

Scientific Innovations and Advanced Technologies in a Multicultural Environment during Distance Learning

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Summary

The article analyzes the concepts of «innovative educational processes», «distance education» and «distance learning». It is determined that distance learning provides wide access to the world's best educational resources and significantly increases the opportunities for traditional education by creating an educational information environment. In this paper, we offer an overview of scientific innovations and advanced technologies in a multicultural environment during distance learning. Theoretical bases of scientific innovations during distance learning are considered. The peculiarities of distance learning have been studied, which is giving everyone the opportunity to independently obtain the necessary knowledge, using developed information resources, thanks to modern information technology. Distance learning involves the use of online tools and platforms. Highlights of advanced technologies in a multicultural environment during the distance learning period are different web resources depending on the purpose and available technical capabilities, in particular: the Moodle platform, Google Classroom, Google Meet Zoom and Microsoft Teams. Organizational and technological models of distance education and basic elements of distance learning are identified, namely distance courses, web pages and sites, forums and blogs, chat and ICQ, video conferencing and virtual classrooms.

Keywords:

Innovations. Scientific innovations. Distance education. Distance learning. Educational process.

1. Introduction

Pedagogical innovations are associated with general processes in society, global problems, and the integration of knowledge. In the XXI century, there is a change in the educational process and the creation of a new pedagogy,

characterized by the ability to improve, and the introduction of the latest information technology.

There is a transformation of the model of learning. Comparing the traditional views of the educational process, namely, “subjective-objective” learning, the “subject-subjective” learning comes first. To comply with the subject-subjective model of teacher-student interaction, periodic monitoring of developed innovative technologies in distance and blended learning is important.

In the XXI century, the availability of computers and the Internet makes the spread of distance learning even easier and faster. Through the Internet, students can now receive instruction and easily learn at home by simply pressing a few buttons on a computer to listen live or asynchronously to a teacher thousands of miles away, interact with the teacher, and solve problems without physically having to be in the classroom. Although distance education is a more expensive learning option in terms of organization, distance education has progressed in concept and practice from an “anywhere” to an “anytime” learning method. Through COVID 19, distance learning has a huge number of advantages, namely the introduction of online tools in online learning, providing the opportunity to independently master immense knowledge through the use of resources used by modern and interactive technologies. Distance learning is a new form of organizing the learning process through developed information resources. The learning environment is characterized by the fact that students are usually distant from the teacher in space and/or time, at the same time they can engage in a dialogue at any time through telecommunications. The most important condition for the

implementation of multicultural education is the use of the potential of the multicultural educational environment and socio-cultural environment in order to mutual enrichment, mutual understanding of the subjects of the educational process, satisfaction of cognitive, cultural, educational interests, and needs of students, educating them in the spirit of peace.

2. Literature review

Distance learning is also known by different names such as distance learning, e-learning, mobile learning, or online learning. Distance learning is a learning practice that effectively uses a wide range of tools and technologies to enrich students' learning experiences and facilitate communication between students and teachers [19].

Minimum technological requirements for successful distance learning include the purchase of hardware such as a computer, mobile device (cell phone) or webcam, some form of listening device, video conferencing software such as webex or Zoom, discussed in the works of Udovychenko et. al., [18], Bertiz and Kocaman Karoğlu [3] in a study compared traditional learning and distance learning and found that most students both face-to-face and online had no technological problems. Theoretical material in distance learning is memorized faster-using information technology (p. 638). Basilaia and Kvavadze (2020) [2] examined the transition to online education in schools during the coronavirus pandemic. Lee (2020) investigated the impact on students' mental health during COVID-19 and the transition to distance learning [12].

Advanced technologies in a multicultural environment in the period of distance learning are reflected in the works of Yagupov et. al. [19], Lototska and Pasichnyk [13].

Identified advanced technologies in the multicultural environment during distance learning: platforms Moodle, Google Classroom, Google Meet Zoom, and Microsoft Teams [11, p. 2323-2343].

3. Materials and Methods

The following general scientific research methods were used to achieve the goal of the study:

Theoretical methods:

- Analysis of scientific literature on this issue, which resulted in the identification of features of distance learning and organizational and technological models of distance education. The study of normative and instructive-methodological documents on the problem under study.
- Generalization of the results of the study. Generalization and systematization of scientific ideas of domestic and foreign scientists, which allowed to analyze scientific innovations and advanced technologies in a multicultural environment during distance education. Methods of

empirical research (observation, measurement, comparison): Comparison of traditional and distance learning models. For the organization of distance learning, it is advisable to use different web resources, depending on the goals and technical capabilities. Identified best practices in multicultural environments during distance learning.

