

## On the Students' Ability to Use Digital Educational Resources

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### ABSTRACT

The study covers the issue of students' ability to use digital educational resources in their professional activity in which reflects their future professional work. Levels of students' readiness to use digital educational resources in their professional activity are identified. The Model of students' ability to use digital educational resources in professional activity is experimentally proved. The authors have shown that in recent years the Internet has captured most of the spheres of life of persons, and has become an integral part of life. It was revealed that the democratization of the world's online users opened the cultural environment in which they are, regardless of their interests, can find a place to socialize with friends with the same interests all over the world. For the proper implementation and application of E-learning as the authors see a need to explore these concepts and its features, a clear definition of E-learning elements and realize its significant advantages compared with traditional learning. Implementation of the developed Model allows to optimize process of professional training in higher educational institutions.

### KEYWORDS

Digital educational resources, higher education, ability to use digital educational resources, professional activity, Model.

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## Introduction

It is difficult to think of modern educational process without high-quality training electronic materials. Recently their specific structure was enhanced with such teaching software, as electronic manuals, means of computer modeling, Internet sites, training oriented teaching machines and other educational resources.

The digital educational resource allows to expand informative interest of students to their professional activity. Such type of training with the help of digital educational resources allows to improve the quality of training, promote development of informative interest in unlimited number of students, and allows to implement educational process with the elements of creativity.

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Digital educational resources are the photos presented in a digital form, video fragments, static and dynamic models, objects of virtual reality and interactive modeling, cartographic materials, sound recordings, symbolical objects and business graphics, text documents and other training materials necessary for the organization of educational process of students.

Under the conditions of informatization of education, development and use of the new tutorials for the organization of work of trainees in the uniform educational environment and promoting better quality of students' training is relevant. It is possible to carry digital educational resources to such tutorials. Digital educational resources give opportunity to provide extensive information; fast search and access to necessary information; objective and high-quality examination of students; evident representation of many difficult phenomena and processes; uses of various graphic registration; simultaneous obtaining of information.

In this regard the comprehensive solution of problems of education informatization requires improvement of students training, training in their methods of work with modern digital educational resources.

The analytical works of W. Burlson (2013), D.A. Muller (2008), D.Zh. Sakenov (2012), E.A. Efimova (2011), N.L. Rosina (2012), E.A. Schantz (2012), F. Magdy (2014), T. Ellis (2004), M.V. Furs (2011), E.A. Gorneva (2007), S.D. Karakozov (2002), B.G. Sarsenbaeva (2014) showed that there is a significant amount of the researches devoted to the questions of students' professional training under the conditions of informatization of educational process.

It should be noted that in some specific works (Burlson et al., 2013; Muller et al., 2008; Sakenov, 2012; Efimova, 2011; Rosina, 2012; Schantz, 2012; Magdy et al., 2014; Ellis, 2004; Furs, 2011; Gorneva, 2007; Karakozov, 2002; Sarsenbaeva, 2014) more attention is paid to theoretical and methodical training of students for using the knowledge of informatics. However in these researches the problem of using digital educational resources for students' training weren't covered. Thus, formation of students readiness to use digital educational resources in professional activity wasn't so far the object of studies that allows us to state the relevance of this research in this direction.

Relevance of the current research is defined by a contradiction between the need for students readiness formation to use digital educational resources in professional activity and insufficient consideration of this question in practice in the institutions of higher education.

In this regard the problem of the research is in the need to disclose specifics formation of students readiness to use digital educational resources in their professional activity.

The Research objective is development and experimental control of a method of formation of students' ability to use digital educational resources in professional activity.

## **Materials and Methods**

Ability of students to use digital educational resources in their professional activity is a steady characteristic of the identity of the student, defining his or her ability to solve main professional pedagogical objectives means of digital educational resources under the conditions of the multisubject multifunctional pedagogical

activity the purpose of which is training, education and development of school students.

Ability of students to use digital educational resources in their professional activity includes the following structural components:

- motivational, presented by the motives expressed by interests and requirements to use digital educational resources in professional activity;
- cognitive, assuming set of subject, methodical knowledge which integrates the general and special knowledge in abilities of students to use digital educational resources in their professional activity;
- activity, expressed by a complex of abilities on the training organization with the use of digital educational resources.

The method of formation of students' ability to use digital educational resources in professional activity assumes implementation of training methods: method of projects, method of the solution of expediently picked up tasks; use of training means: computer, multimedia projector, Internet resources; the organization of process of training on the basis of an optimum combination of collective, team and individual forms of educational activity of students. In the course of development of formation technique of students' ability to use digital educational resources in professional activity specific features of professional activity are considered:

- multiconcreteness to own the theory and a method of teaching a number subjects relating to various areas of knowledge;
- functionality, training, education and development of school students;
- taking into account the age of school students.

