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### E-LEARNING AND COGNITIVE DEVELOPMENT

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#### *Abstract*

High requirements for the level of professional preparedness, willingness and competence to solve professional problems among university graduates, and the conflict of mondialization and globalization trends with the trends of separation and growth of national consciousness are reflected in transforming the information space, a constant increase in the degree of social informatization and, at the same time, the growing demand for developing digital culture - a culture of human interaction with digital devices and programs. These transformations determine the vector of developing modern education and the educational process management system. The evolution of the education system in Russia, Kazakhstan and other countries is due to the implementation of ICTs in all spheres. This is reflected in the continuous development of the electronic information and educational environment, which gradually seems to squeeze out traditional educational technologies from the educational process. Against the backdrop of the "progress" of digital education, the role of the university and school teacher, parents, etcis becoming clearer. The electronic information and educational environment are a combination of electronic educational resources, ICT tools and automated systems to provide students with learn educational programs.

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**Keywords:** Cognitive development, e-learning, electronic information and educational environment, globalization, mondialization, university graduates.



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## 1. Introduction

High requirements for the level of professional preparedness, willingness and ability (competence) to solve professional problems among university graduates, as well as the conditions for the conflict of trends of mondialization and globalization with the trends of separation and growth of national consciousness of communities are reflected in the transformation of the information space, a constant increase in the degree of informatization of society and, at the same time, the growing demand for the formation and development of digital culture - a culture of human interaction with digital devices and programs. These transformations determine the vector of development of modern education and the educational process management system within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities. The evolution of the education system in Russia, Kazakhstan and other countries and the rest of the world is due to the implementation of information and communication technologies in all spheres of human activity. This penetration is reflected in the continuous development of the electronic information and educational environment, which gradually seems to squeeze out traditional educational technologies from the educational process. At the same time, against the backdrop of the "progress" of digital education, the role of the university teacher and schoolteacher, parents and tutors, tutors, etc., is becoming more and clearer.

The dynamics of the development of society is determined by the efficiency and productivity of the extraction and use of resources, as well as the disposal of waste from the extraction and processing of these resources. Nowadays, knowledge has become no less important economic resource than other resources. Innovations, i.e., implemented new knowledge, have contributed to accelerating the economic growth of Kazakhstan, Russia and other countries of the world recently. And the needs of the development of society have necessitated the emergence of effective ways of acquiring knowledge, including through the use of new forms of educational organization.

The electronic information and educational environment is a combination of electronic educational resources, information and communication technology tools and automated systems necessary to ensure that students learn educational programs (Andrews, 2011; Bataeva, 2019).

The electronic information and educational environment is a tool for implementing the active, systematic, effective and productive interaction of all participants in the educational process - students and teachers - through electronic educational resources presented in electronic digital form and including structure, subject content and metadata about them (Bataeva, 2019; Bolkunov, 2016).

## 2. Problem Statement

The integrating link of electronic educational products and the electronic information and educational environment as a whole is electronic educational and methodological complexes. These complexes are structured set of electronic educational resources containing interrelated educational content and intended for joint use in the educational process within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities (Andrews, 2011). These programs and complexes provide targeted, systematic use of electronic

educational resources of various didactic purposes (Brown et al., 2014; Burke, 2013; Lukashov, 2010; Sergeev et al., 2012).

### **3. Research Questions**

In recent years, the electronic educational environment has been widely developed at universities within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities.

### **4. Purpose of the Study**

In the last decades of the last century, and especially nowadays, the processes of improving educational systems at all levels are increasing: schools, higher educational institutions, professional training and retraining. If in the past it was considered possible to obtain education and qualifications one-time, practically for the entire time of active work, now in many fields of activity the updating of professional information and required skills has been going on for 3-5 years. In this regard, training systems should be practically continuous and build on new, more effective principles.

### **5. Research Methods**

In recent decades, scientists have included in the concept of e-learning a specific form of organizing the educational activity of a student and teacher using digital or information technologies, technical devices, including telecommunication networks. In e-learning there is an emphasis on the production, transmission and storage of meaningful (educational) information through communication channels. This is a specific form of organizing interaction between schoolchildren and teachers, students and university teachers, trainees and tutors. This form of the learning using digital communications (devices, technologies and programs). The most widely presented options are learning through or with the participation of interactive multimedia, often practiced by educators, and web-based learning. Scientists and educators are increasingly talking about online learning. At the same time, the term "e-learning" often replaces the previously popular and more correct term "distance learning". At the same time, the widespread use of digital devices, programs and technologies in education minimizes the differences between distance learning and traditional education: in traditional education there are more and more fragments of digital. However, a different situation is now emerging: in Russia more and more there is a substitution of traditional distance learning, up to the application of "education on TV", "on the radio", that is, with the help of analogue technologies, not just digital ones. As a result, more and more different forms and options for organizing the educational process are gathered under the concept of "e-learning". The integration of distance learning and direct-contact learning methods in the context of attracting digital devices, technologies and programs is also referred to as "digital learning". Thus, the problem arises not only of comprehending a productive and effective place for digital devices, programs and technologies in education and upbringing, but also the problem of determining what is and what is not digital learning (education). It is important to note that e-learning, its technologies, programs and devices used in the learning process, bring important changes to traditionally existing educational models. They also set the

