that the e-learning system is one of the main tools for modernizing national education. Special national e-learning programs are being implemented in many developed countries. For example, in France, information and communication technologies are being introduced in all areas of the educational process, from pre-school education to adult education. The e-learning is used in everyday life in countries such as Canada, the United States, Australia, the United Kingdom, and New Zealand [1].

In order to develop human capital by ensuring the availability of quality education and improving the competitiveness of education in Kazakhstan, the State program for the development of education for 2011-2020 was approved where for the first time the tasks of implementing the e-learning system were defined.

The domestic e-Learning project involves the modernization of high-quality educational resources and services, ensuring equal access to them with the help of new technologies. Any student should be able to use these digital services of the information system at any time and from anywhere in our country [2]. However, the pandemic in 2020 and the quarantine measures taken in all countries with the transition to full e-distance learning, including in Kazakhstan, exposed all the problem areas of the state e-Learning project. In particular, due to the poor Internet network or lack of it, school distance education was canceled in many localities of the country, and lessons were introduced through television and classes via specialized Internet platforms that allow students to view previous assignments and questions. Final exams have also been abolished and final school graduates' certification and certificate issuance are now based on annual assessments. This situation has shown that for the successful implementation of the e-learning project, first of all, it is necessary to prepare a technical infrastructure with further training of the entire teaching staff as well as to translate all educational materials into an electronic format with full access for all students.

The country is taking a set of systematic measures to develop education and science. In 2015, Kazakhstan committed itself to achieve the United Nations sustainable development Goals until 2030 where the 4th Goal is quality education and providing lifelong learning opportunities for the entire population. For achieving this goal, the main directions for the development of education in the world have been identified: providing pre-school training, introducing 12-year school education, developing students' skills for the 21st century, equal access to affordable and high-quality technical as well as vocational education and higher education. The above-mentioned

Table 1

## Informatization of educational institutions in the field of secondary education in the 2019-2020 academic year

Regions of Kazakhstan Regions of Kazakhstan	Number of public educational institutions in the field of secondary education, units	Of those with Internet access	Share of educational institutions connected to the Internet, in %
Total	7398	7 332	99,1
Akmola	575	575	100
Aktobe	418	415	99,3
Almaty	791	785	99,2
Atyrau	207	202	97,6
West Kazakhstan	390	370	94,9
Zhambyl	461	461	100
Karagandy	537	530	98,7
Kostanay	516	514	99,6
Kyzylorda	314	312	99,4
Mangystau	155	155	100
Pavlodar	368	366	99,5
North Kazakhstan	486	485	99,8
Turkistan	920	916	99,6
East Kazakhstan	679	673	99,1
Nur-Sultan	118	117	99,2
Almaty	290	289	99,7
Shymkent	173	167	96,5

\* According to the Ministry of Education and Science of the Republic of Kazakhstan.

directions are also priorities for the education system of Kazakhstan [3].

Despite this, the Kazakh system of education and science has several important issues that require urgent solutions. The population of Kazakhstan lags far behind most countries of the world in terms of the level of literacy and competence.

According to the results of the international assessment program of adult competencies (16-65 years) organization for economic cooperation and development, Kazakhstan ranked 32nd in information and communication technology literacy (out of 36 countries), 34th in reading and 33rd in math literacy (out of 39 countries). The results of our country are much lower than the average of the countries participating in this organization and the neighboring Russian

Federation which is ranked 9th in reading and 15th in mathematical literacy. If there is no improvement in the national system of education and science soon, further lagging world indicators, deterioration in the quality of human capital and a decrease in the country's economic potential is inevitable [4].

### Results and conclusion

As mentioned above, today many Kazakh educational institutions are still experiencing difficulties due to low Internet speed, lack or inconsistency of the necessary digital infrastructure for the successful implementation of the e-learning project. About 60 % of preschool organizations, 10 % of schools and 18% of colleges have Internet speeds below 4 Mbit/s which is unacceptable for distance learning.

