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ABOUT INFORMATION AND COMMUNICATION TECHNOLOGIES FURTHER DEVELOPMENT IN HIGHER EDUCATION SYSTEM

ЩОДО ПОДАЛЬШОГО РОЗВИТКУ ІНФОРМАЦІЙНО-КОМУНІКАЦІЙНИХ ТЕХНОЛОГІЙ У СИСТЕМІ ВИЩОЇ ОСВІТИ

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Abstract. *At the end of the 20th century, humanity created an information society characterized by the rapid development of information and communication technologies. Providing the higher education system with the theory and practice of developing and using these technologies is aimed at achieving the goals of education and upbringing in higher education. The Law of Ukraine "About National Informatization Program" demonstrates the relevance of the issue. The purpose of the study is a comprehensive study of the ways of further development of information and communication technologies in the higher education system. There is a growing need for a personally oriented, creative, competitive educator with an information culture, capable of designing and filling the information educational environment of Ukraine created on the basis of Internet technologies. Students should be provided with conditions for searching and obtaining information, developing cognitive and communicative abilities, etc. It is important to ensure the quality of accessible education and increase the availability of quality education. It is necessary to develop principles for the implementation of information and telecommunication technologies that improve the quality and expand access to education, deepen the capabilities of existing traditional teaching technologies, and connect scientists, educators, and students with effective resources within the virtual educational space. Successful improvement of higher education based on information and communication technologies will contribute to improving the quality and accessibility of education, integrating the national education system into the scientific, industrial, social, public, and cultural information infrastructure of the world community.*

Анотація. *Наприкінці XX століття людство створило інформаційне суспільство, що характеризується швидким розвитком інформаційних та комунікаційних технологій. Забезпечення системи вищої освіти теорією та практикою розробки та використання цих технологій орієнтоване на реалізацію цілей освіти та виховання у вищій школі. Закон України "Про Національну програму інформатизації" демонструє актуальність питання. Метою дослідження є всебічне вивчення шляхів подальшого розвитку інформаційних та комунікаційних технологій у системі вищої освіти. Зростає потреба в особистісно орієнтованому, креативному, конкурентоспроможному педагогу, який володіє інформаційною культурою, здатним до проектування та змістовного наповнення інформаційного освітнього середовища України, що створюється на базі Internet технологій. Здобувачам вищої освіти мають бути створені умови для пошуку та отримання інформації, розвитку пізнавальних та комунікативних здібностей тощо. Важливо забезпечити якість доступної освіти та збільшити доступність якісної освіти. Слід розробляти принципи впровадження інформаційних та телекомунікаційних технологій, які дозволяють покращити якість та розширити доступ до освіти, поглибити можливості традиційних технологій навчання, зв'язати вчених, педагогів та здобувачів вищої освіти з ефективними ресурсами в рамках віртуального освітнього простору. Успішне вдосконалення вищої освіти на базі інформаційних та комунікаційних технологій сприятиме підвищенню якості та ступеня доступності освіти, інтеграції національної системи освіти до наукової, виробничої, соціально-суспільної та культурної інформаційної інфраструктури світової спільноти.*

Keywords: information and communication technologies, development, higher education system, university, educator, student.

Ключові слова: інформаційні та-комунікаційні технології, розвиток, система вищої освіти, університет, педагог, здобувач вищої освіти.

Introduction. At the end of the 20th century, humanity entered a post-industrial or information society. Information and communication technologies expand the boundaries of such concepts as knowledge and language.

The idea of the most important function of language - obtaining and transmitting knowledge with its help - has developed historically: language is a specific communication system. In addition to language, people sought additional means for searching, obtaining, storing and transmitting knowledge - writing, printing press, telephone, television, the Internet.

Post-industrial society is characterized by the rapid development of information and communication technologies, and their capabilities are becoming unprecedented for human development, for the effective solution of many professional, economic, social and everyday problems. Only those members of society who have the necessary knowledge to navigate the new information space will be able to use these opportunities wisely. While maintaining their identity, they will use the advantages of globalization, when people living in different cities and countries, on different continents, thanks to the ease and efficiency of communications, can work on one project, conduct joint research and promptly exchange results [1].

We are talking about changing the content of education, about mastering information culture - one of the components of a common culture, understood as the highest manifestation of education, including personal qualities of a person and his professional competence. In modern conditions, for the development of a teacher as an individual, it is necessary to introduce him to the information and communication capabilities of modern technologies, mastering a genuine information culture, which opens the way to achieving one of the main goals of education: from a dialogue between people and cultures through the identification and development of the creative potential of an individual to mutual enrichment and productive interaction of human communities. There is a growing need for a personally oriented, creative, competitive teacher who is ready not only to reproduce acquired knowledge, established skills and abilities, but also to independently design his own activities [2]. The process of providing the education system with the theory and practice of developing and using new information technologies aimed at achieving the goals of education and upbringing is being carried out - informatization of education [3].