Levels of ability formation of students to use digital educational resources in professional activity: I. High; II. Average; III. Low.

Diagnostics of formation levels of students' ability to use digital educational resources in professional activity is carried out on the basis of the following criteria: I. - requirement to use digital educational resources in professional activity; II. - knowledge of digital educational resources and ways of their application in professional activity; III.-ability to use digital educational resources in professional activity. In the course of students' ability formation to use digital educational resources in professional activity it is necessary to create ideas of production stages of digital educational resources (Table 1).

**Table 1.** Production stages of digital educational resources

<i>Stage</i>	<i>Stage Content</i>
Preliminary work	Formulation of initial idea. Assessment of existing elements
Collecting necessary information	Analysis of requirements. Setting the main didactic goal. Justification of need and that new that will make a product to stand out in comparison with the usual printing manual



Preparation of contents	Setting of didactic local goals. Scheduling. Submission of the contents in the form of modules
Design	Development of the general concept. Choice of media (sound, images, video, etc.). Script writing. Detailed design + interactivity.
Production	Programming and contents digitization. Creation of images, sound, etc. Configuration of ready materials in modules.
Testing	Testing and product assessment

In the course of students ability formation to use digital educational resources in professional activity the training:

- should provide an opportunity to work with optimal speed for it;
- is provided by a method and at that level of a statement which most corresponds to level of students' abilities and psychophysical characteristics;
- provides opportunity to revise the material studied earlier, to receive the necessary help, to interrupt training process in any place, and then to return to it;
- can observe dynamics of various processes, interaction of various mechanisms, etc.;
- can operate studied objects, actions, processes and to see results of the influences;
- easily breaks barriers of psychological character (not enough courage, indecision, fear of sneers);
- to provide necessary skills to the degree of ability.

From the level of intellectual development of a society depends on the success of any spheres of life. Given the trend towards globalization means increased competition between nation-states, acquires planetary nature and includes, in addition to the economy, other sectors, it is evident that only the country that will provide adequate requirements of the time development of education and science, can hope for a decent place in the world community.

In the study the authors used the complex of methods corresponding to the investigation stages: 1) the analysis of psychological and pedagogical, scientific, scientific and technical, and methodical literature both by authors in or country, and foreign authors on a research problem; 2) analysis of normative documents, including state educational standards of higher education; 3) modeling; 4) pedagogical experiment; 5) inquiry, testing, analysis of products of students' activity; 6) data processing of experimental work by means of methods of mathematical statistics.

Status information society and dynamic development of the sphere of electronic information resources are responsible for the new requirements to the domestic legislation, the provisions of the doctrinal development of appropriate and integrated organization providing legal information sphere (Gorana and Kanaujia, 2016). Today these important issues on which the decision depends on further improvement in the field of information law (Kang and Vasseur, 2016), and therefore the information legislation and its implementation, the subject of many scientific papers that reveal the content of the legal questions regulatory

information distance education (Määttä et al., 2016), informatization of educational process in higher educational institutions, government information environment of innovative university complexes (Othman and Naintin, 2016), information technology as the basis and means of implementing innovative processes in modern education (McDonald, 2016). However, the legal aspects of the introduction of E-learning remain without attention of scientists.

## Results and Discussion

The Russian Federation is trying to introduce new information technologies in education, but the major drawback is the lack of regulatory support of this process. As a rule, some institutions of higher learning on your own, or rather, risk introducing elements of the new electronic and distance education, taking their own terms and conditions of its use. It is safe to speak about the prospect of regulatory and legal settlement of the issue. In particular, the Ministry of Education and Science announced the purpose of conducting public discussions of the concept of an electronic platform inter-university courses. Unfortunately, more than the publication of the Ministry of the project was not followed, even though adoption of the improved fundamentals of e-learning development would become the basis for further development of the e-learning system. Developments in the field of legal regulation of e-learning quality will affect the development of the information the right to accelerate the process of legislative support for the Information Society.

