

Introduction and Development of Innovative Methods and Technologies of E-Learning at the University

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Abstract

E-learning technologies are helping to shape a new educational space. The e-learning environment today represents a wide range of educational technologies, methods and tools that can be used to organize full-fledged education at a university. The article discusses the issues of transition from traditional educational technologies to innovative methods and technologies of e-learning. Some directions of their implementation at the university within the framework of additional education and professional development programs, as well as for teaching students are given. In addition, the article discusses the forms and methods that are optimal for use in e-learning: heuristic, research, game, diagnostic, information-receptive and reproductive.

Keywords ¹

Innovative methods and technologies, e-learning, distance learning, electronic educational resources.

1. Introduction

In the digital age, e-learning has become an easy part of the educational process. Such training involves the widespread use of a variety of information and communication technologies, including distance learning. The main goal of e-learning is to transfer the baggage of necessary knowledge to students, and without interrupting them from the main activity. E-learning widely uses flexible scheduling and individualized training programs that meet the competency requirements of specific specialists.

Interest in the problem of applying modern technologies and methods of e-learning is caused by the information processes taking place in society, the formation of a new system of digital education, focused on entering the global educational space. The domestic education system has undergone dramatic changes over the past year, teaching has become partly distance learning. This was also facilitated by an unplanned forced widespread transition to remote work at the end of March 2020. The technologies that were used in education in the second half of the 20th century (especially the 70s – 90s), related to traditional pedagogical technologies, are somewhat outdated. With the advent of computer technology, new educational technologies have appeared, they are often called innovative technologies. Under innovative pedagogical technologies, in most cases, we mean such technologies, the implementation of which will lead to an increase in the efficiency of the learning process in modern conditions, and such technologies now, first of all, include digital technologies.

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2. Purpose and objectives of the research

In Western countries, at the end of the 20th century, electronic education was born and began to develop rapidly. In the process of the development of the educational system of Russia, we also observe a gradual change of educational technologies from traditional to innovative: to technologies of distance and electronic education, as well as to new Smart technologies for our education system. However, e-learning, both in world practice and in Russia, has been considered for a long time as additional in the framework of full-time and part-time education and was used, as a rule, for obtaining a second higher education or for retraining [1, 2] ... Now everything has changed. The technologies of distance education and e-learning are being actively introduced everywhere in several areas. The aim of the study is to study possible directions for organizing e-learning and distance learning at a university, as well as to consider the methods used in e-learning..

3. Main part

In modern university education, distance learning technologies are traditionally used: firstly, in the implementation of additional education programs.

Providing students with access to educational and methodological materials for additional education programs is carried out using various distance learning systems, for example, LMS Moodle. To provide additional professional retraining programs, teachers develop remote support for all mastered disciplines. This is a course of lectures, lecture presentations, video clips, methodological recommendations for performing practical or laboratory work, assignments for independent work, test assignments for checking and self-checking knowledge and other additional educational materials. After enrollment, students get access to the educational and methodological materials of the additional education program, which allows them to take a course at a convenient time and place.

Secondly, distance technologies are widely used in the implementation of advanced training programs.

The university has developed several programs of advanced training courses for scientific and pedagogical workers of higher education institutions, school teachers, state and municipal employees, heads and personnel of organizations, office workers, students and other categories of the population. Among them are "Modern information and communication technologies in the activities of a teacher", "Information and communication technologies in professional activities", "Practical application of the MS Office software package in professional activities", "Cloud technologies in education and management" and others. All materials of advanced training programs are presented in the LMS Moodle system. This allows you to train students in remote regions.

Thirdly, distance technologies and e-learning technologies are being actively implemented for teaching students and especially part-time students. According to distance learning programs at the university, educational materials are being actively developed with the possibility of their distance learning. It is no secret that with correspondence courses there are very few hours allocated for the study of disciplines, and correspondence students are not able to fully master the entire volume of educational material in two or three weeks of a session. In this case, remote support allows students to access educational content and calmly study the material throughout the semester, receive remote consultations from teachers, complete assignments, take tests, etc. In this case, during the session, there will be enough time to work out unclear points in the disciplines being mastered and pass tests and exams, which ultimately will undoubtedly lead to an increase in the quality of distance learning [3].