At the turn of the 20th and 21st centuries, the e-science paradigm replaced the empirical, theoretical and computational paradigms. All over the world, appropriate infrastructures are being created that can provide both rapid movement of primary and processed data and intensive scientific research based on the use of global networks and Web technologies [4].

The process of informatization of society is underway, which includes at least three elements that complement each other: mediatization as a process of improving the means of working with information, computerization as a process of improving the means of information processing, and intellectualization as a process of improving human knowledge and abilities to create and perceive information [5].

The Government of Ukraine adopted Law 2807-IX (draft law No. 6241) “About National Program of Informatization”, which demonstrates the relevance of the issue in modern Ukraine [6].

Analysis of literary data and problem statement. Modern information and communication technologies, created not for the needs of the education system, lead to a real revolution in education. The education system is integrated into the network world. The primacy in the practical implementation of network technologies here belongs to higher education (for example, in open, distance education) [7].

However, there are objective difficulties along the way. The following can be cited as examples:

• the growth of information, which in one way or another determines the content of education, is incompatible with the limited time of study;

• higher education institutions are assigned the role of one of the main repositories of traditions and scientific heritage, and this contradicts the fact that universities should be at the forefront of science and use its latest achievements in teaching. However, given that traditional forms of education are already exhausting themselves, the capabilities of modern technologies, including information technologies, are also limited; • the position that higher education institutions are called upon to provide broad training of specialists, observing the general requirements of the relevant state standards, but at the same time providing an educational process that takes into account the individual characteristics and capabilities of students, is also contradictory;

• universities provide education to people who have already made their choice, and therefore their conscious attitude to acquiring knowledge is assumed. However, in practice this is far from the case, and a variable approach to organizing the educational process is required [8].

It is expected that the widespread use of information and communication technologies will help to overcome these contradictions. Various solutions are possible here - from the actual integration of a higher education institution into the network in the form in which it exists, to a complete reorganization of the structure of this institution in the same way as occurs with the introduction of new information and communication technologies in other areas of human activity [9].

In both cases, these changes should enrich the activities of universities, improving the quality of education and expanding its accessibility. A modern institution of higher education is required to introduce new approaches to teaching that ensure the development of students' communicative, creative and professional skills based on the potential versatility of the content and organization of the educational process. Such approaches should not replace, but significantly expand

the capabilities of existing traditional teaching technologies [10].

Many experts study issues of informatization of education and science in higher education. In the review of the study of global trends in the development of informatization of education by KNEU named after V. Getman, attention is focused on the fact that informatization of education requires the introduction of innovative methods, means and forms of professional training of future specialists of a new formation in higher education, the creation of a powerful information infrastructure in higher education institutions with a developed information and computer educational environment, the introduction of Internet technologies, e-learning, communication networks (global, national, local) [11]. O. O. Gagarin and S. V. Titenko reveal the essence of Web systems and distance learning systems regarding artificial intelligence in education, knowledge representation models, website content management systems, and semantic content modeling [12]. Advanced countries recognize informatization as an important factor in national development and create an appropriate legislative and regulatory framework on the basis of which policies (content, resources, finances) are implemented in this area [13]. Many studies are devoted to the informatization of science and education [14, 15]. In modern conditions, the issue of further development of information and communication technologies in the higher education system is relevant.

The aim and tasks of research. The aim of the research is a comprehensive study of the ways of further development of information and communication technologies in the system of higher education.

The tasks of the research are the following:

• to clarify the concept of informatization of educational and scientific activities in the university;

• to study the essence of the main requirements for a modern university teacher;

• to identify the conditions for further implementation of information and communication technologies in the system of higher education;

• to analyze the educational opportunities of information technologies;

• to consider the ways to ensure the quality of accessible education;

• to analyze the possibilities of ensuring the availability of quality education;

• to analyze the difficulties in the implementation of information and communication technologies in the system of higher education and ways to overcome them;

• to consider the classification and characteristics of software for information technology education

• to consider the main tasks of using information technologies, the solution of which will ensure the intensification and actualization of the educational process;

• to analyze the need and ways to form the motivation of students to use information technologies in education;

• to consider the possibilities of information technology in assessing the quality of education.

Methods and materials of the research. The main method of research was the system method. Also used were such empirical methods as observation and description, and among the theoretical methods – analysis, generalization, induction, deduction, explanation, classification, etc.

Research results. World experience shows that the solution to educational problems begins with the professional training of teachers. In this regard, the training of future university teachers is becoming relevant, which is based not only on fundamental knowledge in the chosen field, in pedagogy and psychology, but also on general culture, including information. Teachers must be able to skillfully select and apply exactly those information and communication technologies that fully correspond to the content and goals of studying a specific discipline, contribute to the achievement of the goals of harmonious development of students, taking into account their individual characteristics.

