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**A PROCESS MODEL OF INNOVATIVE PEDAGOGICAL DESIGN
OF UNIVERSITY E-LEARNING ENVIRONMENT**

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Abstract

An increase in the number of University students has led to the possibility of the dilution of educational quality. The potential of qualitative improvement of a wide range of University courses through the use of software shows promise. Specifically, the design and testing of e-learning programs is worthy of considerable examination. In this article, a process model of an innovative pedagogical design of an e-learning environment in Adonis CE software is discussed. A sequence of stages of the process model is described. The process includes setting the goal of innovative pedagogical design, then two parallel steps to create a theoretical and methodological basis for designing and analyzing the current state of the environment, after which three stages of pedagogical design are implemented. Then, with a positive assessment of the educational potential of the environment, the process is completed. The key component of the model is the disciplinary core. This component includes educational content, namely a set of interrelated e-learning courses, and the means and technologies for providing this content. The disciplinary core interacts with five interrelated components of the model and other reference materials, visualization and staffing.

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1. Introduction

Forms and means of the traditional higher education system, that is, the methods of education, require continuous updates and alterations, taking into account development of the information society and contemporary requirements for the quality of higher education (Fuchs, 2009). The specific feature of the updated system should be, first of all, the nature of interaction between the lecturer and the student, where the teacher is a mentor and coordinator of the educational process who opens up the possibility of personalized learning. Secondly, it is necessary to develop methods and tools aimed at the implementation of basic educational goals through the use of the latest advances in the information and communication technologies (Ababkova, Pokrovskaja, & Trostinskaya, 2018; Abbate, 2000; Bylieva & Sastre, 2018; Peña Acuña, 2017).

Carrying out the pedagogical process in the e-learning environment not only affects the quality of education, but also contributes to the involvement of the teacher in promoting the development of a highly professional personality of a student (Nikitina & Kurnosova, 2011; Razinkina et al., 2018). This is confirmed by the increased attention to this vital topic from foreign scientists (Fuchs, 2009), who consider some aspects of modern educational environment, as well as issues of forming professional competence in contemporary global digital society. Based on the research results of the above-mentioned scientists, it can be stated that a completely new culture of higher education within the framework of e-learning is being formed, where new approaches to knowledge acquisition by students are being created that represents a new paradigm of education in Russia.

2. Problem Statement

Since the mid-1990s, there has been an increase in the number of Universities and in the number of University students in Russia. The network of higher education institutions has been constantly expanding. In 1990 there were about 500 universities, in 2008 there were 1,134 universities in Russia, and by 2014 there were 2,500 universities and their branches (Kostuchenko, 2017). In 2014, Russia rose to third in the number of enrolled University students in the world. Since 2017 programs to ensure conditions for quality education for people with disabilities have been actively developed (Björnsdóttir, 2017; Dokhoyan, Ismailova, Yegizarjants, & Sokolova, 2017; Hewett, Douglas, McLinden, & Keil, 2017). Of the total number of students enrolled in 2017, full-time traditional undergraduate, specialist and master's programs, the number of students with disabilities, was 19.6 thousand people, which is 7.4% more than the number of this category of students who studied in the previous year. Today, higher education is perceived as essential for a successful career.

At the same time, there is evidence that the rapid expansion of educational opportunities may have diluted the quality of higher education in the country. Employers comment that Universities are producing graduates that are not equipped to perform at anticipated levels. If the number of medical graduates, engineers and science students, as examples, increases without a commensurate increase in the quality of medical care and scientific advancement, it will have negative effects on the economy.

3. Research Questions

The problem underlined above poses a number of research questions, such as finding new approaches, methods, and technologies for organizing the higher education process in the context of global digitalization. In the attempt to enhance the educational process to produce better qualified graduates, information and communications technologies are currently being widely applied in higher education in Russian (Taramova, 2015).

But often their implementation is ineffective for three main reasons: low quality of electronic educational resources, faculty resistance to change, and the lack of a scientifically based model of an e-learning environment in most universities.

4. Purpose of the Study

Thus, this study is aimed at the developing the process model for innovative pedagogical design of the e-learning environment for a university that is optimal under the modern conditions of higher education.

5. Research Methods

Business process modeling is mapping out regular business processes and finding ways to improve them. It is a part of the practice of business process management. Process modeling software gives an analytical representation of 'as-is' processes in an organization and contrasts it with 'to-be' processes for making them more efficient. In this study, we used business process modeling methods through the use of Adonis CE software, a free program that supports multiple languages, automatic validation of business process modeling (BPM) syntax and BPM best practices. Adonis simplifies process modeling by providing intuitive ways of designing value chain and business practices. It provides graphical analysis views for all stakeholders and allows search and analysis queries. Importantly, for purposes of e-learning, it also allows users to have specific access online. Equally important, Adonis can store and control documents. This software is easy to use. It provides an array of functionalities, including, but not limited to web-based business process modeling using the BPMS notation and BPMN 2.0, search and graphical analysis capabilities, process simulation & optimization, evaluation, as well as publishing and process automation with BPMN 2.0 XML (BPMN DI) and XPD. L.