Recently, e-learning technologies have been actively used for teaching full-time students, especially when teaching graduate students. In the curriculum of masters, a large number of hours are devoted to independent work. To make it easier for the teacher to direct and control the independent activities of students, various means, technologies and methods of e-learning are used: electronic educational and methodological complexes, distance learning systems, cloud services, multimedia technologies, blogs, chats, e-mail, Web 2.0 tools, Web -sites, computer tests, etc. (Fig. 1)

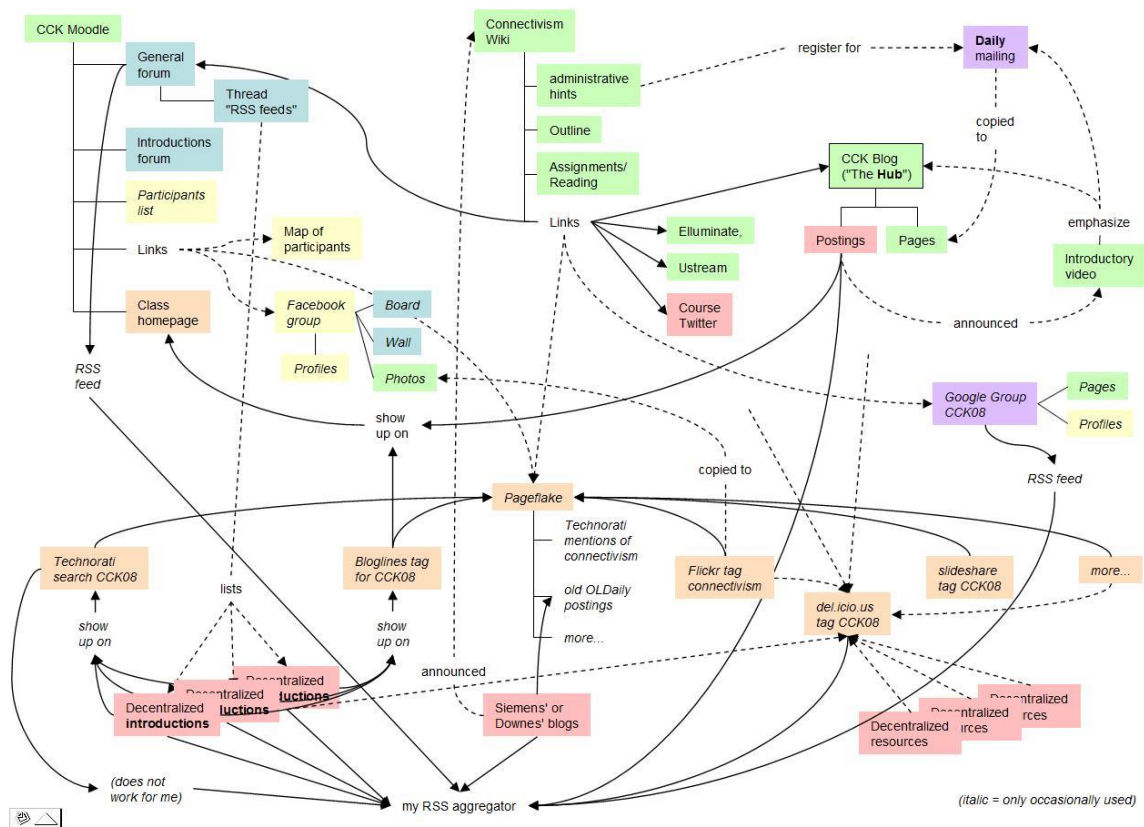


Figure 1: University e-learning system

For example, in the discipline "Information technology in pedagogical activity", which is introduced into all master's programs of the direction "Pedagogical education", an information educational resource for local access (electronic educational-methodical complex) "Information technology in pedagogical activity" has been developed [4]. The electronic resource contains all the educational material on the discipline, and through the LMS Moodle distance learning system, independent work of students is organized, control over the implementation of practical tasks, testing of students is carried out. In addition, through the means of the news forum, feedback of students with the teacher and discussion of topical issues within the framework of the studied discipline are organized.

