

Unified Information Space as a Component of Sustainable Education at the Present Stage of Society Development

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ABSTRACT

The concept of sustainable development in the modern world is an integrating platform for various fields of knowledge, research and practice. The goal of sustainable development is to ensure a decent quality and standard of living for present and future generations. Education plays an important role in achieving this goal. Sustainable development cannot be achieved solely through technology, political regulation, or financial mechanisms. Humanity needs to change its way of thinking and behavior. The article shows that to implement these changes, in turn, it is necessary to provide quality education and training for sustainable development at all levels and regardless of social conditions. There should be a system of sustainable education that would allow anyone to quickly get all the necessary knowledge that exists in the global information space. This becomes especially relevant in connection with the transition to the "information community". The article presents the concept of creating a single information space. The components of the unified information space are the information -learning environment and the information-educational environment implemented at the Department and at the University, respectively.

Keywords: *educational environment, information educational environment, student, sustainable education, educational information*

1. INTRODUCTION

Among the main promising areas of higher education development, it is necessary to highlight the problem of Informatization of education. In the new model of education, the computer and computer technologies play a special role as a means of obtaining information, processing and storing it. There should be an education system that would allow anyone to quickly get all the necessary knowledge that exists in the global information space. This becomes especially relevant in connection with the transition to the "information community". Modern research shows that the introduction of mobile devices in education leads to important qualitative changes in educational practice. First, the boundaries of the mobility class are "stretched" to the limits of the wireless network's reach, that is, "virtual classes" and "virtual groups" of students are created. Second, social interaction, i.e. data exchange, creation of a common resource for telecommunications projects, and so on are added to traditional oral and written interaction. Third, individualization of the educational trajectory, pace and intensity of training. Fourth, sensitivity to the educational space. Fifth, connectivity, creating a universal network interaction environment, linking. Sixth, creating interfaces between the physical and digital worlds using sensors, servers, and so on. the methods and principles of training are Disclosed, the pedagogical system model of mobile

cloud learning is considered, and the results of an experiment on the implementation of mobile cloud learning components are presented.

2. PREREQUISITES FOR THE DEVELOPMENT OF THE INFORMATION-EDUCATIONAL ENVIRONMENT

The concept of "sustainable development" was introduced into world science and policy by the Brundtland Commission as a development that meets the needs of the present, but does not compromise the ability of future generations to meet their own needs. The development of the sphere of education is due to the appearance of new definitions in pedagogical science, the addition of the meaning of existing ones and the reconstruction of unclaimed concepts. This process is accompanied by the development of innovative technologies due to the penetration of Informatization tools in the field of education. In this regard, there are two conditions that affect the organization of independent work of students in a technical University.

The first condition is related to the following. In the psychological and pedagogical literature of the last decade devoted to the Informatization of education, there are such terms as "information space", "information-educational environment", "information-learning environment", etc.,

which relate to various aspects of pedagogy and Informatics. The quality of the educational process must be provided by the system of information education resources and tools that meet the conditions of realization of basic educational program of educational institution and form the information-educational environment of the University. The information-educational environment is an essential condition and at the same time a means of developing a new education system. Informatization of education is impossible without creating an information and educational environment at the University, which in turn provides information opportunities for a specific discipline for the self-realization of a future specialist with the necessary professional competencies. Informatization in a certain direction provides the formation of an information - learning environment as a subsystem of the information and educational environment. Therefore, in modern conditions, the formation and development of its own information-educational environment, as an element of a unified system of information educational space, is one of the most important strategic tasks of each University in terms of adaptation to rapidly developing information technologies. These types of environments should serve as a Foundation for the organization of the modern educational process and, consequently, the organization of educational work of University students.

The second condition is related to the implementation of the organization of independent work (achievement of its goals) of students in the conditions of Informatization of higher education. This condition requires solving the constructive task of providing students with the means of information technologies for organization of educational work. The analysis of various information technology tools from the point of view of their integration into the process of independent work of students made us turn to the educational environments that are currently widely represented in practice. Moreover, in connection with the Informatization of all processes taking place in society, teachers began to use information technologies in their activities. However, as a rule, they are limited to using a single application, and practically do not systematize or generalize their work between several information services, creating a so-called unified information -educational environment.

Therefore, our concept will be considered in accordance with the above conditions. It should be noted that learning is more effective if it takes place within the framework of a learning environment that creates conditions for intellectual cooperation and the creation of meaningful results by students.

3. INFORMATION-EDUCATIONAL ENVIRONMENT

The term "information - educational environment" refers to the new essence of integration of educational and information environments. There are various approaches to determining the information - educational environment of

an educational institution and the problems of its organization.

