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G.A. Tyulepberdinova[1], S.A. Adilzhanova[2], G.Gaziz[3]
[1]Candidate of Physical and Mathematical Sciences, Associate Professor at the Department of Informatics, Al-Farabi Kazakh National University, Almaty, Kazakhstan e-mail: tyulepberdinova@mail.ru
[2]Master of Applied Mathematics, Senior Lecturer, Department of Informatics, Al-Farabi Kazakh National University, Almaty, Kazakhstan e-mail: asaltanat81@gmail.com
[3]Master, senior teacher of the department of informatics, Al-Farabi Kazakh National University, Almaty, Kazakhstan e-mail: gulnurr76@gmail.com

THE DIGITAL KAZAKHSTAN. THE DEVELOPMEMT OF HUMAN RESOURSES IN EDUCATION

Abstract. The digitalization is strategic priorities of development in all around a world. According to the leading world experts, by 2020 a quarter of the world economy will be digital, and implementation of the digital technologies in economy allowing the state, business, and society to interact effectively. Development of the human resources will create a new generation of patriots with excellent ICT skills. This program is one of the strategic directions of Digital Kazakhstan economy development. Governments can play an essential role in enhancing digital literacy through the country's primary education system. Digital literacy skills lead to stronger creativity, self-expression and improved interpersonal relations, and provide a foundation for the responsible use of technologies.

Some of the main barriers to broadband ICT development are the high prices of the Internet, the lack of an enabling policy environment, high costs of infrastructure, low revenue potential and low digital literacy rates.

Today a considerable number of people uses the Internet, origin and promoting of social networks generally erased age and frontiers of the virtual communication of people. Social communities are one of the most exciting services existing on a network today. One of the successfully implementable tasks of social networks is the combining of users on shared interests. Another task is filling with a network various information. For teachers, the social networks are the set of opportunities – discussion of current problems of education, for example, implementation of new State standard teaching programs, representation in networks of own methodical development, creative pupils works and also the experience exchange. There is a massive number of different judgments whether it is worth "retracting" generally once again children in the virtual communication. The modern IT technologies provide the whole list of tools for communications of teachers with pupils not only in school hours but also behind walls of schools. Abroad mobile means of communications with a class through the program on the smartphone or a pad – pretty favorite thing. The Black Board and Canvas services, known in the USA, integrate schools and campuses. The closest to them in essence and to contents – the School student mobile application which serves as a site for combining of schoolmates together with their class teacher. Education of children of a primary school age develops on an electronic network model more and more active today. Implementation in introductory classes of the computer, mobile devices, and software applications transfers ordinary handling real objects to the virtual graphics space, and internal communication – in remote interaction through services and resources of communication of the Internet, including in social networks. Conclusions had addressed access to information and communications technologies for different groups of children, the importance of digital literacy, online safety concerns and other issues.

Keywords: Internet, social networks, mobile application, primary school age.

Introduction. In recent years, less than 20 percent of U.S. teens report reading a book, magazine or newspaper daily for pleasure, while more than 80 percent say they use social media every day, according to research published by the American Psychological Association.

Our digital lives may be making us more distracted, distant and drained, according to research presented at the annual convention of the American Psychological Association. This study built upon previous research that has shown that more narcissistic people use social more often than less narcissistic

people. Virtually no research has been done on how emotional intelligence relates to social media use, according to Konrath.

She and her colleagues analyzed data from four studies of more than 1,200 adult participants and used existing scales that assessed narcissism, empathy, emotional intelligence and emotion recognition. The studies also asked questions about how frequently participants checked and posted on Facebook, Twitter and Instagram.

More empathic people used Twitter less frequently than those who were not as caring and compassionate toward others, the researchers found. Also, people who were more likely to be able to see the world from another's perspective did not spend as much time on Facebook and Instagram. Another interesting finding was that people who scored high on a test of reading others' emotions used Twitter and Facebook less often.

Conversely, more narcissistic people and those who feel overwhelmed by the emotional experiences of others spent more time on all three social media sites.

According to Gartner (the American research and consulting company specializing in the IT markets), an artificial intelligence, digital twins, the thought-over thinking, and the continuous adaptive safety create a basis for the next generation of digital business models and ecosystems of the enterprises.