Among the main methodological principles, in accordance with which the provision of the discipline "Information technologies in pedagogical activity" has been developed [5]:

- the principle of managing the learning process, the implementation of which lies in the application of technologies and methods of e-education - the LMS Moodle distance learning system and Google cloud services;
- principles of consciousness, activity and independence of trainees. The discipline materials are developed with a focus on the professional activity of the teacher and on the development of the possibilities of modern information and communication technologies, in relation to this activity, which stimulates students to consciously and actively master them. Distance support of the course allows you to organize independent work of students and feedback from the teacher;
- the principles of individualization and differentiation of learning, the principle of visibility, the principles of openness and accessibility of educational resources, which are implemented through the materials of the electronic educational and methodological complex and the distance learning system LMS Moodle.

Thus, the means and technologies of electronic education used in teaching students contribute to the creation of organizational and intellectual conditions for enhancing the cognitive independence of students, the development of critical, heuristic and reflective thinking, their creative abilities.

In addition, it should be noted that one of the undoubted advantages of using electronic means and technologies in teaching is the ability to constantly update and improve electronic educational content,

which is especially important for information disciplines in connection with the continuous development of information and communication technologies [1].

For the formation of competencies in the field of using e-learning tools and technologies among students, the discipline "Innovative methods and technologies of e-education" has been introduced into the curriculum of masters of the pedagogical direction. Discipline objectives: to form a readiness for innovative educational activities, for the implementation of e-learning in various educational institutions and in the process of working with various categories of students. As part of the discipline, students study the theoretical foundations, methods and technologies, resources and materials of e-education. They develop skills in creating modern electronic educational content, pedagogically competent application of innovative methods and technologies of e-learning in education and cultural and educational activities. Future teachers learn to model and organize the educational process based on electronic resources and using electronic interactive learning tools. As part of the discipline, students analyze the possibilities of using electronic educational resources for teaching schoolchildren, study techniques for using e-learning tools in the classroom in general education organizations, master the methodology of conducting lessons in the form of a teleconference. In addition, graduate students consider the problems of introducing e-learning technologies, analyze the advantages and difficulties of using e-learning in higher educational institutions, learn to organize and conduct webinars, teleconferences, chat classes, explore the possibilities of network interaction as a form of professional communication of teachers in the modern information space. ...

We believe that the choice of teaching methods is important in organizing e-learning. The teaching method - aimed at achieving a given teaching goal is an orderly activity of the teacher and students. Teaching methods (didactic) are often understood as a set of ways or means of achieving goals, solving educational problems.

E-learning methods include:

1) Information-receptive methods, which presuppose mainly independent work of students with educational and methodological literature, with electronic educational resources, with computer training programs, with information databases. This method is considered to be the most economical for the transmission of educational information [6]. The means that are widely used when applying this method include:

- e-books and textbooks, which differ from paper relatives by the convenience not only of navigation, interactivity, but also the ability to update without reprinting;

- video materials - what does "watch" mean. They contain video courses in simple forms that are quite simple to do;

- video lectures - although they have a simple format, they can be supported by illustrations and diagrams in support of the lecturer's speech;

- augmented reality videos - such videos are similar to a lecture, but they are richer and more polished. The presenter against the background of a green screen works not for the audience, but for the viewer; the script itself contains the interaction of the real world with computer graphics;

- audio courses - what does "listen" mean. Audio courses are pretty specific. Technically, this is a dictated educational text provided in good quality and in an easy-to-listen form. Such materials, of course, can be useful, but initially they are intended for familiarization outside of work, for example, at home or somewhere on the road. This takes them far beyond the traditional system of corporate training through the e-learning system and creates the risk of leakage (scattering) of materials, in which case these courses are not in demand in companies.