transformation of the framework of education: prohibitions and restrictions, regulations and recommendations. Their purpose is to increase access to education and improve the quality of education. However, this goal can be realized only with a thoughtful and careful consideration and solution of the two issues outlined above: 1) how much and what kind of digital education is needed by specific people at different levels and in different types of education; 2) what is digital learning, what is its place in education in general?

## 6. Findings

By considering the concept of e-learning, we can

- to attribute to it a number of types of activity in the context of organization, management and development of cognitive and metacognitive functioning and development of a person and a group, the implementation of creative and reproductive cognitive and metacognitive (reflexive) activities;
- independent work of schoolchildren and students with electronic devices, programs and technologies. such work with educational materials, using technical means and teaching methods should be implemented in the context of solving problems of cognitive development and the implementation of creative and reproductive cognitive and metacognitive (reflective) activities;
- consultations and receiving recommendations and explanations from a mentor (teacher, tutor) in the context of remote or direct interaction, one way or another mediated by digital devices, programs, technologies. Such consultations are carried out in the context of solving problems of the cognitive and metacognitive development of the student, for the successful implementation of his creative and reproductive cognitive and metacognitive (reflexive) activities;
- creation of network communities of students (social networks, forums) living in different parts of the region, country, world, for productive and effective joint "virtual" educational activities, in the context of solving the problems of cognitive and metacognitive (reflexive) development, implementation of creative and reproductive activities a person as a person, partner and professional;
- familiarizing students with the newest, most relevant, which is of high importance for their training as individuals, partners and professionals, scientific and educational information proper, providing the student with electronic educational materials, electronic programs and devices, in the context of solving problems of cognitive and metacognitive (reflective) development , the implementation of the creative and reproductive activities of a person as a person, partner and professional.

In the e-learning system, you can include electronic textbooks and the work of students with them, as well as other educational services and technologies within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities.

In general, e-learning provides a number of educational opportunities:

- E-learning with a meaningful and well-provided organization (availability of devices, programs and technologies, as well as their methodological support) makes it possible to include in education groups of people who, for various internal and external reasons, could not use traditional educational services. E-learning creates an opportunity to optimize one-to-one learning. It can simplify the path to the organization of training, establish the educational process in harmony with the characteristics of the student, including his knowledge and skills, the direction and level of the chosen training, as well as other factors and characteristics (personal, interpersonal, professional, etc.).
- E-learning, with its correct methodological organization, comprehensively thought-out forms and formats of organizing training and education, can improve the quality and make education more intensive. On the one hand, digital technology devices and programs make it possible to reduce part of the costs of traditional education. They provide an opportunity to optimize and improve the management of teaching and learning processes. However, on the other hand, financial and, more broadly, other material and social conditions of access to education are changing, for example, savings on the purchase of textbooks and travel are combined with the need to spend money on digital devices, programs, technologies.
- E-learning stimulates the emergence of new concepts and models of teaching and learning and the improvement of existing technologies, formats and forms. E-learning is often seen as a factor in the transition to an open, lifelong learning model. The development of a person and ensuring the success of his social functioning in a changing world is associated with continuous learning both within the framework of situational training in production, in the process of work, and within the framework of advanced training courses, retraining, programs for obtaining new types of education or new levels of education.

E-learning is considered as the main innovation in this area, which is a significant development of distance learning, as it should include the positive features of both full-time and part-time education systems (Bolkunov, 2016; Brown et al., 2014; Lukashov, 2010).