TOP of ICT of technologies and skills, Gartner

1. Digital Security
2. Internet of Things
3. Speech Interface
4. Artificial Intelligence
5. 3D - the printing
6. Robots
7. Virtual/Expanded Reality
8. Digital Twins
9. Blockchain/Distributed Database
10. Transport

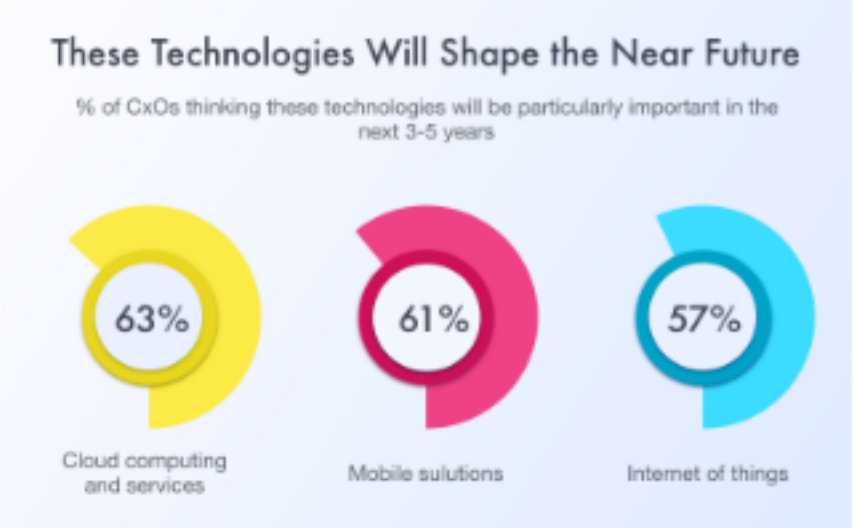

Figure 1 – Technologies of Future

Gartner reads that intellectual digitalization is a basis for future digital business. For the creation of competitive advantage, experts of Gartner mark, principals of the companies shall estimate the central tendencies for determination of opportunities which can be used.

As we know, five directions are the mains in the state program "Digital Kazakhstan". Development of the human capital is one of them. Development of the human capital is the direction of conversions enveloping creation of productive society. Society in which knowledge and skills of the future are

cultivated since the youngest years the efficiency and speed of business operation due to automation, and other new technologies increase and the dialog of citizens with the states becomes open and straightforward.

New requirements to the younger generation imply revising of maintenance of secondary education through the development of creative thinking and technical skills. The digital economy requires presence in the population of the digital skills allowing to use its products. Now the level of population digital literacy is 76,2%, and its growth in the next years is necessary. To create a digital society, it will need to update the education system in accordance with the best world practices.

Emphasis will be placed on the development of creative moreover, critical thinking, as well as the use of modern educational technologies in the learning process.

The development of education is one of the most important aim of the Russia's social and economic policies. Therefore, according to this scenario, the education quality improvement at any level is a priority. Nowadays, the most appreciated method to reach this goal is based on the activity approach (Digital Kazakhstan).

During the latest decades, Russia's process of school modernisation as a key part includes information and communication technology (ICT) implementation. The fast process of Internet technology evolution leaded to the replacement of the "ancient" computer into modern devices, for example tablets or smartphones.

Information society offers new opportunities for the teaching and learning methods upgrading. Those can include a transfer of everyday practices, supported by ICT usage, to education environment. Researchers provide a spotlight on how ICTs can help to improve the quality of education (O.V. Akulova, A.A. Andreev, A.A. Akhayan, N.S. Anisimova, V.I. Bogoslovsky, L.L. Bosova, E.I. Bulin-Sokolova, V.V. Laptev, V.P. Merkulov, T.N. Noskova, G.K. Selevko, V.A. Sitarov, G.V. Tarakanov, A.I. Shutenko, etc.) The research of the latest years has revealed the present-day acute need for innovative education approaches. State Educational Standard sets out the formation and development of comprehensive basic ICT competency as the expected metasubject outcome.

According to Russian and international studies schoolers own and actively utilize smartphones for a broad array of communicative purposes (G.U. Soldatova, D. Holloway, S. Livingstone.) This fact changes the whole design of educational environment. Nevertheless, research on the potential of mobile technologies in school education constitute on case studies and do not describe the situation comprehensively (I.B. Gosudarev, M.A. Grigoryeva, O.B. Golubev, T.A. Makarchuk, O.Yu. Nikiforova, etc.)

Social media is one of the most commonly used types of websites for teenagers. Students use social media services for communication as well as for information search and self-education (O.A. Gurkina, D.V. Maltseva, I.B. Gorbunova, I.O. Tovpich, etc.).