Table 2

Provision with computers of educational institutions in the field of secondary education in the 2019-2020 academic year

City	Number of students, people	Number of computer equipment in schools purchased over the past 5 years, units	Number of students per 1 computer, people
Total	3 337 783	175 732	10
Akmola	127 809	4 762	9
Aktobe	153 517	12 212	8
Almaty	414 560	24 329	10
Atyrau	131 239	10 932	11
West Kazakhstan	108 710	6 132	8
Zhambyl	232 782	13 150	9
Karagandy	203 293	13 977	8
Kostanay	110 033	5 281	7
Kyzylorda	163 789	11 612	11
Mangystau	151 382	4 473	15
Pavlodar	111 030	7 136	5
North Kazakhstan	73 454	3 892	5
Turkistan	480 607	16 752	16
East Kazakhstan	192 794	12 459	7
Nur-Sultan	182 513	8 971	15
Almaty	286 797	14 415	12
Shymkent	213 474	5 247	19

\* According to the Ministry of Education and Science of the Republic of Kazakhstan.

However, according to the Ministry of Education and Science of the Republic of Kazakhstan, the availability of the Internet in the field of education is as follows:

In 2018, more than 300 thousand computers were used in the educational process in schools, 30 % of which were considered outdated. Therefore, there is an urgent need in further develop the IT infrastructure in all domestic educational institutions and educational organizations as well as improve the networks and platforms of online courses, automate public services and digitalize educational resources [5].

One of the main problems is not achieving the intended results in the implementation of the e-education program can be noted:

1. Insufficient level of knowledge in ICT, possession of modern network technologies or lack of experience in working with modern

electronic educational resources, in particular with foreign ones. Based on research in Russia – more than 73 % of teachers with up to 20 years of experience noted the complexity of working with ICT and about 67 % of the teaching staff indicated a lack of experience in the network environment [6];

2. the introduction of educational reforms without preparing the necessary infrastructure and training base which forces the teaching staff to work according to the old method, especially in rural areas. It is necessary to review existing educational and methodological materials and develop new ones, especially in the state language;

3. Quality of electronic materials for e-learning implementation. More than 80% of the available material that is uploaded to the system is the text and presentation materials which do

not provide feedback and are not interactive that reduce the effectiveness of training [7];

4. Low level of self-training of students. E-learning involves active independent work, constant feedback, timely completion of tasks which is common for European education in contrast to the Soviet one. This problem is compounded by the lack of access to necessary information or literature, especially in the state language. Many of the world's resources are not available to students because they do not know English or because of the paid resources.

5. Implementation of international standards in higher education institutions without necessary changes in school education. In countries such as Japan, South Korea, and China where students already have been enrolled in the 12-year education system and the school system is represented by 3 stages where students of primary, secondary, and high schools' study separately in different educational buildings while the training system and the necessary infrastructure are aimed at each stage.

In this regard, it is necessary to finalize and implement improved measures for the further development of the national education system based on world practices.

Thus, within the framework of digitalization of the education system, it is necessary to form and spread new models of work, such as:

1. A clear distinction between pre - (school) and higher education, where a separate state body will deal with pre-school and secondary school education with further implementation of 12-year education, and a second state body that supervises higher education and science with training for the country, necessary research and commercialization.

2. Introduction of world pedagogical practices are successfully implemented in the digital educational environment and operate on the basis of digital technologies;

3. Equipping educational institutions with all the necessary infrastructure and the necessary amount of computer equipment which provides for the construction of new schools throughout the country. Application of new digital tools that will allow institutions to implement the program "1 student – 1 computer";

4. Involvement of leading IT companies in the development and improvement of educational network platforms considering all identified current problems and recommendations.

5. Strengthen the knowledge of the teaching staff in ICT and the ownership of modern network technologies with further training of students;

6. Translation of all educational and pedagogical literature into digital electronic format with feedback and interactivity functions with the further provision of free access to foreign educational materials;

7. Conducting organizational work for the practical implementation of the necessary strategic changes (working with parents, organizing the necessary moral environment among the heads of educational institutions and teachers, etc.) [8].