E-Learning is learning via the Internet and multimedia within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities. E-learning includes:

- independent creative and reproductive cognitive and metacognitive (reflective) activities with electronic materials using a personal computer, PDA, mobile phone, DVD player, TV and other electronic materials;
- receiving advice, advice, assessments from a remote (territorial) expert (teacher), the possibility of remote interaction within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities;
- the creation of a distributed community of users (social networks), leading a common virtual learning activity within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities;

- timely round-the-clock delivery of electronic training materials; standards and specifications for e-learning materials and technologies, distance learning toolsto support cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities;
- the formation and improvement of information culture among all heads of enterprises and group units and their mastery of modern information technologies, increasing the efficiency of their usual activities within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities;
- development and popularization of innovative pedagogical technologies, their transfer to teachers within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities;
- an opportunity to develop educational web resources within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities;
- the opportunity at any time and in any place to obtain modern knowledge located anywhere in the world and accessibility of higher education to persons with special needs in psychophysical development within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities.

The main distinguishing features of e-learning are (Lukashov, 2010):

- the availability of computer literacy for both students and trainees within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities;
- translation of the content of the studied subjects (including practical skills) into electronic form, i.e. the creation of electronic textbooks, use of modern information and computer technologies, including the Internet, to ensure effective interaction of all participants in the learning process within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities;
- creation, phased improvement of scenarios and models of using e-learning tools in various subject areas within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities;
- knowledge and understanding of Internet ethics as the main medium of e-learning within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities.

There are a number of opportunities that are essential for the organization of the educational process in secondary and higher education: the possibility of active development of professional competencies of students; raising the level of educational potential and the quality of professional and general education; effective organization of independent research activities; the introduction of new forms and technologies of organization of cognitive activity of students; personality-oriented nature of learning, allowing to take into account the individual characteristics of the student; increasing social and professional mobility of students (Burke, 2013; Satunina, 2006; Sergeev et al., 2012).

In the world now different types and forms of the e-learning:

- Blended Learning (hybrid learning). If the benefits of traditional learning are combined with the present phase and the distance e-learning phase, then we are talking about Blended Learning. At the same time, Blended Learning combines both curricula in a common curriculum within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities.
- Learning Communities. Groups of people with the same goals and / or specific interests can create a common knowledge system (base) about a certain subject area within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities. Each member of Learning Communities can supplement the system with their own materials, so the system is modernized and expanded.
- Content Sharing In this case, web pages are used that allow for the exchange of training materials within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities. These are commercial (material incentives are used in the preparation of educational content) and ordinary offers.
- Virtual Classroom. In the case of using Virtual Classroom, the Internet is a means of communication between geographically separated students and teachers within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities. Thus, the virtual classroom makes possible a synchronous form of learning.
- Web-Based Collaboration (teamwork). The concept of Web-Based Collaboration describes the joint educational work of a certain group of people using the Internet within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities.
- Whiteboard. Whiteboard is comparable to a whiteboard or Flipchart (lecture poster). Users have the opportunity to jointly create and analyze drafts (sketches). To do this, they have at their disposal a variety of tools within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities.
- Business TV (training business television). Business television is a television program specifically tailored to a particular target group. Business television is an effective method of stimulating groups of people (organization employees, suppliers, customers) to learning within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities (Sergeev et al., 2012).

There are various forms of e-learning, including (Lukashov, 2010):

- E-learning, managed by the learner, is the transfer of educational knowledge to independent students (autonomous or self-directed learning). As a rule, the content of courses consists of interactive information posted on the server. In this case, the student within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities is completely independent.

- Guided e-learning courses, in addition to content in an interactive environment, the system contains the means of collaboration between a teacher and students within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities. Assignments are issued by hanging on the discussion forum, where students post assignments. This form is suitable when trainees cannot work as part of a hard schedule.
- E-learning, managed by a teacher (instructor). It is an analogue of the traditional form of conducting classes on a schedule, but at the same time, the interaction of the process participants takes place in the information and communication environment based on the Internet within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities.

All these training modes use not only text files, but also multimedia tools for presenting video and audio information within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities. A mandatory element is also a means of monitoring and control of the course of training, which allows ensuring a high level of student learning.

According to the e-learning system abroad (in Germany, France, Great Britain, India, China, Turkey, United Arab Emirates, Netherlands and many other) and in the CIS countries there are numerous open and virtual universities, which today already constitute a significant competition to traditional education.

E-education has several advantages over traditional (Satunina, 2006):

- Freedom of access - the student can practice almost anywhere. Not all e-learning functions are implemented through the Internet within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) learning activities. An adult student can study on the job.
- Reducing the cost of training - the student bears the cost of the media, but does not bear the methodological literature on the issues of the tasks of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities. In addition, savings are growing due to salaries that teachers do not need to pay, the maintenance of educational institutions and so on. The production of electronic training materials does not imply deforestation.
- Flexibility of learning. Any student can himself / herself regulate the duration and sequence of studying the materials. So he or she can adapt the educational process to his / her capabilities and needs in the context of solving the problems of cognitive development and the implementation of creative and reproductive cognitive and metacognitive (reflexive) activities.
- Ability to keep up with the times. Pupils and teachers as users of electronic devices, technologies and programs (courses) develop their knowledge and skills (competences) in accordance with the latest modern standards. Electronic forms and formats of teaching give the opportunity to update teaching materials in the context of solving problems of cognitive development and the implementation of creative and reproductive cognitive and metacognitive (reflexive) activities.