The basic principles of the Information Society and the doctrine of the development of education identified priority activities aimed at implementation of the state policy in this area, the implementation of which, in particular, will ensure the improvement of the educational process, accessibility and effectiveness of education of the young generation preparing for life in the information society, It will create the conditions to bring the level and quality of the educational potential in line with the requirements of the staffing of innovative development, namely:

- Ensure progressive informatization of the education system, designed to meet the educational information and communication needs of the participants of the educational process;
- Development and implementation of information educational environment in general secondary, extra-curricular, vocational, higher and postgraduate education;
- Development of individual modular training programs of various levels of difficulty, depending on the specific needs, as well as the release of e-books and encyclopedias;
- Creation of an information system supporting the educational process, the system of information and analytical support in the area of school management, information technology support monitoring of education;
- Ensuring the full education of computer systems and multimedia equipment;
- Development of a network of digital libraries at all educational levels;
- Create a system of distance learning, including for persons with disabilities and children who are on long-term treatment, and on that basis the effective implementation and use of information and communication technologies at all educational levels of all forms of learning;
- Ensuring the educational process by means of information and communication technologies, as well as access to educational institutions of the world information resources;

- Creation of an open network of educational resources;
- Establishment of a national scientific and educational space, which will be based on a combination of various multi-national information and communication systems;
  - Development of methodological support in terms of the use of computer multimedia technology in the teaching of subjects and disciplines;
  - Improving the curriculum, opening of new specialties of the latest information and communication technologies, the embodiment of the principle of "education for life";
  - Providing free access to the means of information and communication technologies and information resources, especially in rural and remote settlements;
  - Increased level of computer literacy of the population, in particular pensioners, low-income persons and persons in need of social assistance and rehabilitation;
  - Creation of conditions for the acquisition within the next five years, all high school graduates of computer literacy;
  - Ensuring all schools broadband access to international research and educational networks and the Internet.

With regard to international experience, the main trend in the global information world environment is an active transition to a system of e-learning and the next phase of Smart Education. The European Commission in the Plan of Action on e-Education (2001) defines e-learning as the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services, as well as through remote sharing and collaboration. At a meeting of the European Commission, which took place 23-24 March 2001 in Stockholm, at the initiative of Viviane Reding, Commissioner for Education and Culture, the European Commission approved the full-scale action plan in the field of e-learning, aimed at mobilizing all the national programs and mechanisms of the European resources investment Bank and the efforts of all stakeholders to accelerate the introduction of e-learning in Europe. Next, 10 May 2001 in Brussels at the International training center of IBM, the first European summit on the issues of e-learning. For Europe, e-learning has become an excellent opportunity for the maximum unification of educational programs of the various EU member states. The consistent policy of active development of e-learning continues today. In particular, the Minister of Higher Education and Research Valérie France Perkes in his speech at the meeting in ParizhDofin university dedicated to the transition of universities in the electronic era, said that "... today the main objective in the reform of the French education system is defined as 100% of teaching materials in electronic form to 100% of ...; ... The purpose of e-learning to provide access to all knowledge - and young people who can not attend all the classes, because forced to work in parallel, and the disabled, for which not all universities are created appropriate conditions ...; ... E-learning also allows you to link universities around the world in the total educational process ...".

Within the framework of the World Economic Forum in Davos in 2015, a round table "RevolutiOnline.edu", where, in particular, it was noted that online education in the near future can dramatically change the whole education system. One of the main advantages of e-learning free access to information, regardless of financial status, nationality, place of residence and health.

Among the post-Soviet countries, only the Russian Federation, the Federal Law "On education", where e-learning is seen as an organization of the educational process with the use contained in the database and used in the implementation of educational programs, and information technology, provide processing, technical means, as well as information and telecommunication networks, providing the transmission lines for communication of this information, the interaction of individuals, students and teaching staff.

Russia also is on the path of reform and development of information society, the conclusion about what can be done on the basis of an analysis of the current legislation and the state of the use of Internet network resources in the educational process. A more striking example is the higher education institutions, since they have a greater competition in the training of various professions and are interested in the efficient and mobile, with the use of modern technology, the process of training young professionals and modern. Unfortunately, this issue is not settled properly at the legislative level, experts are not paid due attention to this problem. Therefore, higher education institutions are forced to develop and implement the use of electronic resources in the learning process.

