

Problems of effective use of information and communication technologies in educational institutions of higher education

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Abstract. The article examines the modern process of education and training in institutions of higher education. The article is devoted to the analysis of the role of information and communication technologies in higher education; experience in teaching and problems arising in this regard; opportunities and types used in higher education; the necessity of their application is justified, which is an urgent problem of improving the quality of education through an innovative approach in the conditions of the formation of an information society. Approaches to the process of improving the information and educational environment of a humanitarian university are determined. Recommendations on the formation of a system of advanced technologies of education are given.

1 Introduction

Modern education of specialists in the humanitarian sphere is undergoing drastic changes. This is due to a change in the strategic orientation of higher education and its goals. Therefore, now there are new requirements for the education of specialists in the field of electronic and information systems, communications, resources, which can be defined as innovative education. The basic position of the innovative component of the modernization of the educational process is the expansion of the content and methodology for a more complete development of the knowledge system.

Information technologies and computer communications (ICT) are of great importance for solving the problems facing the modern school, that is, informatization acts as a factor in the modernization of the entire education system.

Information technologies and computer communications have the following didactic capabilities:

- the possibility of rapid transmission of information of any volume, any form of representation to any distance;
- storage of this information in the computer memory for the required duration of time, the possibility of editing, processing, printing, etc.;
- the ability to access various sources of information, including remote and distributed databases, numerous conferences around the world via the Internet, work with this information;
- the possibility of organizing electronic conferences, including in real time, computer audio conferences and video conferences;
- the possibility of dialogue with any partner.

- the ability to transfer the received materials to your storage device, print them and work with them when and how it is most convenient for the user.

Therefore, at present, one of the most urgent tasks of the system of continuing pedagogical education is the need to form the information and communication competence of a teacher, which includes: · a set of knowledge, skills, and abilities formed in the process of learning and self-learning Computer Science and Information Technology, · the ability to perform pedagogical activities with the help of information technology.

2 Materials and Methods

The main direction of modern education is the development of independent thinking and the ability to self-education as the basis for continuous professional growth. The disciplines of the information and telecommunications cycle in a humanitarian university, forming a holistic personality, prepare to determine the essential meanings of professional activity, contribute to the development of personality qualities at all levels of the competence-based approach: instrumental, communicative, systemic.

The use of innovative teaching aids by the teacher, i.e., the use of new knowledge, methodological approaches, technologies is positively evaluated by students, disciplines them, and computers and other technical means of informatization of the educational process are perceived by students as the most progressive means of communication, and this is

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expressed in active, democratic “teacher – student” contact [1].

Thus, with the existing possibilities of informatization of education, we can talk about asynchronous communication between a student and a teacher, in particular, via e-mail, therefore, the most important task is to create such a system that will provide conditions for the dynamic development of future specialists in socio-cultural, economic and technological terms.

There are several interrelated directions for solving this problem:

- improving the quality of education through fundamentalization, the use of new approaches to education by introducing new information and communication technologies, including network ones;
- ensuring the advanced nature of the development of the information system of education;
- providing greater accessibility of education through the use of distance learning technologies.

In the process of training information specialists, the issues of ensuring high-quality training based on advanced education technologies are relevant. Reflecting the needs of social production in qualified specialists, advanced higher education satisfies these needs. In this system, the main attention should be focused on developing the ability to act independently in conditions of uncertainty. The ability to learn, acquire new knowledge in the cycle of information and communication sciences, and the skills of mastering modern methods of obtaining, accumulating, classifying, and transmitting network information resources should also be developed [2, 3].

Unlike computer technologies, in which the basis is the development of software and the effectiveness of its work, information technologies in the information activities of the humanitarian sphere are used in the process of meeting modern information needs, analyzing and synthesizing information flows, and information and analytical activities. The development, operation, and modernization of information systems require developers and users to know the subject area in terms of information and analytical support for decision-making processes [4].