The process of modernization of the education system is reflected in the programs adopted by the Government of the Republic of Kazakhstan among which the main ones are "State program for the development of education in the Republic of Kazakhstan for 2011-2020", "Digital Kazakhstan", "Third modernization of Kazakhstan: global competitiveness".

The e-learning system provides such opportunities as:

1. structuring the learning material by lessons, subjects and courses;

2. tracking the exact activity of students due to the timing and deadlines;

3. providing each student with their own set of lessons and courses;

4. generating integrated user-friendly testing reports and testing gained knowledge using the built-in testing algorithm.

5. storing the history of each student's learning process [9].

Investing in the digitalization of education units adduces to the transformation of the educational system and the development of the country's economic indicators. The main purpose of this research is to evaluate the impact of the digital transformation of education for the national economy and society overall.

Consequently, in the process of the study it was formed the system of interrelated economic

and mathematical models of education units. This system was formed with the maximum possible consideration of the digitalization factor.

1. Macro model of the dependence of gross domestic product (GDP) on the factors of investment in fixed assets (INVfc) employed in the Economy (EE) and the human development index (HDI).

The standard statistical analysis computer program Windows was used to estimate the parameters of the econometric model (Table 1), which allows implementing the classical least squares method.

The calculations results allowed to identify the most optimal model in the form:

**Table 3**

**Dynamics of development of the macro indicators in Kazakhstan**

Years**	G D P , billion. tenge	INVfc, billion. tenge	EE, t h s d . people	HDI
2010	21815,5	4653,5	8114,2	0,714
2011	28243	5010,2	8301,6	0,745
2012	31015,2	5473,2	8507,1	0,754
2013	35999	6072,7	8570,6	0,754
2014	39675,8	6591,5	8510,1	0,757
2015	40884,1	7024,7	8433,3	0,788
2016	46971,1	7762,3	8553,4	0,794
2017	54378,9	8770,6	8585,2	0,8
2018	61819,5	11179	8695	0,817
2019	69532,6	12576,8	8780,8	0,825
2020	69547,1	12332,7	8732,0	0,827*

Note: compiled by the author based on sources: National collections "Statistics of the education system of the Republic of Kazakhstan" for 2012-2020; information base of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms.

\* - assessment of the expert community (the index for 2020 will be officially published by the international organization in late 2021-early 2022.

GDP – gross domestic product

INVfc – investment in fixed capital

EE – number of people employed in the economy

HDI – human development index

2. The model of the global quality index of specialists.

This index is a generalizing, resultant indicator of the chain of quality formation by the units, and therefore the model is constructed as a multifactorial dependence on the quality indices by the units of the educational system. The result performed using the data in the Table 14 revealed the following model:

$$IND_{glob} = 0,468 IND^{1491,63} \cdot IND^{20,062} \cdot IND^{30,337} \cdot IND^{4+0,227},$$

IND1 – indicator of the quality of Preschool education in the Preschool unit of the educational system

IND2 – indicator of the quality of education in Secondary education.

IND3 – indicator of the quality of professional personnel in technical and vocational education

IND4 – indicator of the quality of training specialists in Higher and Postgraduate education.

The economic and mathematical analysis of the parameters of the derived model the coefficients of elasticity of factors, allows to preliminary conclude about the significance, in comparison with other parts of education, of the influence on the global quality of education of the factor of Preschool preparation and Primary education, bearing in mind the indicator IND1, which determines the quality of children's preparation for Primary school.

This conclusion confirms the correctness of the experts' findings, that digital technologies and the development of digital competencies must be introduced from primary school.