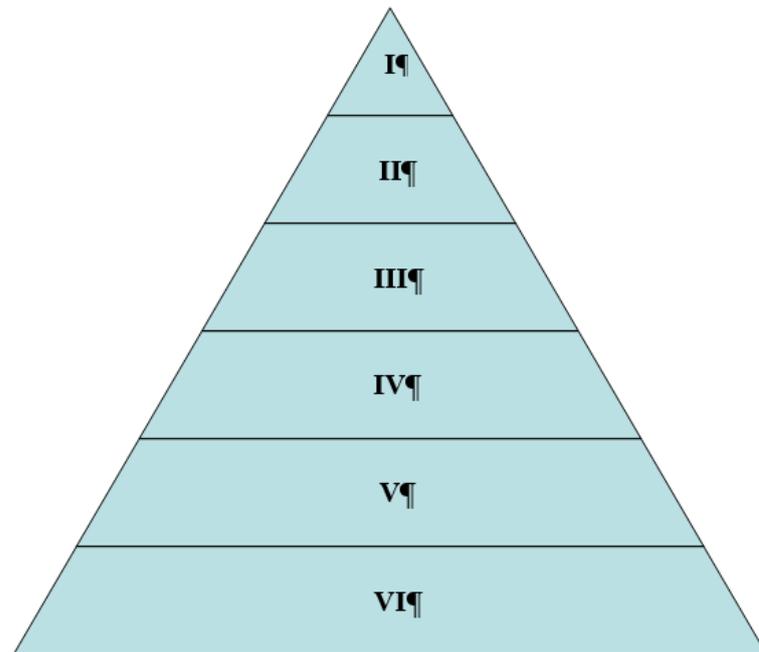
Given the lack of comprehensive understanding of e-learning, we consider it necessary to consider the basic elements of e-learning, which are now being introduced in the educational process of higher educational institutions. The concept of "e-education" includes items such as distance education, electronic library (teaching materials certainly are in electronic form), audio, video lectures and the use of multimedia tools in the learning process.

At present, there are higher education institutions that implement educational process in the newest technologies and some elements of e-learning. In the world there are other e-learning management system, for example, such as Blackboard, Angel, WebCT. The difference between these systems are administrative tools (authentication, authorization, registration, etc.); means to create a course (authoring tool, content sharing / reuse of content and others.); means of access to information (course management, the students tracking tools, automatic testing, categorization, and others.); means of communication between teachers and students (forums, email, chat, video, etc.); productivity tools (help, search, on-line / off-line mode, and others.).

At present, universities are developing the concept of the introduction of e-learning and its implementation began in the life of students that will be effective and advanced stage in the development of education in higher education. An important achievement is the use of multimedia technology in the teaching process, and video lectures on specific subjects.

Distance learning - a form of e-learning, where student and teacher are at a distance, while using all possible means of communication, it is a method of transmitting material does not matter. And in e-learning all the learning material presented in electronic form only, means of communication the teacher and students are based on the use of information and communication technology, especially computer technology, network technology, particularly the Internet, and mobile communications.

The support of components of students ability formation to use digital educational resources in professional activity allowed us to design the Model of students ability to use digital educational resources in professional activity which is presented in Figure 1.



**Figure 3.** Model of students' abilities to use digital educational resources in professional activity.

The explanation to figure 1. The model of students' ability to use digital educational resources in their professional activity:

I. – Ability of students to use digital educational resources in professional activity.

II. – Components of students ability to use digital educational resources in professional activity.

III. – Criteria of students ability to use digital educational resources in professional activity.

IV. – Levels of students ability to use digital educational resources in professional activity.

V. – Methods of students ability formation to use digital educational resources in professional activity.

VI. – Production stages students of digital educational resources in professional activity

Skilled and experimental work was carried out under natural conditions of pedagogical process in an institution of higher educational.

At a starting stage of experimental work diagnostics was carried out by means of the methods directed at studying levels of students ability formation to use digital educational resources in professional activity. The assessment of level of students abilities to use digital educational resources in professional activity was carried out by identifying the levels of formation of students abilities components to use digital educational resources in professional activity.

In the course of experiment methods of projects, a method of the solution of expediently picked up tasks was used; use of tutorials: computers, multimedia projector, Internet resources; the organization of process of training on the basis of

an optimum combination of collective, team and individual forms of educational activity of students.

We revealed the initial level of abilities to use digital educational resources in professional activity among the students in experimental and control groups. Stating experiment showed that the results of distribution on levels of achievement of students' abilities to use digital educational resources in professional activity in experimental and control groups differ slightly and correspond generally to low level (65% of students in control group and 66% of them in experimental).

The purpose of this experiment was approbation of the developed Model of students' abilities to use digital educational resources in professional activity.

At the final stage of experimental work all the levels of students' abilities formation to use digital educational resources in professional activity were defined.

Comparison of levels of students' abilities formation to use digital educational resources in professional activity before carrying out forming experiment showed that in experimental group 71% of examinees reached a high level of abilities whereas in control group this level was reached only by 6% of examinees. Thus, realization of the Model of students' abilities developed by us to use digital educational resources in professional activity with regard to characteristic features of activity of future school teachers, allowed us to increase considerably the level of students' ability to use digital educational resources in professional activity.

Thus, the carried-out experimental work confirmed the put-forward purpose on formation students' abilities to use digital educational resources in professional activity and proved efficiency of the developed Model of students' abilities to use digital educational resources in professional activity.