This, in turn, implies a complete knowledge of modeling methods, the ability to apply relevant knowledge and skills when working with remote information resources, to have an information network culture, to be able to use the Internet to globalize information resources. As a basis for information modeling, mastering the basic principles of programming, and application development, students should study the basics of programming technology in high-level languages [5, 6, 7].

IT components also include computer equipment, communications, office equipment and specific types of services – information, technical and consulting services, training, etc. The development of IT has contributed to their rapid spread and effective use in management and production processes, almost universal application, and a wide variety.

Information technologies (IT) in education are currently a necessary condition for the transition of society to an information civilization. Modern technologies and telecommunications make it possible to change the nature of the educational process organization, completely immerse the student in the information and educational environment, improve the quality of education, motivate the processes of information perception and knowledge acquisition. New information technologies create an environment for computer and telecommunications support for organization and management in various fields of activity, including education. The integration of information technologies into educational programs is carried out at all levels: school, university, and postgraduate education.

The rapid development of computer technology makes it possible to open access to various sources of information, increase the efficiency of independent work of students, and provides an opportunity for creativity not only for the student, but also for the teacher, and allows implementing new forms and methods of teaching.

Constant improvement of the educational process, along with the development and restructuring of society, with the creation of a unified system of continuous education, is a characteristic feature of education in Russia. The reformation of the education carried out in the country is aimed at bringing the content of education in line with the modern level of scientific knowledge, increasing the effectiveness of all educational work and preparing students for activities in the conditions of transition to an information society. Therefore, information technologies become an integral component of the content of education, a means of optimizing and increasing the efficiency of the educational process and contribute to the implementation of many principles of developmental education.

IT can currently be *classified* according to several criteria:

1. *According to the methods of building a computer network:*

- Local (several computers are interconnected);
- Multilevel (networks of different levels are subordinate to each other);
- Distributed (networks of automated data banks, for example, banking, tax and other services).

2. *By type of information processing technology (in the software aspect):*

- Text processing;
- Spreadsheets;
- Automated data banks;
- Processing of graphic information;
- Multimedia systems;
- Other systems (expert, programming systems, integrated packages).

3. *By the type of user interface (i.e., in terms of user access to information and computing resources):*

- With a command interface – the user gives commands to the computer, and the computer executes them and gives the result to the user.

The command interface is implemented in the form of batch technology and command line technology.

- With WIMP-interface (Window, Image, Menu, Pointer) – conducting a dialogue with the user using graphic images – menus, windows, and other elements. An example of IT with a WIMP interface is the MS Windows operating system.
- With SILK-interface (Speech, Image, Language, Knowledge). It is closest to the usual, human form of communication. Within the framework of this interface, there is a “conversation” between a person and a computer. Varieties of SILK – an interface based on speech (commands are given by voice, by pronouncing special reserved words – commands) and biometric technologies (facial expression, direction of his gaze, pupil size, iris pattern, fingerprints, and other unique information are used to control a computer). Images are read from a digital video camera, and then commands are extracted from this image using special image recognition programs.

In the educational process of a higher educational institution, the study of IT involves solving tasks of several levels:

1. The use of information technology as a tool of education, cognition, which is carried out in the course “Informatics”;
2. Information technologies in professional activity, what the general professional discipline “Information Technologies” is aimed at, considering their theory, components, methodology;
3. Training in applied information technologies focused on the specialty, intended for the organization and management of specific professional activities, which is studied in the disciplines of specializations.

It should be noted that at present, in the unity of means, methods, and forms of teaching used in the education system, information technology is a powerful resource that improves the quality of education. To improve the effectiveness of training specialists in higher educational institutions, the following important aspects of the use of information technologies can be identified [11]:

- the use of information technologies significantly increases the efficiency of the educational process by reducing the time for mastering complex information and educational array and unlocking the potential of students;
- information technologies make it possible to provide educational material in new forms that capable of providing individualization of education for each student;
- the use of information technology ensures the conduct of control and evaluation activities, which makes it possible to use various software and hardware tools for monitoring the quality of education.