The use of mobile technologies as a unique element of education reform is under active consideration by the researchers (V.P. Andreev, A.S. Voronkin, S.G. Grigoryev, V.V. Grinshkun, O.A. Klimenko, T.N. Noskova, E.D. Patarakin, A.V. Feshchenko, A.I. Shutenko, N. Ellison, S. Manka, etc.) Therefore, the use of mobile and network technology application in the educational activities is being deeply developed due to its high practical importance. However, this is still an underexplored field.

Can technical innovations lead the educational innovation? United Nations Educational, Scientific, and Cultural Organization (UNESCO) are the following: "In a world that is increasingly reliant on connectivity and access to information, these devices are not a passing fad. As mobile technologies continue to grow in power and functionality, their utility as educational tools is likely to expand and, with it, their centrality to formal education." (M. West, S. Vosloo, 2013, p. 42).

These factors indicate the high relevance of the chosen research area-the use of mobile and network technologies in the modern school for upgrading the educational process.

It is shown that during the education in the period of Early–Soviet the central element with the help of which was planned to achieve the desired results was the textbook. In the period of 1960s, the focus has shifted to the upgrading of teaching through the redesigning the lesson (K. A. Moskovenko, 1959). In the 1980s the emphasis was on the optimization of the educational process (Y. K. Babanskiy, 1983), the change in the relationship of teacher and student (S. L. Soloveichik 1976). In the 1980s the emphasis was on the optimization of the educational process (Y. K. Babanskiy, 1983), the change in the relationship between students and teachers (S. L. Soloveichik 1976). During the Post-Soviet period (1990s), educa-

tional institutions was diversified as well as subjects programmes, wht leaded to an idea of education individualization (V.V. Serikov, 1994; I.A. Skopylatov, 1994; E.V. Bondarevskaya, 1996; I.S. Yakimanskaya, 1996; and G.M. Anokhina, 2003). Thus, the tasks of modernization of Russian education have been repeatedly revised. At different stages of the development of the education system, the driver of the changes were different actors and processes. Nowadays, the most appreciated method to reach this goal is based on the activity approach (State Educational Plan).

One of the central issues for modernization of education is the formation of innovative mechanisms, which leads to development of education. For these purposes, education modernization process has been reviewed in the innovation theory context. Literature analysis shows there two types of innovation implementation. Top-down innovation has the advantage that the stakeholders set the pace - they set the targets and the objectives and provide the funding. The implementation is left to the appropriate personnel. According to research a significant limitation of top-down innovation is the resistance to change, which leads to a number of difficulties at the stage of its implementation, including misunderstanding and lack of motivation. (V.A. Bolotov, A.E. Volkov, A.G. Kasprzhak, D.V. Livanov, A.A. Fursenko, I.D. Frumin, M. Barber, K. Donnelly, etc.)

According to E. Rogers, the higher the level of centralization and formalization of organization activities, the easier it is to make a decision on innovation implementation and the harder it is to really implement it (E.M. Rogers, 1962.)

On the other hand, there are bottom-up, or grassroots innovations. Generalizing the definitions by different authors (G. Seyfang, A. Smith, 2007; M.F. Hilmi, 2012; E.S. Phelps, 2013), grassroots innovations are rhizomatic (non-linear, chaotic, nonstructured) processes of development, implementation and expansion of novel methods and products happening at various hierarchy levels down to the lowest ones. This innovation type arises as a reaction to external changes.

When considering the formation of the information society and the requirements to change the organization of the educational process at school Informatization of education is described as a tool for modernization. A model has been introduced for the array of external and internal factors influencing the informatization process (A.G. Asmolov, A.L. Semenov, A.Yu. Uvarov, 2010) (figure 1).

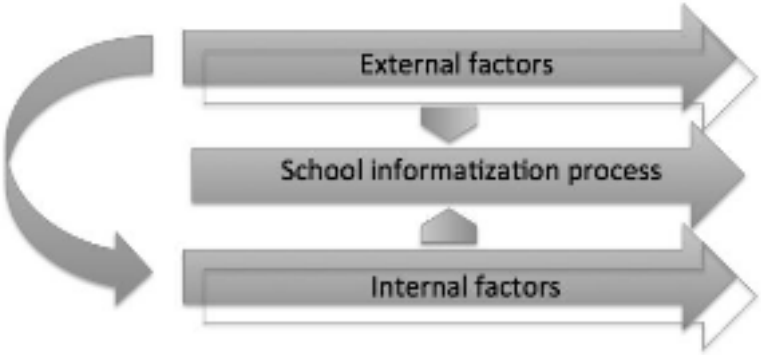

Figure 2 – Inter-relations between external and internal factors of school informatization process

The existence of these factors leads to the possibility of large-scale changes. First, the emergence and spread of new information technologies s inevitable (external factor). Secondly, it is necessary to develop and disseminate new educational technologies based on new information technologies (an internal factor determined by the system and associated with the level of development of pedagogical science and practice, readiness to support innovative processes, the ability to respond to emerging requests).

