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Research Paper Education

Informatization of Education in the Republic of Kazakhstan: Current Status and Future Prospects

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ABSTRACT

Our research was aimed at determining the influence of a state policy of the Republic of Kazakhstan for informatization of educational process as well as the impactInformation and Communication Technologies (ICT) competence on the formation of highly qualified competitive specialists in various spheres of activity. The study was conducted during 2005-2012. The analysis of education management information system in the Republic of Kazakhstan was made, themonitoring of teaching staff, Internetization, the digital interactive multimedia educational resources (DIMER) was carried out and introduction of "MOODLE"distance learning system was evaluated in this study. The results of our research identified the influence levels of informatization of the educational process in the Republic of Kazakhstan as well as measuresthat should be taken toward the development of educationinformatization.

KEYWORDS : informatization, educational process, competitiveness, Information and Communication Technologies competence, educational system.

1. Introduction

Global informatizationprocess bringsabout tremendous changes in the social and economic structures of a modern society. This process is based on the deep intellectualization of all forms and aspects of life of both an individual and a society. Typically a country, a nation that can not provide the informatization of the educational process fails to achieve a competitive position.

If we use information technology so that to achieve effective intellectualization of society in the Republic of Kazakhstan, it will improve the efficiency of education system and raise the development level of our society on the whole. Currently achieving a high level of education is based primarily on the informatization of educational process. It requires a system solution for the educational process organization in the Republic of Kazakhstan, which will raise the level of education funding, tax preferences for educational institutions.

2. Methods of education informatizationin the Republic of Kazakhstan

Pedagogical theory of efficiency and development of education informatization promotes a socially important learner-centered paradigm of using Information and Communication Technologies that enablestudents to self actualize in the educational process, contribute to the students' personality development, which would meet the development needs of a society. According to V.I.Zagvyazinsky and R. Atakhanov, informatization of educational process contributes to the rational solving of many problems connected with adaptation and active participation in the working process. Informatization of educational process can help to develop a totally new education system.

Informatization of education should be examined as a pedagogical phenomenon. Informatization of educational process should be carried out within the framework of the unity of interrelated elements that focus on the personality of a teacher, a student and on a content-related component of education system as well as on the integration processes of education and Information and Communication Technologies, as they all have a common goal of the formation of a person's readiness to life and further professional activities in the society.

While considering informatization of education as a pedagogical process, we should note that due to education informatization the interaction between Information and Communication Technologies and the participants of the educational process takes place. And it leads, in its turn, to a change of the level of education informatization, objectives ofinformatization of educational process when they are used not only to solve the problems in the educational process, but also to meet the needs of a society and an individual.

While examining the level of education informatization in the Republic of Kazakhstan the concept of Information and Communication Technologies Infrastructure should be introduced. Its indicators are the equipment with computers, the ratio of the number of computers and the number of students in educational institutions. The developed countries try to create a model of educational space when there is one computer per one student. This model makes it possible to implement the principles of learner-centered education. One of the important indicators of the informatization is the number of multimedia classrooms in educational institutions. When we use multimedia technology many kinds of information (sound, video, animation) areharmoniously integrated, thereby it contributes to increasing the efficiency of the educational process.

Financial, technical and personnel support as well as the level of involvement of members of educational process in the formation of the technical environment should be considered as indicators facilitating Information and Communication Technologies Infrastructure.

One of the criteria for evaluating the level of informatization of educationsystem is software, the indicators of which are types of system, tool, application support of the educational process.

The effectiveness of informatizationwhen we take the software into consideration is associated with the conformity of corresponding software, which is available in educational institutions, with the basic software listed as well as with the number of teachers who can use at- hand software along with the number of students who can usesoftware products.

It is also necessary to analyze the content provision of educational process, when the information resources, used in the educational process, are considered as a "bank" of teaching experience and a national treasure. The transfer of educational content results in the transformation of the sources of knowledge into digital format leading to a new approach in the educational paradigm.

The indicators of the education content provision status should be considered as the ones that provide the ability to analyze the availability of information and educational resources on their types as well as the technology used in the educational process, including case, network technology, Internet and TV.