- Potentially equal learning opportunities in training becomes independent of the quality of teaching in a particular educational institution within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities.
- The ability to create competency criteria (availability and formation of knowledge and skills) within the framework of cognitive development and implementing creative and reproductive cognitive and metacognitive (reflective) activities. It is possible to set clear criteria by which the knowledge acquired by the student in the learning process is evaluated.

Mental development in the process of e-learning is a possible process, but not guaranteed. E-learning can optimize the educational process, increase the efficiency and productivity of the learning side. However, many problems of its application are connected with educational and developmental issues. The modern Internet does not so much develop a person as it leads to bodily, psychological, social and moral degradation: the absence of a digital culture means the absence of rules for dealing with digital devices and programs, with content. Thus, the development of intelligence and other cognitive aspects of human activity is not guaranteed, sporadically. Moreover, the devaluation of the value of knowledge (in the context of their search and even conquering) leads to intense intellectual (cognitive) degradation of a person. That is why, with all the numerous studies of e-learning (Andrews, 2011; Brown et al., 2014; Burke, 2013; Duhigg, 2014; Grebenyuk et al., 2012; Harle, 2019; Kahneman, 2013; Kentor, 2015; Koohang et al., 2009; Moore et al., 2011; Nagy, 2005; Udaya Sri & Vamsi Krishna, 2014), only a few are devoted to the development of human cognitive abilities in dialogue with digital resources (Kassymova, Triyono et al., 2019; Kassymova, Arpentieva et al., 2019; Lavrinenco et al., 2019; Mayes & de Freitas, 2005; Martinez, 2009; Roberts, 2019; Vacchi, 2012; Verbitskiy, 2019; Zivan et al., 2019).

Scientists note that for all its capabilities, however, e-learning, in general, is disruptive to human consciousness and cognitive abilities. There is only one problem in this context. This is the lack of digital culture. Digital culture is the culture of human interaction with digital devices and programs, which involves spiritual and moral (ethical), aesthetic and ergonomic, technological and other principles of working with digital resources (Malushko et al., 2019; Minin et al., 2019). In the presence of such a culture, they can be used productively. Then what is currently only an advertisement of digital education can become partly real. However, a computer and other gadgets will not replace a person with a person. We see that, indeed, computers can significantly increase the speed of some human operations, however, they are not able to neither think in their place nor create in their place. Even teaching computers creative programs with multi-pass combinations, even using computers that use the technology of "big data", are not able to make a person a person (person, partner and professional), if that is not his own efforts and the efforts of society. Without such efforts, the labor of human creation, the computer is not able to prepare even a professional, not to mention the person and the partner.

In modern education, there is an active search for new learning technologies and learning management. At the same time, many questions are related to the discussion about the place and role of digital learning in the general education system (Arpentieva et al., 2020; Badalov et al., 2020; Kassymova, Gimazov et al., 2020; Kassymova, Lavrinenco et al., 2020; Kenzhaliyev et al., 2020; Triyono et al., 2020; Tyumaseva et al., 2020).

## 7. Conclusion

Currently, the processes of improving educational systems at all levels are increasing: school, higher education institutions, vocational training and retraining. If earlier it was considered possible to get education and qualification only once, practically for the whole time of active work, now in many fields of activity updating of professional information and required skills are held within 3-5 years (Minin et al., 2019). In this regard, training systems should be practically continuous and build on new, more effective principles.

But mental development in the process of e-learning is a possible process, but not guaranteed. E-learning can optimize the educational process, increase the efficiency and productivity of the learning side. However, many problems of its application are connected with educational and developmental issues. The modern Internet does not so much develop a person as it leads to bodily, psychological, social and moral degradation: the absence of a digital culture means the absence of rules for dealing with digital devices and programs, with content. Thus, the development of intelligence and other cognitive aspects of human activity is not guaranteed, sporadically. Moreover, the devaluation of the value of knowledge (in the context of their search and even conquering) leads to intense intellectual (cognitive) degradation of a person. That is why, with all the numerous studies of e-learning, only a few are devoted to the development of human cognitive abilities in dialogue with digital resources.

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