Referring to the State Program "Digital Kazakhstan", which provides information that according to the study by the international company Ernst & Young, there is a direct connection between education and the economic growth of the country:

$$VVP = 24,42 INVok^{0,491} \cdot TR^{3,469} \cdot INDhg^{2,806}$$

- increase in the Primary education coverage by 1% increases the country's GDP by 0.35% (Stevens & Weale, 2003);
- increase in the duration of high school education by one year increases the country's GDP by 0.44% (Barro, 2002);
- the implementation of strategic education development programs more than 10 years duration, increases the country's GDP by almost 5% (Hanushek & Wößmann, 2007);
- A country that scores 5 points above the average PISA score increases labor productivity by 2.5% and GDP per capital by 1.5% (OECD, 2006);
- 50-point improvement in PISA increases the country's annual GDP by 1% (Hanushek, 2010);

In the context of a consistent digital transformation, in consideration with the flexible regulation of the scale of implementation at the links of the education system, these estimates may increase significantly.

Based on the data of the National Collection "Statistics of the education system of the Republic

of Kazakhstan" for 2012-2020, it was conducted economic assessment of the contribution of ICT technology costs to the development of education links in the resulting quality indicators.

The economic and mathematical analysis with a 1% increase in quality indicators for education units and the increase in the global quality indicator will be 2.152%.

Investing additional 1% in the digitalization of education units by an afford an increase in economic development at the level of 2.152%, which is, for example, from the volume of GDP equal to 69.55 trillion tenge in 2020, about 1.5 trillion tenge.

The economic efficiency of the digital transformation of the education system is sufficiently elevated. Since the analysis of the model reveals the significant role of the impact on GDP development and the factor of employment of live labor. In the combination with the increasing factor of global quality of education based on consistent digitalization, it causes to a purposeful increase in labor productivity.

## References

1. Отчет о реализации Государственной программы развития образования и науки Республики Казахстан на 2016-2019. [Электронный ресурс] – URL: <https://www.gov.kz/memleket/entities/edu/documents/details/22112?lang=ru> (дата обращения: 08.08.2021).
2. Постановление Правительства Республики Казахстан от 12 декабря 2017 года № 827 «Об утверждении Государственной программы «Цифровой Казахстан». [Электронный ресурс] – URL: [https://online.zakon.kz/Document/?doc\\_id=37168057](https://online.zakon.kz/Document/?doc_id=37168057) (дата обращения: 20.08.2021).
3. Постановление Правительства Республики Казахстан от 27 декабря 2019 года № 988 «Об утверждении Государственной программы развития образования и науки Республики Казахстан на 2020-2025 годы». [Электронный ресурс] – URL: <https://adilet.zan.kz/rus/docs/P1900000988> (дата обращения: 26.08.2021).
4. Официальные публикации на сайте PIAA. [Электронный ресурс] – URL: <https://www.oecd.org/skills/piaac/> (дата обращения: 05.09.2021).
5. Презентация МОН РК «Внедрение умного образования в рамках государственной программы «Цифровой Казахстан 2020». [Электронный ресурс] – URL: <http://www.myshared.ru/slide/1371783/> (дата обращения: 14.08.2021).
6. Resta P., E-learning for teacher training: building capacity for the information society // UNESCO between the two stages of the world summit on the information society: proceedings of the International conference (May 17-19, 2005).- Moscow: ISDI, 2005.- pp. 204-215.
7. Ушакова К. В., Инновационные технологии в образовательном процессе /Современные технологии в образовании: материалы международной конференции, научной конференции - Караганда: Изд-во КГУ, 2015.- 318с.

8. Уваров А. Ю., Образование в мире цифровых технологий: на пути к цифровой трансформации - Москва: Издательство НИУ ВШЭ, 2018. - 168 с.
9. Отекина Н.Е., Электронное обучение, дистанционные образовательные технологии // Международный научный журнал «Инновационная наука» №04-2 / 2017 ISSN 2410-6070. С. 127-128.

**А.Б. Ибраева, С.М. Егембердиева**

*Евразийский национальный университет имени Л.Н. Гумилева, Астана, Казахстан*

### **Оценка цифровой трансформации в системе образования Казахстана**

**Аннотация.** На сегодняшний день вопрос электронного обучения является очень актуальным. Понятие «информатика» вошло во все сферы нашей жизни, постепенно преобразовывая многие процессы деятельности из механизированной в автоматизированную с помощью информационных систем. В современном мире мы уже не можем представить себе многие жизненные циклы без информатизации или цифровизации.