Currently, there is a tendency to combine various types of information technologies into a single computer-

technological complex, which is called *integrated*. A special place in it belongs to *telecommunications*, which provide not only extremely wide technological possibilities for automating management activities, but also represent the basis for creating a wide variety of IT network options.

Just as railroads and highways determined the economy at the beginning of the century, the infrastructure of the modern economy is made up of *telecommunication technologies* that provide remote data transmission based on computer networks and modern technical means of communication.

One of the most important trends in their development is the process of merging local, domestic, and global computer networks, which significantly affects the scale of economic processes, the activities of corporations and firms. This merger is due to the spread of Internet technology as the most convenient means.

The current state of the information and educational environment of a humanitarian university is represented by a variety of electronic books and textbooks, works of scientific classics, special scientific and educational literature from leading Russian publishing houses, at the same time, there are such educational multimedia as:

- interactive tests and simulators designed to practice the acquired knowledge and skills;
- audiobooks and video materials that students use to listen to lectures by teachers, both in specially equipped classrooms and at home;
- presentations, diagrams, spreadsheets, etc.

Each student in a humanitarian university, as a rule, is provided with access to an electronic library system containing publications on the disciplines studied and formed in agreement with the copyright holders of educational and methodical literature. The electronic library system provides the possibility of individual access for each student from any point where there is access to the Internet [1, 8, 9].

Thus, for the effective use of the information and educational environment in the university of the humanitarian sphere, it is necessary to form:

1. A methodological council that unites teachers with a high level of ICT competence, technological culture, and creativity. Its tasks include the analysis of innovative activities of teachers in the development and systematization of information resources, these are electronic textbooks, electronic reference systems, electronic simulators, computer systems for measuring knowledge, skills, and abilities in newly formed areas of bachelor’s and master’s degree programs, as well as the formation of an educational profile of secondary vocational education. Since the currently offered electronic resources of libraries do not fully correspond to the prospective development of the newly formed information and educational environment of universities in the humanitarian sphere [2, 10, 11].
2. Creative laboratories bring together teachers who use ICT to study and generalize the experience of effective use of ICT in teaching.
3. The organizational and legal component of management includes an administrative center, a

publishing center, a website studio, a video studio, a PR studio and a “multiplex” center, which is a multifunctional interactive hall, including:

- conference hall for Council meetings, conferences, teleconferences, Internet lectures;
 - a platform for trainings, presentations, round tables, online discussions in online mode;
 - intellectual club for competitions, intellectual games;
4. The information and analytical component of the information and developing environment includes an electronic library, a database of students, an electronic storage of electronic learning resources.
 5. The component of technical support and maintenance of the infrastructure of the information and development environment includes:
 - computer equipment, peripheral and projection equipment (printers, scanners, projectors, interactive whiteboards);
 - telecommunication equipment (modems, routers).

We single out the following aspects as promising directions for the development of the innovation model:

- expanding the functionality of the information and educational environment within the framework of an innovative model that improves quality;
- organization of effective educational resources using the electronic model of the main educational program;
- interactive technologies that make the educational space individualized.

3 Results and Discussion

Interactive technologies are a real chance to organize independent work of students. Resources of specialized software allow creating multi-variant multi-level educational content. Equipment, technical teaching aids make it possible to restructure the educational program for the educational task, and this allows the teacher to be more free and mobile.

The use of modern technical means and information technologies makes it possible to intensify, improve the efficiency and quality of education.

4 Conclusion

The use of information technologies makes it possible to organically combine information and communication, personality-oriented technologies with methods of creative and search activity, which affects the quality of education in general.

Education using the means of information and communication technologies allows creating conditions for the formation of such socially significant personality traits as activity, independence, creativity, the ability to adapt in the information society, for the development of communication skills and the formation of a personality culture.

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