Educational and financial support for the development of information and educational resources, placing them on educational portals can be used as indicators for evaluating the content provision of the educational process.

The effectiveness of the content provision of an educational process byusing information technology requires motivation, self-esteem of students, and increaseof cognitive activity.

Staffing is another criterionfor evaluating informatization of educational process because a teacher plays a very important role in the educational process.

Readiness of teachers to use new methods in the educational process,

which is based on the integration of teaching and ICT (Information and Communication technologies) are the indicators of the effectiveness of educational staffing.

3. Monitoring of informatization of RK education system

3.1. Kazakhstan's education informatization features

Currently the main goal of education informatization in the Republic of Kazakhstan is the development of quality educational services for participants of the educational process and equal access to them by using Information and Communication Technologies.

The objectives of education system development in the Republic of Kazakhstan are directed at creating the regulatory framework for e-learning system, developing educational technological infrastructure, automating educational process, developing digital educational resources and organizational support and training of e-learning users.

The current organization of education informatization in the Republic of Kazakhstan is shown in Figure 1

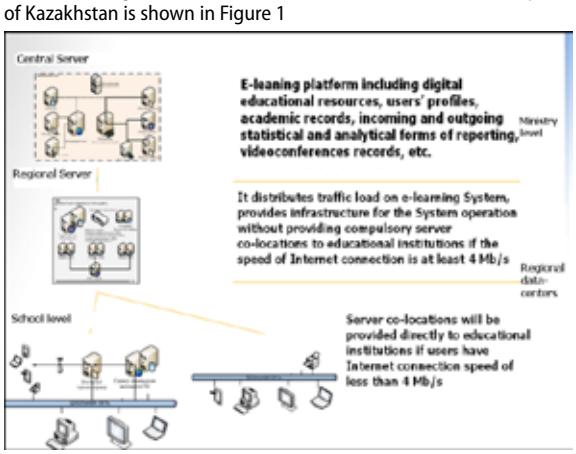


Figure 1. Current organization of education informatization in the Republic of Kazakhstan

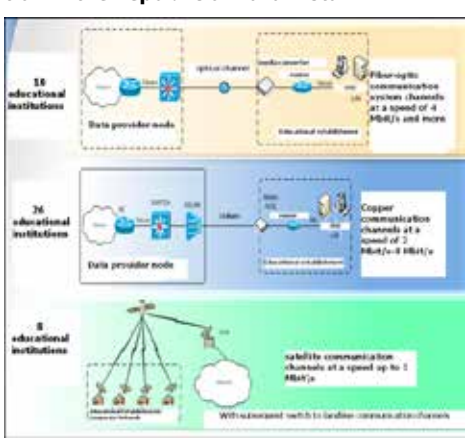


Figure 2. The development level of information technology infrastructure of educational institutions in the Republic of Kazakhstan in 2012

Thus, 10 educational institutions of the Republic of Kazakhstan have fiber optic communication channels at a speed of 4 Mbit/s and more, 26 educational institutions are equipped with copper communication channels at a speed of 2 Mbit/s-8 Mbit/s, 8 educational institutions have satellite communication channels at a speed up to 1 Mbit/s, which provides high-speed Internet access.

Digital educational resources were widely used in the Republic of Kazakhstan in 2012.

It should be noted that the development of digital educational resources in the Republic of Kazakhstan is carried out for different subjects, at the same time educational resources in both Kazakh and Russian languages are being developed. According to the Ministry of Education and Science of the Republic of Kazakhstan 142 digital educational resources for subjects such as geography, handicrafts, physics, mathematics, valeology, world history, native language and many others had been developed till 31.12.2012 in the Republic of Kazakhstan.

3.2. Education management information system

One of the stages of informatization of educational process in the Republic of Kazakhstan comprises the development and implementation of Education Management Information System (EMIS) covering all regions of the country. EMIS is designed to automate the activities of RK education workers for the collection and processing of information that has an impact on decision-making, ensuring the reliabilityof information and promotion of the exchange of teaching practices. EMIS organization in the Republic of Kazakhstan is presented in Figure 3.