Based on the analysis of scientific sources [2, 3, 4, 6, 8, 9, 10 etc.], the information-educational environment is understood by us as a pedagogical system that combines a system-organized set of information and educational resources, data transmission and educational process management, organizational, methodological, hardware and software, including pedagogical techniques, methods and technologies, and is aimed at meeting the needs of users in information services and educational resources that have information literacy.

Our concept defines the goals that the information - educational environment should achieve, including: the formation of professional and interdisciplinary competence of the future engineer; the development of information culture of future specialists; the realization of creative potential and personal development; the formation of a modern scientific and professional Outlook; the development of professional self-awareness.

The information - educational environment of the University as a system should have structural elements. The main structural element that provides educational services at the University is the Department, so the main element of the information - educational environment is the virtual representation of the Department. In addition, the information -educational environment of the University, like the system, also has the following structural elements:

1. Virtual representations of departments are information bases and educational software package that implements a standard set of educational services that support the educational process in the disciplines of the Department through the corporate network of the University (didactic support for individual courses or course cycles (notes, textbooks, manuals, task books, simulators, tests, control tasks, glossaries, reference and additional literature, etc.).
2. Electronic library – a set of databases that provide the ability to accumulate and provide users with information resources through the corporate network, with its own system of documentation and protection (books, magazines, textbooks, reference books, articles, etc.).
3. Portal – a software and hardware complex that provides a personalized and customizable interface that allows users to interact with each other, find and use relevant applications and information resources in the information - educational environment in accordance with their interests, tasks, functions, i.e. communication systems between users of the environment. The portal should include: virtual representations of departments; catalog of curriculum programs, educational standards; electronic library; research information resource; catalog of Internet resources in various subject areas – natural Sciences, General engineering, Humanities, etc.; electronic store for the sale of educational and scientific materials; consulting information center; virtual student employment service; chats on specific disciplines.
4. Users – subjects of the learning process, i.e. individuals who use the resources of the information -educational environment of the University (faculty, students, etc.).

5. System resources – software, hardware, and organizational complex that provides support for user resources, i.e. computer support (CD-ROMs, files of various types and purposes of programs, etc.).

6. User resources – a set of subject developments and service tools available to the user.

7. Service services – a set of organizational and technical measures that ensure the functioning of the information - educational environment.

8. systems for monitoring and evaluating students 'knowledge – a set of software and hardware tools that provide the functions of testing and evaluating students' knowledge.

9. Cloud services – a software, technical and organizational complex that ensures the relationship of the main components of the environment with each other and the entire environment with students. SkyDrive, Dropbox, Box, SugarSync are some of the well – known "clouds". More recently the list includes giants like Yandex.Drive and Google Drive. Such storage on your computer is displayed as a regular disk and is easily recognized by file managers. Therefore, working with them is as easy as with conventional drives.

The goals of creating an information - educational environment are:

- transfer to a new technological level of all information processes taking place in an educational institution, for which it is necessary to integrate information and communication technologies into teaching activities;

- research and implementation of modern information technology and methodological approaches to presenting information in combination with traditional teaching methods;

- ensuring the availability of educational materials and information and educational resources in the information - educational environment of the University.

To achieve a new quality of education based on an information-oriented approach, the information - educational environment has the following functions:

- ensuring differentiation and individualization of training;

- increase students ' motivation to learn;

- providing clarity in the presentation of theoretical material;

- training in modern methods of information processing;

- formation of independent activity in obtaining knowledge.

During the implementation of the unified information environment, the following tasks are solved:

- providing a variety of organizational, educational and extracurricular forms of program development;

- creating conditions for productive creative activity of the student-teachers together with students set creative tasks, which contributes to the emergence of students ' own ideas;

- creating a space for students ' social practices and engaging them in socially significant activities.

The information - educational environment of the University provides an opportunity to carry out the following types of activities in electronic form [2]:

- planning the educational process;

- placement and preservation of electronic resources, including students ' works;

- recording the stages, components and results of the main educational program development;

- interaction of students and teachers in the educational process, including remotely via the Internet;

- use of the obtained training results for analysis and correction in solving problems of educational activity management;

- control of access of participants of the educational process to information educational resources on the Internet.

One of the important features of the information - educational environment is the availability for students and teachers of educational multimedia resources, structured teaching materials at any time and from any device with Internet access, as well as continuous communication with the teacher, getting advice in online or offline modes and getting individual "navigation" in the process of completing the task [7].

Based on the analysis of existing information - educational environments, their advantages and disadvantages, the current state of information technologies and telecommunications [5, 7], we can formulate the principles on which a unified information - educational environment should be built, which we have conditionally divided into external and internal:

External principles:

1. The information -educational environment meets the requirements of federal state educational standards and the general psychological and pedagogical, methodological and technological criteria of educational and information resources.