Цифровая трансформация – это внедрение современных технологий в бизнес-процессы предприятия. Этот подход подразумевает не только установку современного оборудования или программного обеспечения, но и фундаментальные изменения в подходах к управлению, корпоративной культуре, во внешних коммуникациях. Цифровизация процессов актуальна не только на уровне отдельных предприятий, целые отрасли выбирают для себя этот путь развития как единственную возможность соответствовать стремительно меняющимся условиям окружающего мира. Благодаря этому цифровая трансформация промышленности, торговли, государственного сектора, образования и других сфер уже сегодня меняет жизнь каждого человека и каждой компании.

В статье исследуется современное состояние цифровой трансформации в системе образования на основе реализации электронного обучения в Республике Казахстан, выявляются основные проблемы в реализации государственных программ цифровизации национальной системы образования в целом.

Цель статьи – обозначить меры по развитию системы образования в направлении цифровизации процессов на основе оценки реализации электронного обучения.

**Ключевые слова:** экономическая оценка, цифровая трансформация, экономико-математическая модель, валовый внутренний продукт, информационные технологии, дистанционное обучение, интернет, образовательные ресурсы.

**А.Б. Ибраева, С.М. Егембердиева**

*Л.Н. Гумилев атындағы Еуразия ұлттық университеті, Астана, Қазақстан*

### **Қазақстанның білім беру жүйесіндегі цифрлық трансформацияны бағалау**

**Аңдатпа.** Бүгінгі таңда электронды оқыту өте өзекті мәселе. «Информатика» ұғымы өмірдегі барлық салаларға еніп, біртіндеп ақпараттық жүйелердің көмегімен көптеген механикаландырылған процестерді автоматтандыруға айналдырды. Қазіргі әлемде біз көптеген өмірлік циклдарды информатизациялаусыз немесе цифрландырусыз елестете алмаймыз.

Цифрландыру трансформациясы - бұл кәсіпорынның бизнес-процестеріне заманауи технологияларды енгізу. Бұл тәсіл тек заманауи жабдықты немесе бағдарламалық жасақтаманы орнатуды ғана емес, сонымен қатар менеджмент, корпоративті мәдениет және сыртқы коммуникация тәсілдерінің түбегейлі өзгеруін білдіреді. Процестерді цифрландыру жекелеген кәсіпорындар деңгейінде ғана емес өзекті болып табылады, бірақ бүкіл салалар өздері үшін дамудың осы жолын қоршаған әлемнің тез өзгеретін жағдайларын қанағаттандырудың жалғыз мүмкіндігі ретінде таңдайды. Соның арқасында өнеркәсіптің, сауданың, мемлекеттік сектордың, білім берудің және басқа салалардың цифрлық трансформация әр адамның және әр компанияның өмірін өзгертеді.



Мақалада Қазақстан Республикасындағы электрондық оқытуды енгізу негізінде білім беру жүйесіндегі цифрлық трансформацияның қазіргі жағдайы қарастырылады, жалпы ұлттық білім беру жүйесін цифрландыру жөніндегі мемлекеттік бағдарламаларды іске асырудағы негізгі проблемалар анықталған.

Мақаланың мақсаты – электрондық оқытуды бағалау негізінде үдерістерді цифрландыру бағытында білім беру жүйесін дамыту шараларын белгілеу.

**Кілт сөздер:** экономикалық бағалау, цифрлық трансформация, экономикалық-математикалық модель, жалпы ішкі өнім, ақпараттық технологиялар, қашықтықтан оқыту, интернет, білім беру ресурстары.