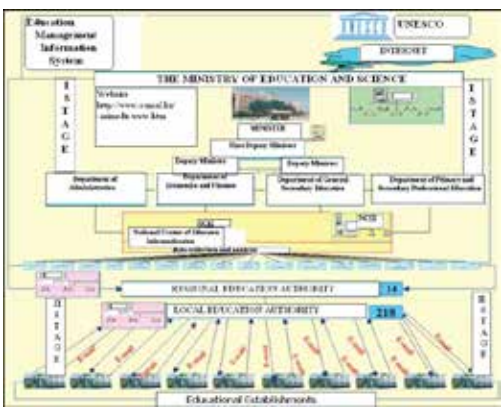


Figure 3.EMIS organization in the Republic of Kazakhstan

This system is designed to automate the collection and transmission of information in organizations involved in the educational process at all levels of education of the Republic of Kazakhstan. Using EMIS also helps to ensure the reliability of the primary information during its transfer to the control centers of the Ministry of Education and Science of the Republic of Kazakhstan.

Achieving the above mentioned goals involves the use of following EMIS subsystems: a systemsfor the collection and transmission of information at all levels of education, a system for generating statistical reports of the Ministry of Education and Science of the Republic of Kazakhstan.

3.3. Monitoring of teaching staff

The Strategic Plan of the Ministry of Education and Science of the Republic of Kazakhstan defines the training of teaching staff as a priority objective for the country's education system development. The underdevelopment of the present education systemshows the low level of readiness of teaching staff to use information and communication technologies in their professional activities. The level of effectiveness of financial investment in computerization of the educational process in the Republic of Kazakhstan is based primarily on the motivation and competence of teaching staff participating in modernizing reforms of the educational process. It is associated with the computer literacy of teachers, using case technologies,computer measuring systems, Internet resources and multimedia technologies in educational activities.

In 2012 according to the Ministry of Education and Science of the Republic of Kazakhstan the number of teachers with the high level of readiness to use case technologies is 47%, the number of teachers who received a certificate in "Reducing the digital divide" program - 42%, 38% of them got a certificate in using Information and Communication Technologies. Besides, 33% of teachers in the Republic of Kazakhstan are the members of research teams on the development of digital educational resources, 33% are certified in the use of network technology in the educational process, 21% have certificates in the use of distance learning technologies, 12% - in the use of TV technology-based learning.

One of the important directions of the strategy of the Ministry of Education and Science of the Republic of Kazakhstan is aimed at educators training. Its effectiveness is measured in the number of teaching staff retrained in the country at the expense of the state budget. This figure varies between 5.5-6% of the total number of education officers in the country and 0.4-0.5% abroad. The number of teachers and consultants hired from foreign educational institutions is about 0.5%.

In the process of teachers' training case technology isfrequently used. Besidesnetwork interaction between teachers and students taking e-learningis underdeveloped in the Republic of Kazakhstan. One of the reasons for it is a low level of readiness of teaching staff toimplement their professional activities directly on the Internet.

3.4. Monitoring ofinternetization

96% of schools in the Republic ofKazakhstanwere connectedto the Internet in 2011-2012, which indicates the intensive development ofinformation and communication environmentinthe sphere of education(See Figure5).

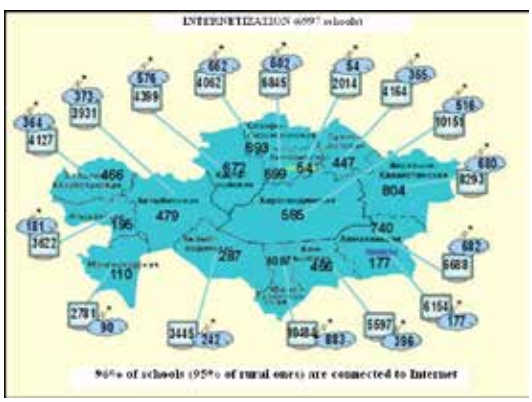


Figure4.Theinternetization level ofschools in the Republic ofKazakhstan

However,the problemof connectingto the Internet still remains.Today the connectionsusingoutdatedanalog stationsprovideslowerdata transfer rate reducing the efficiency ofthe use ofInternet resources inthe educational process.