## Conclusion

Compared with the traditional e-learning offers significant advantages and some unique features such as: moving activities in space and time, flexible schedule, access to materials and the greater their diversity, the presence of all the necessary training materials in electronic form, the ability to re-listen to or view the audio -, video lecture, improved communication, and significantly faster feedback to teachers.

Based on the above we see possible to give the following definition of e-learning is a form of learning in which the main media educational information are e-learning resources, the use of information and communication technologies and the Internet to improve the quality of learning by facilitating access to resources and services, as well as through remote exchanges and collaboration between students and teachers. As for e-learning components, we can note the use and implementation of the higher education institutions of some of its elements: distance learning, digital libraries, audio, video lectures and multimedia.

As a result of the conducted research we determined of students' abilities to use digital educational resources in professional activity, as the steady characteristic of the identity of the student, defining ability to solve the main professional pedagogical objectives by means of digital educational resources under the conditions of the multisubject multifunctional pedagogical activity the purpose of which is training, education and development of school students. Criteria of students' abilities to use digital educational resources in professional activity are experimentally proved: - requirement to use digital educational resources in

professional activity; - knowledge of digital educational resources and ways of their implementation in professional activity; abilities for using digital educational resources in professional activity. At the experiment levels students' abilities to use digital educational resources in professional activity are proved. Efficiency of Model of students abilities to use digital educational resources in professional activity is developed, approved and is experimentally proved. Thus, implementation of the developed Model of students abilities to use digital educational resources in professional activity allows us to optimize process of professional training.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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### References

- Burleson, W., Ganz, A., Harris, I. (2013). Educational innovations in multimedia systems. *Journal of Engineering Education*, 90(1), 21–31.
- Efimova, E.A. (2011). Interactive learning as a means of preparing professionally mobile specialist. *Vocational Secondary Education*, 10, 23-24.
- Ellis, T. (2004). Animating to build higher cognitive understanding: A model for studying multimedia effectiveness in education. *Journal of Engineering Education*, 93(1), 59-64.
- Furs, M.V. (2011). Interactive training and means of increasing the level of training of students. *Journal of Higher School*, 10, 29-33.
- Gorana, R.N., Kanaujia, P.R. (2016). *Reorienting Educational Efforts for Sustainable Development: Experiences from South Asia*. Dordrecht: Springer, 212 p.
- Gorneva, E.A. (2007). *Electronic educational resources as an integrated tool of information culture of the future teachers of technology*. PhD Thesis. Bryansk: Academician I.G. Petrovsky Bryansk State University, 24 p.
- Kang, M.-J., Vasseur, A.F. (2016). Criteria on Contractions for Entropic Discontinuities of Systems of Conservation Laws. *Archive for Rational Mechanics and Analysis*, 222(1), 343-391.
- Karakozov, S.D. (2002). The methodological basis for the design of educational WEB-site. *Information Technologies in Science and Education*, 1, 288-291.
- Määttä, S., Ray, C., Roos, G., Roos, E. (2016). Applying a socioecological model to understand preschool children's sedentary behaviors from the viewpoints of parents and preschool personnel. *Early Childhood Education Journal*, 44(5), 491-502.
- Magdy, F., Iskander, J., Catten, C., Jameson, R., Jones A., Balcells, A. (2014). Development of multimedia modules for education. *Computer Applications in Engineering Education*, 3(2), 97-110.
- McDonald, C.V. (2016). Evaluating junior secondary science textbook usage in Australian schools. *Research in Science Education*, 46(4), 481-509.

- Muller, D.A., Sharma, M.D., Reimann, P. (2008). Raising cognitive load with linear multimedia to promote conceptual change. *Science Education*, 92(2), 278–296.
- Othman, M.R., Naintin, E.A. (2016). The relationship between maritime education and employer trust: the structural equation modelling (SEM) perspective. *WMU Journal of Maritime Affairs*, 15(2), 112-124.
- Rosina, N.L. (2012). Development of professional learning psychology students in terms of high school preparation. *Educational Psychology*, 1, 70-78.
- Sakenov, D.Zh. (2012). Preparation of students of higher education institution for professional activity in the course of studying of pedagogical disciplines. *World Applied Sciences Journal*, 19(10), 1431-1436.
- Sarsenbaeva, B.G. (2014). Pedagogical conditions of formation professional competences in students (Pedagogics and psychology specialty as an example). *Life Science Journal*, 11(5s), 166-170.
- Schantz, E.A. (2012). Professional training of university students as a holistic educational system. *Theory and Practice of Education in the Modern World*, 1, 383-386.