2. Creation and development of the information - educational environment is carried out on the basis of budgetary and extra-budgetary sources. The formation of the fund of information and other resources of information - educational environments should be based on the principles of the author's economic interest in placing his resource in this environment and ensuring the protection of his copyright. A similar approach should be used to attract technical services that ensure the functioning of the information - educational environment.

3. The environment created in this way is distributed and should have unified navigation tools that allow the user to quickly and easily find any information resource registered in the environment, regardless of its physical location [1].

Internal principles, including the principle of:

1. Multicomponents – the inclusion of educational materials, test and other knowledge control systems of varying complexity, technical tools, databases and reference systems, storage of educational information, including multimedia, graphics, etc.;

2. Adaptability – inclusion in a single information environment of basic knowledge in the field of science,

determined by the profiles of training specialists, taking into account interdisciplinary connections, as well as information and reference base of additional educational materials with access to world resources;

3. Distribution – information components of a single information – information environment that are optimally distributed across topics and sections, taking into account the requirements for the level of knowledge and individual psychological characteristics of each student;

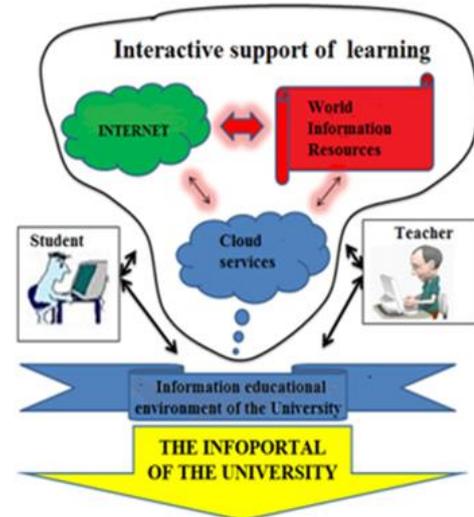
4. Integrality – the information - educational environment is integrated into the existing education system and should not be rejected by this environment [7].

To build an information educational environment, according to the formulated principles, it is necessary to consider the information -educational environment, on the one hand, as an independent system aimed at developing active cognitive activity of students using new information technologies, and, on the other hand, as part of the traditional education system [9, 102]. The structure of the information - educational environment is shown in Figure 1.

4. INFORMATION-LEARNING ENVIRONMENT

So, the information - educational environment is defined on the one hand as a software and hardware complex, and on the other hand, as a pedagogical system. Therefore, when developing an information - educational environment, not only information, software and technical, but also psychological and pedagogical problems should be solved. Psychological and pedagogical issues are based on the concept of information -learning environment.

We will consider information-learning environment specifically designed pedagogical system, is a subsystem of a holistic educational environment of the University, implemented by means of mobile cloud technologies, content integrated into the learning process and providing conditions of effective organization of educational work of students.



Information and Training Environment of The Department	The Virtual Space of the University Departments	The system-wide information resources to support the learning process	
	Interactive support of academic disciplines	The information and reference base of the Department of the University	The user resources
	The organization of Educational process	State educational standards, curricula, working curricula, educational and methodical complexes	Professional communication environment (virtual conferences, forums, chats, webinars, etc.)
	Remote core (the set of all disciplines of the Department)	Electronic resources of the Department (glossaries, electronic textbooks, dictionaries, manuals, didactic materials, etc.)	The system resources
The control and testing. Electronic control and settlement-graphic works	The control works and settlement-graphic works	Documents (class schedules, producing the degree and direction)	Customer service resources
		Scientific and research resources	Monitoring and evaluation systems
		Additional educational services (second higher and distance education, etc.)	

Figure 1 Structure of an integrated information-educational environment

The most General concept in our research is the concept of educational space. The information - educational environment of the University is a subsystem of this space and is focused on the use of information and communication technologies in education. The next concept at a lower level of the hierarchy is the information - learning environment, since it is primarily related to the information content of the Department of higher education, including methodological support for the content of education.

Information and training environment of the Department as a pedagogical system should have the following structural elements:

- Educational-methodological complex of the discipline (information content of the learning process), including electronic and methodological support, including educational knowledge, which are combined into an educational-methodological complex (EMC). For each educational and methodological complex, specific goals and objectives of studying this educational material in the discipline should be formulated, a description of the course structure, its main content, relevant scientific methods, a list of recommended textbooks and monographs.
- Electronic library.

- Academic disciplines – electronic textbooks, manuals, own projects, online classes (conditions for individual learning paths).
- Constantly updated information banks of the discipline (electronic textbooks and manuals, demonstrations, test and other tasks, samples of completed projects).
- Modular principle of building courses of disciplines.
- Implementation of creative projects, including collective projects and their public protection; automated knowledge control system (facilitates the work of the teacher and promotes openness, objectivity and impartiality of students' assessment); selection of an information resource (the optimal combination of electronic and traditional educational resources).