3.5. Monitoring of digital interactive multimedia educational resources (DIMER)

One of the components of information and resource support for education informatization are the electronic teaching aids. NCEI (National Center of Education Informatization) JSC team has developed 47 packages of electronic teaching aids, covering 465 topics. They are presented in the form of animated maps on the history of the Republic of Kazakhstan and electronic manuals in chemistry and physics. In addition students can use 252 electronic education publications in Kazakh, Russian and English.

Electronic textbooks and multimedia programs are compiled in accordance with state standards, typical curriculum and educational programsfor the subjects.

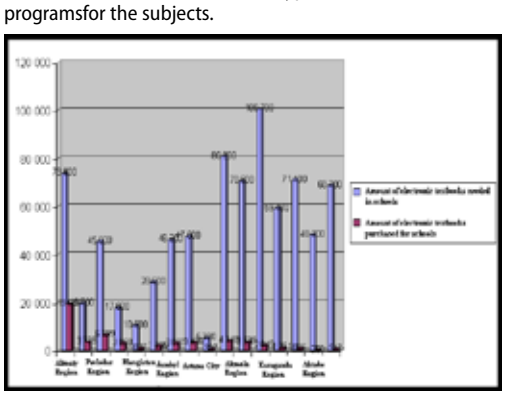


Figure 5. Provision with electronictextbooks

Top list of RK regionsaccording to the percentage of electronicaids acquisition is indicated in Figure 7.

Information resources are developed owing to a creative process that occurs within the cooperation of teachers, scientists, IT specialists and designers. This cooperation has become a possible formation after the adoption of educational technology as an open evolving system. One of the experiments in this field is the development of the regional component of digital educational resources being used as supplements to the already developed electronic textbooks. Activities directed at enriching an electronic textbook "History of Kazakhstan" can serve as an example. On the basis of the initiative of West Kazakhstan region local administration this textbook has been supplemented with an annex "BukeyevskayaOrda" ("The Bukey Horde") and with an annex "Saraychik" ("Small Palace") on the basis of the initiative put forward by the University of Atyrau. Geography teachers of Pavlodar region prepared the section "Local History" being included in the textbook on physical and economic geography. The activities in this direction are effective since they are based on a synthesis of innovative teaching practices.

3.6. Introduction of «MOODLE» distance learning system

The current informatizationof educational process in the Republic of Kazakhstan is characterized by using «MOODLE» distance learning system. On the basis of NCEI distance learningweb portal «Modular Object Oriented Digital Learning Environment (MOODLE)» has been functioning since 2006. This is a part ofUNESCO project "Distance education with the use of Information and Communication technologies (ICT) for secondary schools in remote and disadvantaged areas". The aim of this project is to increase the efficiency of the educational process. MOODLE serves as an open software package aiming at increasing the effectiveness of distance learning.

Http://moodle.nci.kzweb portal allows its users to get a free access after registration for educational materials in school subjects, undergo a trial test and get assistance concerning methodological issues.

Besides MOODLE gives the possibilityof training organization based on a joint decision of tasks, sharing of knowledge. Within the system file exchange in any format is supported, and it should be noted thatall members of the educational process can be involved in the file exchange process.

A wide range of tools provides the possibility of organizing the work with the available materials.

MOODLE system provides virtual communication between colleagues as well as the opportunity to spread innovative experience. In this regard, on the basis of the virtual platform a new section "Festival of pedagogical ideas" ("Ozyқ təzhiribeler festivali")has been introduced whereteachers from different regions of the Republic of Kazakhstan can get a unique opportunity to introduce their methodological developments, provide guidelines for ICT using in teaching process. Thus, this area can be considered as a tool for teachers' continuous professional improvement.

4. Results and Discussion

4.1. Results of implementing education informatization in the Republic of Kazakhstan

The use of digital educational resources in education system of the Republic of Kazakhstan contributes to the maximum visualization of the studied material. At the same time we can observe an increase of cognitive independence of students and the quality of learning material.

According to the Ministry of Education and Science of the Republic of Kazakhstan nearly 90.7% of teachers in the educational institutions of the Republic of Kazakhstan believe that the use of digital learning resources helped to raise students' interest in the subject.