6. Findings

Let's consider two notions: of “design”, and “pedagogical design”. The first notion, design, arises from the Latin word “cogitatum” which means plan or idea. In general understanding, design represents a scientifically proven system of parameters of the future object or qualitatively new condition of the existing project with the means of its achievement. From our point of view, designing consists in developing models of processes and systems that are planned in the future. As for the pedagogical design, the concept is relatively new (Kuznecova, 2015).

The founder of this theory and practice in Russia is considered to be A.S. Makarenko, who was against the spontaneity of the educational process, considering the educational process as a definitely organized pedagogical production. Similar ideas belong to S.T. Shatsky: A teacher should see the most necessary embryos for the future and create favorable conditions for their development. The researcher who initiated the creation of the discipline of pedagogical design was G.P. Shchedrovitsky. He also suggested the necessity of the existence of a teacher-designer, whose task would be to develop a project aimed at pedagogical production.

Analyzing recent studies of this concept, it can be noted that N.G. Alekseev defines pedagogical design as the field of what should be. E.S. Zair-Beck proposed the following wording: Pedagogical design is one of the directions of research pedagogical activity, which provides the solution of problems of educational practice in specific conditions. The term pedagogical project, from the point of view of the above-mentioned authors, is the result and at the same time the purpose of pedagogical design. From the point of view of the author of the given research, pedagogical designing represents the process of creation of the pedagogical project as a product (document), allowing to predict and carry out transition of pedagogical object from the current condition to the desired condition.

The above authors mentioned above identify three stages of pedagogical design:

Stage 1. Modeling or model creation: This is the creation of a general idea for a pedagogical system or process.

Stage 2. Pedagogical project development: it is the further development of a proposed model and bringing it to the level of practical use

Stage 3. The pedagogical construct is the further detail of the project, which brings it closer to use in specific contexts. In this article we will focus on the first stage, in which we will offer a suggested process model of Innovative pedagogical design of an e-learning environment (Ivanova, 2015; Movchan, 2015; Zhuravleva, 2017) developed in Adonis CE software (figure 1).

We envision this modeling as an activity in which a design of a system includes a system of interactive cycles of mutual influences between the learner and the factors of four groups: psychodidactic, virtual social environment, technical and information.

At the first stage of modeling (Stage 1.) an objective for innovative pedagogical design is determined. In this case, obtaining an innovative pedagogical design of an e-learning environment is both the goal and the result of this pedagogical design.

At the second stage (Stage 2) the theoretical and methodological base of designing is created, such as the analysis of basic concepts and definitions of the e-learning environment, modern approaches and methods used in the design of information and educational environment, and so forth.

At the same time as step 2, step 3 is carried out (Stage 3) - analysis of the current state of the e-learning environment of higher education institutions (if it exists).

Stage 4 involves modeling the e-learning environment: pedagogical and structural models of the environment as a whole are developed, as well as modeling its individual components.

Stage 5: Developing projects for the components of the model, namely: 5.1 Disciplinary core.5.2 Educational process administration. 5.3 Information base.5.4 Visualization and interactive support

(Bradberry & Greaves, 2015; Kolesnikov, Lomachenko, Kokodey, Khitushchenko, & Mihailov, 2019; Medina, 2013). 5.5. Staffing.5.6 Software and hardware procurement.

Stage 6: Construct development. Specification of the abovementioned projects of environment components. That is: we define innovative methods of visualization and interactive support of the educational process, innovative methods for conducting various kinds of classes, and so forth.

Stage 7: At this stage the educational potential of the environment is determined. If it is assessed positively, the process is completed, otherwise a return to stage 4 is indicated.