In turn, the electronic educational and methodological complex of the discipline should contain the following elements: electronic textbooks, including theoretical material, Glossary, and topics of laboratory and practical work; plans for lectures and practical classes; virtual laboratory complexes; lecture notes-presentations; tasks for laboratory work; training tasks for independent work and requirements for them; questions and tasks for final certification; descriptions of information tools and technologies necessary for completing training tasks; guidelines for the use of this complex; electronic banks of tests; links to additional information resources on the discipline on the Internet; additional educational materials (textbooks, manuals, magazines, etc.). This educational and methodological complex can be provided to students using mobile-cloud technologies.

5. CONCLUSIONS

We believe that the organization of students' educational work in the presented hierarchy of environments will be

REFERENCES

[1] A. G. Abrosimov, Journal "Bulletin of the RUDN "series" Informatization of Education", 2004, № 1. <http://ido.rudn.ru/vestnik/2004/3.pdf>

[2] E. I. Shangina, Methodological Foundations for the Formation of the Structure and Content of Geometric and Graphic Education in A Technical University in Terms of Integration with General Engineering and Special Disciplines: Dis. ... Doctor of Pedagogical Sciences, Moscow, 2010, 365 p.

[3] E.I. Shangina, G. A. Shangin, Mobile education. Int. scientific-practical conf. «The Ural Mining School Regions», organizing Committee: N. Mr. Valiyev (resp. for the release) [et al.]; Ural state mining University. – Ekaterinburg: publishing house of URSMU, 2014, pp. 22-24.

most effective if the variable use of information-educational and information-learning environments, which are integrated into the information-educational space (Figure 2).

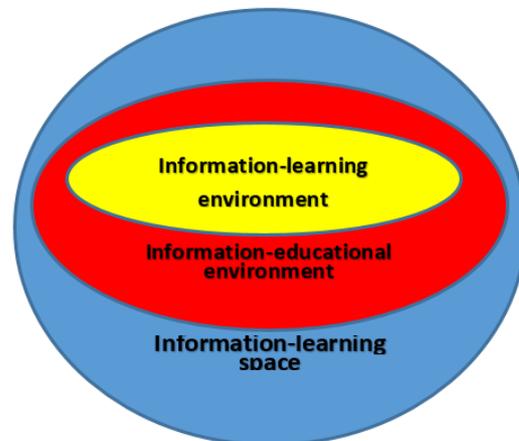


Figure 2 The hierarchy model of information environments

Their material embodiment is the means of information technology. The level at which the information - learning environment is located implements the level of direct interaction between the teacher and students at the Department (albeit indirectly, using information and communication technologies), and also implements the use of mobile cloud technologies. The information - educational environment implements the interaction of students and employees at the University, and the information and educational space represents the interaction of the entire educational community of the world.

Thus, we come to the conclusion that it is necessary to create a model of the information-educational space and its subsystems of the information-learning environment and the information -educational environment.

[4] E.I. Shangina, G.A. Shangin, Modern information educational environment. Int. scientific-practical conf. "The Ural Mining School-Regions", organizing Committee: N. Mr. Valiyev (resp. for the release) [et al.]; Ural state mining University, Ekaterinburg: publishing house of URSMU, 2015, pp. 15-16.

[5] G. A. Aleksanyan. Formation of Independent Activity of Students of Secondary Vocational Education in Teaching Mathematics Using Cloud Technologies [Text]: Diss. ... Kan. PED. nauk: 13.00.02. Armavir, 2014,150 p.

[6] I.G. Zakharova, Formation of the Information Educational Environment of Higher Educational Institutions: Dis. Doctor of Pedagogical Sciences: 13.00.01. / Irina gelievna Zakharova-Tyumen, 2003. - 399 p.

- [7] K. E. Marinchenko. Formation of Professional Competence of Future Specialists on the Basis of Network Educational and Methodological Complexes. Dis. ... Candidate of Pedagogical Sciences: 13.00.08-Theory and Methodology of Professional Education, Volgograd, 2009. – 185p.
- [8] N. N. Kurova. Information Environment of an Educational Institution as a Managerial Resource of a Modern School Head, Conf. Information Technologies in Education. - Electron. Dan. - M., 2005.
<http://www.ito.su/main.php?pid=26&fid=5434&PHPS ESSID=00a0f682fb916586aca80c70e80f2ab0>
- [9] V. A. Kuklev, E-learning Using Mobile Devices Anytime and Anywhere, Ulyanovsk: UISTU, 2009, 356 p.
- [10] V. A. Kuklev, Formation of the Mobile Learning System in Open Distance Education. Abstract.... Diss. D. PED. Sciences. Ulyanovsk, 2010, 42 p.