Key stakeholders interviews were taken to reach an information from a wide range of people – including community leaders, professionals, who have first hand knowledge about the process of education informatisation in Russia (S.M. Avdeeva; E.I. Bulin-Sokolova; V.V. Grinshkun; S.P. Kalashnikov; E.Yu. Kulik; M.E. Kushnir; A.Yu. Uvarov; and D.E. Fishbein).

Since the mid-1980s, Russia has seen a vast number of policy initiatives aimed at fostering various aspects of ICT integration into national learning environments.

The first wave of education informatization went underway in 1980s, when Decree No. 13-XI "On the Reform of General and Vocational Education" was passed in April 1984. As a result of this policy step, Russian schools and universities were equipped with the essential computer infrastructure enabling access to basic ICT. In terms of the curriculum, a new course, "Computer Science," was introduced in secondary schools, and some STEM teachers received special training in IT and computer operation to be able to give appropriate instruction in this new subject. Also, some training in computer basics was organized for teachers in other subject areas as well as for school administrators. At the same time, a number of disincentives and downside factors of various scale and socioeconomic nature dampened this reformative momentum. For one, there was a huge gap between urban and rural schools in Russia; for another, educators themselves would often counter the reform and the ICT transitioning processes it had prompted amidst then meagre awareness of the new role that ICT was soon to obtain as a major competitive driver in technology and human capital. The fall of the Soviet Union embroiled Kazakhstan into situation of persisting socioeconomic disarray where education-related objectives long remained outside the state executives' top-priority agendas. It was not until the late 1990s that education informatization came back to broad public and government attention.

According to innovation theory the first wave of informatization was consistent with the principle of *top-down innovation*: decision-making was centralized at higher levels of the system, excluding lower-level in the change planning process; innovation implementation was a time-consuming and deliberate process. Default of acceptance and lack of cooperation from the educators side was the main barrier for top down innovation implementation. Education system saw a period of reforms which gradually prepared schools for innovation.

The second wave of education informatization, which spanned a period from the late 1990s and through 2010, was marked by a surge in the number of initiatives to facilitate ICT-supported learning at both federal and various regional levels. These were complemented by a series of non-government endeavours run by international foundations and other organizations, such as World Bank, Intel and Microsoft, among others. For educators, training & development programs were deployed that sought to advance ICT literacy within a broader multidisciplinary cohort of instructors, unlike in the first wave of informatization when only limited teacher corps received such IT-focused professional upskilling. The above-mentioned measures to boost ICT integration into the educational perimeter have yielded noticeable enhancements in the overall ICT infrastructure. Thus, schools have been procured with more comprehensive background hardware, including computers and related IT systems, laptops, e-boards and other multimedia, which has facilitated the creation of mobile classrooms, hybrid libraries and media centers with access to various electronic learning resources, etc. In higher education, a number of massive state-run programs have also been implemented to spur sector digitization and ICT-assisted networking for more effective administrative and academic operation. Taking stock of the said period, as noted in the OECD's "Measuring Innovation in Education" report, Kazakhstan has achieved a major progress in transitioning to a digitally supported educational model thanks to the improved availability of computer and internet infrastructure across the country's institutional landscapes (OECD, 2014).

The second wave of Informatization, in comparison with the first wave, was more associated with new electronic technologies. Technology drove the educational process. The second wave of Informatization is also a *top-down innovation* example.

Definition and characteristics of education informatization after 2010 is complicated by the lack of reliable data. In recent years, many schools have been carrying out local programs to expand and renew their ICT infrastructure, which involve procuring modern desktop PCs, server and network equipment, as well as portable and tablet devices that have received growing popularity among an ever-expanding population band in today's settings ofubiquitous mobile communication and networking. These modernization initiatives are typically financed on a multilateral basis, including schools' own funds, parental donations and corporate sponsorship. However, the quantitative metrics, for example number of computers and Internet access speed, do not automatically insure positive attitudes towards the teaching process. According to the IEA Second Information Technology in Education Study (SITES), the extent of ICT use depended not only on school-level conditions, however, but also on national curriculum policies, as evidenced by large differences in the use of ICT among mathematics and science teachers within the same schools in some countries. (E.I. Bulin-Sokolova, 2016).