## References

1. Otchet o realizatsii Gosudarstvennoy programmy razvitiya obrazovaniya i nauki Respubliki Kazakhstan na 2016-2019 [Report on the implementation of the State Program for the Development of Education and Science of the Republic of Kazakhstan for 2016-2019]. Available at: <https://www.gov.kz/memleket/entities/edu/documents/details/22112?lang=ru> (accessed: 08/08.2021).
2. Postanovleniye Pravitel'stva Respubliki Kazakhstan ot 12 dekabrya 2017 goda № 827 «Ob utverzhdenii Gosudarstvennoy programmy «Tsifrovoy Kazakhstan» [Decree of the Government of the Republic of Kazakhstan dated December 12, 2017 No. 827 “On Approval of the State Program “Digital Kazakhstan”] Available at: [https://online.zakon.kz/Document/?doc\\_id=37168057](https://online.zakon.kz/Document/?doc_id=37168057) (accessed: 20/08/2021).
3. Postanovleniye Pravitel'stva Respubliki Kazakhstan ot 27 dekabrya 2019 goda № 988 «Ob utverzhdenii Gosudarstvennoy programmy razvitiya obrazovaniya i nauki Respubliki Kazakhstan na 2020-2025 gody» [Decree of the Government of the Republic of Kazakhstan dated December 27, 2019 No. 988 “On approval of the State Program for the Development of Education and Science of the Republic of Kazakhstan for 2020-2025”]. Available at: <https://adilet.zan.kz/rus/docs/P1900000988> (accessed: 26/08/2021).
4. Ofitsial'nyye publikatsii na sayte PIAA [Official publications on the PIAA website]. Available at: <https://www.oecd.org/skills/piaac/> (accessed: 05/09/2021).
5. Prezentatsiya MON RK «Vnedreniye umnogo obrazovaniya v ramkakh gosudarstvennoy programmy «Tsifrovoy Kazakhstan 2020» [Presentation of the Ministry of Education and Science of the Republic of Kazakhstan “Introduction of smart education within the framework of the state program “Digital Kazakhstan 2020”]. Available at: <http://www.myshared.ru/slide/1371783/> (accessed: 14/08/2021).
6. Resta P. E-learning for teacher training: building capacity for the information society, UNESCO between the two stages of the world summit on the information society: proceedings of the International conference (May 17-19, 2005). (Moscow, ISDI, 2005, pp. 204-215)
7. Ushakova K.V. Innovatsionnyye tekhnologii v obrazovatel'nom protsesse /Sovremennyye tekhnologii v obrazovanii: materialy mezhdunarodnoy konferentsii, nauchnoy konferentsii [Innovative technologies in the educational process / Modern technologies in education: materials of the international conference, scientific conference]. (Karaganda, Izd-vo KGU, 2015, 318 p.)
8. Uvarov A.Yu. Obrazovaniye v mire tsifrovoykh tekhnologiy: na puti k tsifrovoy transformatsii [Education in the world of digital technologies: on the way to digital transformation], (Publisher NIU VSHE, Moscow, 2018, 168p.)
9. Otekina N.Ye., Elektronnoye obucheniye, distantsionnyye obrazovatel'nyye tekhnologii [E-learning, distance learning technologies], Mezhdunarodnyy nauchnyy zhurnal «Innovatsionnaya nauka» [International Scientific Journal "Innovative Science"], 04(2), 127-128(2017).

### Information about authors:

**Ибраева А.Б.** – Л.Н. Гумилев атындағы Еуразия ұлттық университетінің докторанты, Нұр-Сұлтан, Қазақстан.

**Егембердиева С.М.** – экономика ғылымдарының докторы, Л.Н. Гумилев атындағы Еуразия ұлттық университетінің профессоры, Нұр-Сұлтан, Қазақстан.

**Ibrayeva A.B.** – Doctoral Student, L.N.Gumilyov Eurasian National University, Astana, Kazakhstan.

**Yegemberdiyeva S.M.** – Doctor of Economic Sciences, Professor of the Department of Economics and Entrepreneurship of L.N. Gumilyov Eurasian National University, Astana, Kazakhstan.