4. Results and discussion

Modern global education is characterized by trends such as:

- The evolution of knowledge as the main source of costs in the information society;
- Education becomes the most important factor in overcoming backwardness in the development of most of humanity;
- Transformation and expansion of the concept of education;
- Education is no longer identified only with formal schooling and even secondary education;
- Transition from the concept of functional training to the concept of personal development;
- The concept of continuing education and the development of adult education; the transformation of knowledge into goods and the development of market relations in education;
- Integration of educational systems and the transition of education into the category of universal priorities.

The above-mentioned trends determine the main directions of the development of a new system of education, which is focused on the introduction of the high potential of computer and telecommunication technologies. The technological basis of new information technologies allows the implementation of one of the main advantages of the new educational system - distance learning [9].

Distance education involves the use of online tools and platforms while in a normal classroom. Distance learning is when teachers or students use educational tools available on the Internet. This means that students can use online tools while physically in the classroom with their teachers and peers. Online learning can be used anywhere and anytime, so teachers can use them as tools in the classroom or to prepare and complete tasks at home [2].

Distance learning is an individualized process of acquiring knowledge, abilities, skills, and ways of cognitive activity, which occurs mainly through the mediated interaction of remote participants in the learning process - teachers and students (students, listeners) in a specialized information environment that operates based on modern psychological and pedagogical, information and communication technologies and tools [19, p. 43].

A generalized model for implementing distance learning in educational organizations, which can be used at

all levels (macro-, meso- and micro-) and types of educational organizations, should include the following stages:

- Preparatory. Predicting, designing, and selecting evaluation criteria;
- Basic. Introduction, implementation, analysis, and adjustment;
- Final. Analysis and prediction.

Since technology and software are constantly evolving, it is important to maintain the functioning of the system of distance education at all levels during and after the main stages of its implementation, which should include monitoring and improvement of the system [1, p. 68]. And at each stage the process should be organized, equipment, personnel, software, as well as didactic, methodological, regulatory, technological, remedial, and financial resources should be prepared [6, p. 1669-1684]. This should reflect the results of monitoring, reflecting the state and prospects for further implementation of distance education [8].

The main problem of distance education is the lack of quality methodological support. However, a number of researchers separately identify its organizational and technical advantages:

- Development of a unified standard (format) of storage of educational information resources;
- Ensuring effective communication between teachers and students;
- Creation of management tools for the distance learning process;
- Development of effective planning of the learning process (curriculum);
- Effective presentation of instructional material;
- Ensuring student collaboration;
- Access to information resources.

Methodological opportunities implemented in distance learning:

- Flexibility in the structure of the learning process allows you to consider the requirements and communication within the course and thematic conferences both “vertically” (central periphery), and “horizontally” (between remote listeners, both in e-mail mode and in conference mode);
- Increased efficiency (speed, completeness, and, most importantly, objectivity) of checking students' activities and learning;
- Control, thanks to cross-checks easily implemented in networks; basic expansion of available information collections and ways to access them;
- The interests of students and the rate at which they progress through the material they have learned;
- The possibility of practical use of materials obtained in networks or generated during distance learning in ongoing learning activities.

Organizational and technological models of distance education [19]:

- Unitary media is the use of a single medium of instruction and channel of information. For example, learning through correspondence, educational radio, or television programs. In this model, the dominant medium of instruction is usually printed material. There is practically no two-way communication, bringing this model of distance learning closer to traditional distance learning.
- Multimedia - the use of various means of education: printed textbooks, computer programs for educational purposes on different media, audio, and video recordings. If necessary, elements of face-to-face teaching are used - personal meetings of students and teachers, conducting final training seminars or consultations, and face-to-face examinations.
- Hypermedia is a third-generation distance learning model that involves the use of new information technologies and is dominated by computer telecommunications. The simplest form of this is the use of e-mail and teleconferencing, as well as audio learning (a combination of telephone and telefax). With further development, this model of distance learning includes the use of a set of such means as video, telefax and telephone (for video conferencing) and audio graphics, while making extensive use of video disks, various hypermedia, knowledge systems, and artificial intelligence. During the distance learning the following main elements are used: distance learning courses, web pages and sites, e-mail, forums and blogs, chat and ICQ, tele- and videoconferences, and virtual classrooms. Also, the principle of multicultural learning remains important even during distance learning.