While computers purchased during the second wave of Informatization become obsolete, school environment is saturated with smartphones. The drivers for changes in teaching and learning in school education are students. The transition of everyday practices related to the use of ICT into education processes leads to its the transformation. This is a bottom-up innovation.

Analysis of the research results, which is the subject of chapter I, showed the replacement of the "ancient" computer into modern devices as tablets or smartphones. The grassroots innovation beetroots out the top of education system, indicate new emerging requirements that society will sooner or later present to education. Thus, *the third wave of Informatization* is brewing, which should bringinformation technologies and approaches used in education into line with the modern needs of society.

In TGU revealed, what groups "VKontakte" are pleasant to gifted school students. Scientific TGU improves the program in search of gifted entrants. The algorithm analyzes groups in a social network of "VKontakte" on which graduates are signed, and reveals, what subjects are pleasant to them. Its accuracy – about 85%. Also, the program learned to determine I.Q., creativity, and motivation of entrants by their subscriptions. The programming team, linguists, and philosophers continue to enhance the program in search of "the" entrant for Tomsk state university. In 2017 while receiving campaign, they looked for in Siberian Federal District potential entrants with obvious interest in the humanities. The program analyzed subscriptions to subject communities of 126 thousand graduates, the accuracy of determination of a profile appeared 82%.Besides, scientists added the program algorithm of detection of gifted entrants on three signs: intelligence, creativity, and motivation. For this purpose, they used machine training in the course of which the computer model masters specific data and in new materials can make out the vital signs with high accuracy.

As primary data for training of the program researchers used results of professional diagnostics and psychological testing this held among Tomsk school students of NOTs «Institute of Innovations in Education» of TGU. The program revealed that school students are signed with the high level of creativity on such groups as "Silence psychology", "The romantic of city suburbs", "Eskiza", "with Art the Shelter of creative people", "Indie Music" and others. Potential entrants with the high level of intelligence select "Literary memes", "FURFUR", "The Question", "Arzamas", "Postnauk", "Typical mathematician" and similar, and with the high level of motivation – groups "Is beautifully told...", "Ideas for life", "the Typical Leader", "FATALIST", "0 calories", etc.

While technologies such as BYOD (Bring Your Own Device) are not welcomed by teachers, analysis of intensity and scope of unauthorized Internet usage during the learning process among adolescent and their academic performance did not give statistically significant correlations.

Speaking about school computer equipment, more than half of respondents (56%) noted that access to school computers or other devices (laptop, tablet, etc.) is limited. Students can visit computer class only in special hours and usually during the "Computer science" course.

Despite the school network does not allow connection, among others, to social media, they have become one of the novel channels for student-teacher connections. A third (33%) of respondents have noted that they are used to writing to their teachers via social media, while 41% of them stated they can also communicate on mobile.

Students with no access to mobile and social network technologies (about 3%); students who use new technologies daily - the dominant group; students who use new technologies for education reason (about 70%).

Three groups of teachers were identified: teachers with no access to mobile and social network technologies are the dominant group; teachers using new technologies randomly group are fewer; and innovative teachers group are fewer still.

School principals demonstrate the following breakdown: administrators supporting innovations are the smallest group; those who banning new technology is the next one; school principals with neutral position (leaving decision to teachers) is the largest group.

Among the barriers to the use of mobile and network technologies in schools pointed out by managers is the lack of modern criteria for assessing the quality of the educational process, tools to promote and support educational initiatives, difficulties in involving teachers with experience in innovative practices. For school teachers, the lack of uniform and understandable rules and recommendations on these practices, as well as special training programs, is a serious restriction on the use of mobile and network technologies in the educational process.

Among the possibilities of modern technology usage for schoolchildren teaching, it is possible to find out a large number of relevant methods.

Development of general rules and methodological recommendations on modern technology usage in schools would 'legalize' usage of the technology by teachers as well as simplify their work. It is necessary to develop and implement training programs for teachers and general courses ideas, as it was done in theprevious stages of informatization, but does not find response in modern programs. It is also important to organize the collection, evaluation and replication of the best pedagogical practices, which will create a "core" of pedagogical ideas, which, thanks to network technologies, will ensure equal access of teachers to new technologies.