2) Reproductive methods are based on the algorithmic nature of the students' activity, namely, on the performance of a variety of exercises and tasks similar to those presented in the guidelines and instructions [6].

Reproductive methods in e-learning include the implementation of practical tasks with loading the results of the execution into the Report - an element of the distance learning course, for further verification by the teacher [7, 8].

3) Heuristic (search) methods. This method is excellent for use in e-learning, as it is productive and involves the implementation of both an independent search for educational information and the search for information under the guidance of a teacher, for example, using Internet resources for these purposes. When using this method, students are gradually prepared for solving problem situations on their own.

4) Research (problematic) methods. These methods are one step higher than heuristic methods, since they involve the implementation of independent research and project activities of students. Research activities in e-learning help develop students such personal qualities as independence, initiative and creative use of knowledge in non-standard situations.

5) Game methods (or games and simulations). This method is also widely used in e-learning. Its essence is that of a learner placed in realistic or imaginary conditions with a developed formulation of the problem, which must be solved according to the rules of the situation. When e-learning is used [9]:

- simulator of work in software - the simplest simulator that shows work in a program. Quite popular for training in corporate databases (databases) or in specific company software;
- process modeling - complex business models that are packaged in an interactive form. There are the following forms: game graphics or "technical" form of numbers and diagrams. Their task is to check the understanding of the educational process on a specific example with given parameters;
- engaging games are cousins of recreational games. These games contain elements of competition in order to arouse in students an active desire to understand the plot or mechanics of the game, as well as to consolidate the necessary knowledge through this interest. They are especially common in "ideological" and process courses.

6) Diagnostic methods designed to check the results of mastering the discipline under study. These include:

- computer tests (a time-limited test, presented in the form of a variety of questions: with one or more answer options; for establishing correspondences; for lining up in the correct sequence, etc.);
- questionnaires (lists of questions (or statements) intended for objective and subjective data from the words of the survey);
- questioning (written survey);
- electronic portfolio (a set of works collected using electronic means and media).

In the modern world, there are practically no restrictions on technologies, means and methods of e-learning in the subject area [10]. They have found their application in various fields. For most students, e-learning is, first of all, one of the most convenient ways to continue their education due to a flexible schedule and an individual program corresponding to the competencies of a specialist in the chosen profession. Many students combine education with work and therefore find it difficult to find time to fit into the schedule of higher and secondary specialized educational institutions. Naturally, such students are more motivated to study in electronic format.

4. Results

Distance learning has become very popular lately. This is primarily due to the fact that it allows you to solve the problems of training students, retraining and especially additional professional training of students due to the possibility of building an individual educational trajectory and at a convenient time for students. In addition, distance courses form the ability for self-organization and self-education, which is a prerequisite for the implementation of the concept of lifelong learning [11, 12].

As a result of the study, we can conclude that modern distance learning is based on the use of the following basic elements:

- information transmission medium (radio, television, mail, information communication networks);
- tools for organizing remote interaction and storage of remote content (distance learning systems, webinars, cloud storage, etc.)
- methods and technologies of distance learning, depending on the technical environment for information exchange.

The organization of distance learning requires from the teacher the knowledge of distance tools and the ability to apply the tools of distance and online learning in practice.

5. Conclusion

In the digital age, distance learning has easily blended into the educational process. Distance learning widely uses flexible hours and individual training programs that meet the requirements of modern education in the preparation of highly-demanded specialists.

Distance education technologies are information technologies that provide students with interaction with the teacher at a distance, provide students with electronic content of the courses being studied, and distance learning is based on the interactive interaction of students and teachers in the learning process. In our opinion, this technology provides trainees with more opportunities for independent work in mastering educational material [13, 14].

In conclusion, we note that the concept of e-learning is fully consistent with the new paradigm of “lifelong learning” and is an effective tool for the development of the information society [15]. However, despite all the advantages of e-learning, most educational organizations in Russia are still at the beginning of a long path of transition to e-learning, and there is still a lot to be done on this path.

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