The most important component of the implementation of multicultural education is to use the full potential of the multicultural educational environment and socio-cultural environment for the enrichment, mutual understanding of members of the educational process, the realization of cognitive, cultural, educational interests and needs of students, educating them in a spirit of peace.

The multicultural potential of distance learning has a pronounced character based on the spiritual context, i.e., the primacy of the teacher's personality, which sets a positive atmosphere of interaction, mutual respect, trust, and co-creativity, despite the content of the educational material. The polycultural potential of some disciplines is based on the possibility of strengthening the aspects of polycultural education and formation of polycultural competence in the content of educational material, ensuring the success of educational distance tasks: connection of the studied material with life, future personal and professional plans of the student. The selection of the content of educational material should be made based on focusing on the value and moral aspects

that constitute multicultural competence. Students should be involved in discussing and solving current problems of the world, the country, and local problems in the process of studying individual topics and the whole educational material. The polycultural potential of the educational process has a pronounced social orientation due to the following components: the culture of managing the system of functioning of a polycultural educational environment for the formation of polycultural competence [16].

Distance learning as a technology has the potential for an integrated approach, simulated learning, and the involvement of computer technology capabilities. There are several prerequisites for success in distance learning: thorough preparation, large budgets and the mindset of all training participants for success, motivation to work, and willingness to master new learning approaches and methods of work. The use of different modes, forms of communication training also dictates the complexity of planning, organizing, and implementing the training process, provides for good technical training and a powerful material and technical base [18].

Distance learning claims a special form of education (along with full-time, part-time, evening, externship).

Features of the use of distance learning technologies:

- In distance education, interactivity and communication are guaranteed by technological tools. Thus, good technology provides a meaningful course and provides the desired learning experience for students.

- It is the technology that provides a good distance learning course, not the pedagogical model used. This requires the development of a course project that explores all of the resources that offer the technology.

In order to organize a distance learning course, it is sufficient to transfer the face-to-face model, because distance education is not a differentiated model of learning, but the same course, which is supported by the use of the computer and its technological tools [5].

Distance learning is playing an increasing role in the modernization of education. Distance learning, which is carried out with the help of computer telecommunications, has the following forms of classes [15]:

- Chat-Lessons are training sessions that are conducted using chat technology. Chat lessons are conducted synchronously, that is, all participants have simultaneous access to the chat. Many distance learning institutions have a chat school, which organizes the activities of distance educators and students with the help of chat rooms.

- Web-exercises are distant lessons, conferences, seminars, business games, laboratory work, workshops and other forms of educational activities carried out with the help of telecommunications and other features of the World Wide Web. For web-based lessons, specialized educational web forums are used - a form of users' work on a particular topic or problem with the help of entries

that remain on one of the sites with the appropriate program installed on it.

Web-lessons differ from chat lessons in the possibility of longer (multi-day) work and the asynchronous nature of the interaction between students and teachers.

For the organization of distance learning it is advisable to use various web resources depending on the goals and available technical capabilities, in particular [13]:

- The Moodle platform is a free learning system effectively used by a large number of institutions of higher education. It allows you to present learning material in different formats, carry out testing of knowledge, record progress, etc.;

- Google Classroom platform, which is functionally similar to the previous one, allows you to post materials to the YouTube channel;

- Zoom – is a service for online events with the ability to record and replay if necessary.

When designing the information and educational environment should use software and tool platforms with internal services such as a glossary, resource, tasks, forum, Wiki, lesson, test, and external (cloud) services and modes of creation and application of electronic learning resources [10, p. 79-90].

Internal services and modes include the following elements [11]. Communications that support the exchange of files in any format between teachers and students, as well as between students themselves;

- Mailing lists, allowing for the prompt informing of all participants in the educational process or individual groups about current and planned events and activities;

- Forums to facilitate discussions on learning problems within the group;

- Chat, allowing students to discuss problems in real-time;

- “Messaging,” “commenting,” and “reviewing,” designed for individual teacher-student communication;

- “Teachers' Forum,” which allows teachers to discuss professional and organizational, and managerial issues;

- Formation of workrooms for teachers and trainers of trainers;

- Creation and storage of each student's portfolio with the ability to store all of their submissions, grades received, and teacher comments, as well as all forum posts;

- Creating and maintaining a summary record of students' learning activities;

- Monitoring of attendance, student activity, and time of their academic work.