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Г.А. Тюлепбердинова[1], С.А. Адилжанова[2], Г.Газиз[3]
[1]кандидат физико-математических наук, доцент кафедры информатики КазНУ им.аль-Фараби г.Алматы, Казахстан e-mail: tyulepberdinova@mail.ru
[2]магистр прикладной математики, старший преподаватель кафедры информатики КазНУ им.аль-Фараби, г.Алматы, Казахстан e-mail: asaltanat81@gmail.com
[3] магистр, старший преподаватель кафедры информатики КазНУ им.аль-Фараби, г.Алматы, Казахстан e-mail: gulnurrr76@gmail.com

ЦИФРЛЫ ҚАЗАҚСТАН. БІЛІМ БЕРУДЕ АДАМ КАПИТАЛЫНЫҢ ДАМУЫ

Аннотация. Қазіргі уақытта көптеген елдерде цифрландыру дамудың стратегиялық басымдығы болып табылады. Әлемнің жетекші эксперттерінің болжамына сәйкес 2020 жылға қарай әлемдік экономиканың төрттен бір бөлігі цифрландырылады және мемлекетке, бизнес және қоғамға тиімді әсер ету үшін цифрлы технологиялар кең ауқымда және динамикалық процесс ретінде қалыптасады.Адам капиталының дамуын қалыптастыруда жаңа патриот ұрпақтың АКТ дағдыларының меңгеруі Цифрлы экономика даму бағдарламасының стратегиялық бағытының бірі болып табылады.

Білім беру жүйесінің барлық деңгейінде цифрлық сауаттылық басым міндеттердің болып тұр. Мұнымен бірге қазіргі бастауыш білім бағдарламасына кіріктіру және цифрлық шындық трендтері туралы көптеген сұрақтар туындайды. Қазіргі кезде интернет пайдаланушыларының адамдардың көп санын құрайды және әлеуметтік желілердің пайда болуы және кең таралуы адамдардың виртуалды қарым-қатынасының жас ерекшелік және мемлекеттік шекарасын жойып отыр.Әлеуметтік қауымдастық бүтінгі күні желілер арасында қызықты сервистің бір түрі болып табылады. Әлеуметтік желілердің табысты түрде жүзеге асқан міндетінің бірі ортақ қызығушылықтары бар қолданушыларды біріктіру. Әлеуметтік желілер педагогтар үшін көптеген мүмкіндіктер ұсынады – білім беруде өзекті мәселелерді талдау, мысалы жаңа типтік оқу бағдарламаларын енгізу, жеке өзінің әдістемелік нұсқаулықтармен, оқушылардың шығармашылық жұмыстарын таныстыру, сонымен бірге тәжірибе алмасу. Жалпы балаларды виртуалды қарым-қатынасқа тартудың қажеттілігі туралы көптеген әртүрлі пікірлер бар. Қазіргі IT-технологиялар мұғалімдер мен оқушыларға тек сабақ уақытында ғана емес, сонымен қатар сабақтан тыс уақытта да пайдалану үшін толық нұсқаулықтар тізімін ұсынып отыр. Шет елдерде сыныпта қарым-қатынас құралы сыныпта смартфон немес планшет бағдарламасы арқылы жүзеге асады. Атақты АҚШ-ның BlackBoard және Canvas қызмет көрсетуі кампустар мен мектептерді біріктіреді. Ресейде әзірге ұқсас аналогтар байқалған жоқ. Сыныптастар мен сынып жетекшісін біріктіру үшін «оқушы» кеңістігі қызмет етеді. Электронды-желілік модель бойынша кіші мектеп оқушыларына білім беру белсенді түрде дамып келе жатыр. Бастауыш сыныптарға компьютер, мобильді құрылымдар енгізу және шынайы объектілерді виртуалды графикалық кеңістікте манипуляция жасап ауыстыру үшін бағдарламалық қосымшалар пайдаланады, ал ішкі коммуникация – Интернет желілерінде, соның ішінде әлеуметтік желілерде қарым-қатынас ресурсы қызмет көрсетудің жойылған өзара әрекеттерді жүзеге асыруға мүмкіндік береді.

Түйін сөздер: Интернет, әлеуметтік желілер, мобильдң қосымшалар, кіші мектеп жасы.