We can observe the effectiveness of education informatizationif we take the increase of academic performance into consideration. The number of students who have "4" and "5" marks has increased by 25%. These figures confirm the necessity to create conditions for a quality education which is possible in the context of e-learning system.

In the Republic of Kazakhstan 7043 electronic resources for 6 school subjects, 38 college subjects of 8 specialtieswere developed in 2013. In 2014 these resources will be applied in the lessons in mathematics for 1-11 forms, physics - for 7-11 forms, chemistry - for 8-11 forms, the Kazakh language - for 2-11 forms.

4.2. Development of RK education informatization.

The introduction of e-learning systems in the Republic of Kazakhstan involves the creation of conditions for the implementation of a guiding principle of education in XXI century, which was declared by UNESCO - "life-long education". The objective of implementing e-learning system was first designated in the State program for the education development (e-learning).

According to the Ministry of Education and Science of the Republic of Kazakhstan first of all informatization was carried out in 44 educational institutions, in 2012 - in 537 educational institutions, in 2013 it is planned to carry out informatization in 926 educational institutions. Then in 2800 informatization will be implemented in 2014 educational institutions, in 2015 - 1968 institutions, in 2016 - 1802 educational institutions.

Within the framework of the education informatization project the following consulting services will be provided for municipal educational institutions:

- conducting a survey on the automation of business processes in all subordinate organizations and divisions of MES RK (Ministry of Education and Science of the Republic of Kazakhstan);
- the use of international experience.

Besides hardware and software and collocation services will be purchased, a corporate portal of MES will be created, a central server, a regional server will be deployed, 8 school levels will be introduced.

We should consider the following as the main results of education informatizationin the Republic of Kazakhstan:

- automation of 8077 educational institutions by 2016 ;
- training 275,000 teachers and educational institutions' workers of the Republic of Kazakhstan;
- improving the quality and efficiency of education system of the Republic of Kazakhstan.

By 2015 E-learning system will cover about 50% of institutions in the education system in the Republic of Kazakhstan and by 2020 this figure is expected to reach 90 %. It is assumed to provide teachers' workplaces with computers, multimedia projectors and interactive whiteboards. Schoolchildren are expected to use tablet computers during lessons. Internet connection speed will be increased from 4 to 10 Mbit/sec.

E-learning system creation involves updating the control system, the development of a new technological infrastructure based on the running of the school, a class, a learning process, a process of social interaction, psychological and educational monitoring. These components are a part of a common platform for e-learning system that provides functionality not only for teachers and students but also for parents, psychologists, and medical professionals. All the structural elements of the e-learning co-operate with the national education system of the Republic of Kazakhstan. A government official receiving the flow of information from each element of the system will be able to carry out an objective assessment of the situation at any level of education, which will increase the efficiency of the educational process on the whole.

The use of digital educational resources is influenced by the integration of teaching and communication technologies. Digital educational resources hosted on the servers of educational institutions of the Republic of Kazakhstan will represent not only the ready-made resources of the National Center of Informatization, but also include the independent developments of teaching staff as well as the resources provided by foreign teachers. It should be noted that the involvement of foreign companies is justified from an educational point of view, primarily because foreign educational resources are more practical, interactive, and less dependent on explanatory and illustrative approaches.

Conclusion

(1) Informatization influences the quality and efficiency of educational process in the Republic of Kazakhstan.
(2) The effectiveness of education informatization in the Republic of Kazakhstan contributes not only to the improvement of students' academic performance but also to teachers' continuous professional improvement.
(3) Future prospects forinformatization of educational in the Republic of Kazakhstan are connected with the scientific understanding of the pedagogical concept of Kazakhstan's virtual school, with the creation of the theoretical and methodological foundations, scientific and methodological support for the development of information and educational resources.
(4) The current status of educationinformatization in the Republic of Kazakhstan contributes to solving the problem of standardization of digital educational resources as well as to the search for new methods of e-learning.
(5) The usage ofinteractive distance learning systems influences the development of personal qualities of the members of educational process and thereadiness of teachers and students to apply network systems, theincrease of the level of innovation in Information and Communication Technologies implementation in educational process in the Republic of Kazakhstan.

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