Intra-platform capabilities are significantly enhanced with the integrated use of services and modes of other purpose platforms, as well as cloud-oriented ones. Among the main ones are the following:

- Integration of didactic-oriented software and instrumental platform with the administration platform of the educational process [14; 17];
- Integration with cloud services Alfresco (electronic document management and automation of administrative processes), Box repository_boxnet (creation of repository and storage of confidential documents), Dropbox (synchronization and exchange of information, keeping a history of downloads, so that after deleting files it is possible to restore them), EQUELLA (repository for posting educational materials), Flickr or Picasa (photo hosting designed to store and then use digital photos and video clips), Google Drive (downloading files from a user's cloud account), Merlot (a collection of free and open educational resources for learning used by the international education community), Amazon S3 (storing and retrieving any amount of data from anywhere on the Internet);
- Provision of cloud services by providers on both a royalty-free and reimbursable basis (saas solutions and paas solutions);
- Integration of courses developed in different LMS (CMS, LCMS) systems, as well as the exchange of training materials between them.

During distance learning the student can:

- Participate in video lessons;
- View educational content;
- Participate in video conferences;
- Participate in forums and chats to discuss important issues;
- Access books, documents, handouts, and academic research in virtual libraries.

Virtual learning environments provide communication and interaction for students, facilitating inclusion in their course of study in a more active way [7].

5. Conclusions

Distance learning, which emerged in the late twentieth century, enters the twenty-first century as one of the most effective and promising systems of training specialists. The emergence and active spread of distance learning is an adequate response of the education systems of many countries to the processes of integration of the movement into the information society taking place in the world. Distance learning provides wide access to the best world educational resources, namely, it significantly increases the possibilities of traditional education by means of the formation of the educational information environment, in which a student can study the material he/she is interested in independently or under the guidance of a teacher.

The peculiarity of distance learning is the opportunity to independently obtain the necessary knowledge, using the developed information resources, thanks to modern information technologies. Distance learning increases the level of educational programs by offering alternative

programs to the general public. Allows the formation of unique educational programs by combining courses provided by educational institutions, including those from different countries.

Distance learning includes the use of online tools and platforms and information resources: databases and knowledge, computer, including multimedia, training and monitoring systems, video and audio recordings, digital libraries, together with traditional textbooks and teaching aids to create a unique distributed learning environment, accessible to a wide audience [4, p. 589-599].

The main idea of distance education methods is to create an educational information environment, including computer sources of information, electronic libraries, video and audio collections, books, and manuals.

The components of such an educational environment are both students and teachers, whose interaction is carried out by means of modern telecommunications. Such an educational environment provides students with unique opportunities for gaining knowledge both independently and under the guidance of teachers. In designing the training courses the emphasis is placed on students' independent work, their collective creativity, and conducting mini-studies of different levels. A large number of tasks for individual study are provided, with the possibility of daily consultations.

World experience in distance education shows that in this organization of the educational process the interaction between students and teachers on an individual basis is much more frequent and more effective than in other forms.

The distance learning model is an integrated environment, with the role of various components defined - methodological, organizational, pedagogical, and technological - such as printing materials, radio broadcasting, television, and the use of computers [17]. Analysis of the development of university education in the world shows that under the influence of modern computer and telecommunication technologies, as well as in the process of forming market relations in education, new university models are being formed that use distance learning with innovative technologies (university consortiums, teleuniversities, virtual classes, virtual universities).

During distance learning, the following main elements are used: distance courses, web pages and sites, forums and blogs, chat and ICQ, tele- and videoconferences, and virtual classrooms.

Organizational and technological models of distance education are: single media, multimedia, hypermedia. One-unit media - usage of a single educational medium and information transmission channel. Multimedia is the use of various didactic materials. Hypermedia is a model encompassing the use of new information technology.

Advanced technologies in the multicultural environment during distance learning: Moodle, Google Classroom, Google Meet Zoom and Microsoft Teams platforms.

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