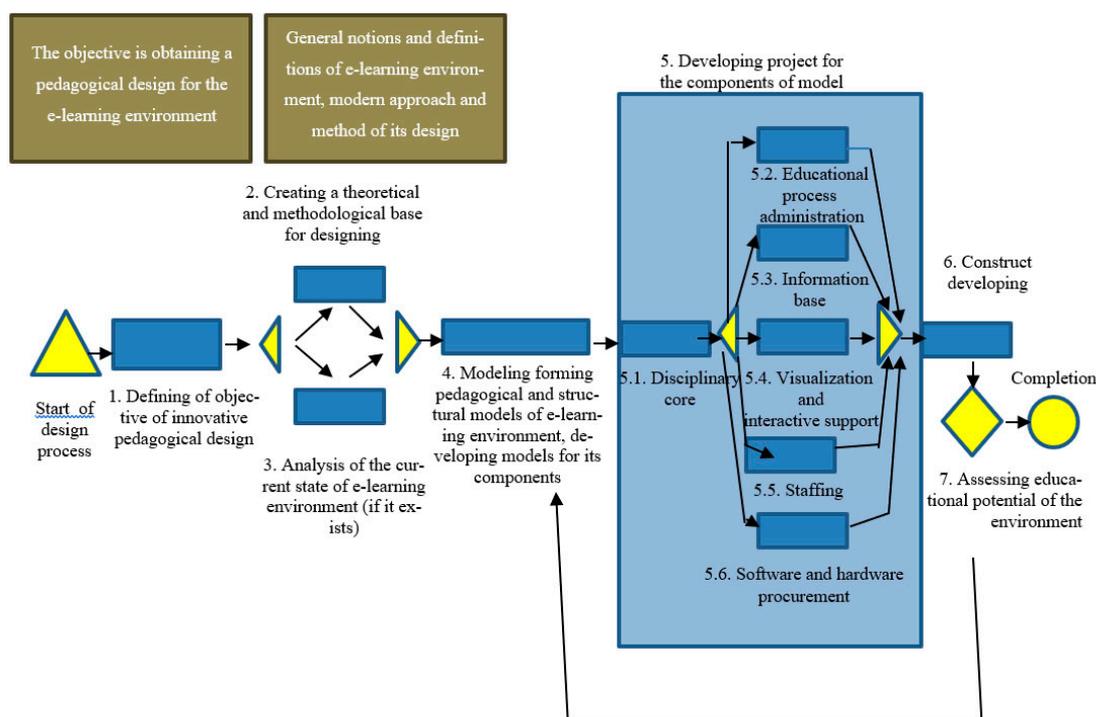


Figure 01. Process model of innovative pedagogical design of the e-learning environment in AdonisCE software

It should be mentioned that the design of this environment is based on the following principles: multi-component, integrity, distribution, and adaptivity. The multi-component e-learning environment makes it possible to unite the whole complex of educational-methodical and software of the educational process, including training, information and reference systems, and so forth. Integrity - information component of the environment, including the basic knowledge of training of students with the possibility of access to global resources.

Distribution, which assumes an optimal number of servers (information repositories), in accordance with the requirements for the provision and use of technical means in the educational process. The principle of adaptability contributes to the flexible construction of information and educational environment on the basis of the basic education system, without neglecting the existing principles of design of its structure. The main component of the proposed process model of innovative pedagogical design of e-learning environment is the disciplinary core. In this research: the disciplinary core of the e-learning environment includes both educational content (disciplines, their topics, sections and units of

knowledge) and the means and technologies of providing this content. Examples of tools are: the DLS Moodle and Mirapolis toolset (Jackson, 2017).

Examples of the most commonly used technologies are multimedia and hypertext technology. Hypertext technology makes it possible to turn a weakly structured linear text into a structurally organized one, with the transition from one structural unit to another taking place at the initiative of the student, although the structure itself is defined by the teacher. Multimedia technologies allow to present educational material in a form that promotes its most effective assimilation and takes into account the presence of different types of perception. In the traditional view, the disciplinary core is a set of interrelated disciplines. From the author's viewpoint, the disciplinary core can be represented as a triangular pyramid, in which the three sides are disciplines (educational content), technologies and means of providing this content. Then the disciplinary core is a set of interrelated electronic training courses of e-learning environment of professional training.

As a result, the disciplinary core of the e-learning environment discussed above is a complex of interrelated disciplines, which constitute a single information field. Consequently, the disciplinary core includes all educational content, as well as the means and technologies of providing this educational content. The core interacts with five interrelated components of the model: information and reference base (dictionaries, glossaries and other reference materials); visualization and interactive support of the educational process; support and administration of the educational process; software and hardware (including Moodle and Mirapolis Virtual Room); human resources

7. Conclusion

In this study, a process model of an innovative pedagogical design of an information and educational environment in Adonis CE software was formed. The sequence of stages of the process model includes setting the goal of innovative pedagogical design, then two parallel steps to create a theoretical and methodological basis for designing and analyzing the current state of the environment, after which three stages of pedagogical design are implemented: modeling the environment, designing the content of the main components of the environment model and designing. Then, with a positive assessment of the educational potential of the environment, the process is completed.

The key component of the model is the disciplinary core. This component includes educational content, namely a set of interrelated e-learning courses, and means and technologies for providing this content. The disciplinary core interacts with five interrelated components of the model: reference database (dictionaries, glossaries, and other reference materials); visualization and interactive support of the educational process; support and administration of the educational process; software and hardware (including Moodle and Mirapolis Virtual Room); and staffing.]

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