Thus, the content of pedagogical education, enriched by the use of information and communication technologies, which are associated with the acquisition of such key competencies as social, communicative, informational, cognitive and special, will become much deeper and more meaningful if the following conditions are met:

• creation of real conditions for the training of teaching staff capable of taking an active part in the implementation of state and regional programs for the informatization of education;

• significant increase in the level of professional and general humanitarian interaction between teachers and students due to the possibility of implementing joint projects, including telecommunications;

• the emergence of qualitatively new conditions for the realization of the creative potential of students due to the expansion of the capabilities of traditional libraries and laboratories of higher education institutions due to access to electronic libraries and virtual laboratories, to scientific, educational and other culturally and socially significant resources of the Internet;

• increasing the effectiveness of independent work of students with traditional and electronic resources due to developed systems for self-monitoring and support for feedback with the teacher;

• implementation of continuous open education, when students will be able to take the most active part in organizing the learning process, choosing courses that are accessible at any time thanks to telecommunications.

Fulfillment of the listed conditions will contribute to achieving the main goal of modernization of education - improving the quality of education, increasing the availability of education, meeting the needs of the harmonious development of the individual and the information society as a whole (Fig. 1).

Appropriate training is also very important because it is teachers who are given a decisive role in the design and content filling of the information educational environment of Ukraine created on the basis of Internet technologies, the main purpose of which is to make the national scientific, cultural and educational potential accessible and in demand.

Let us dwell on the educational opportunities of information technologies.

In institutions of higher education, students should be provided with conditions for using the technological capabilities

of modern means of communication, for searching and obtaining information, developing cognitive and communicative abilities, the ability to quickly make decisions in difficult situations, etc. Teachers, who have received freedom in choosing the forms of interaction with students, will be able to apply their efforts to developing approaches to studying disciplines taking into account the individual capabilities and needs of students, learning through discussions, joint design and critical analysis of the results obtained. Even traditional classroom forms of work will be filled with new content in this case, since the time saved due to the use of information and communication technologies can be given to personal communication between teachers and students, necessary for their professional training. The rapid entry of information and communication technologies into our lives has become possible due to the widespread use of personal computers and the creation of the global Internet. The simplicity of the concept of working with information (at the level of elementary bits) is accompanied, however, by the possibility of working with images, sound, and multimedia. The microelectronic base uses the cheapest and most accessible types of energy. And, accordingly, having changed the methods and expanded the possibilities of communications, new technologies are already influencing and will increasingly influence science, education, culture, and politics.

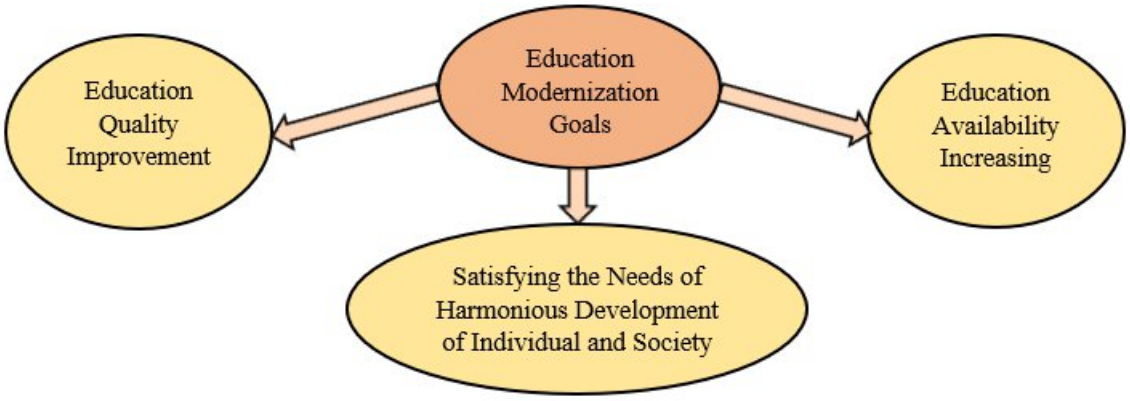

Fig. 1.- Education modernization goals
Рис. 1. Цілі модернізації освіти

The increase in the volume of accumulated knowledge by mankind and rapid social development are the main driving forces for the improvement and enrichment of human and social communications based on the advanced technologies of our time.

The issue of the role of modern information and communication technologies in improving the educational system has remained relevant over the past decades. However, it has become most acute during the introduction of personal computers into the educational process, united in local networks and having access to the Internet. For successful modernization of education based on its computerization and Internetization, both modern technical equipment of educational institutions and the appropriate training of teachers and organizers of the education system are required.

How can the quality of accessible education be ensured? Usually, distance education programs are aimed at organizing the widest possible access to it and have unclear requirements for the quality of training. To improve the quality, compared to traditional forms of training, the following requirements must be met.

1. The expansion of the circle of students must justify the invested funds, since distance learning of even a small group requires the creation of additional (compared to the traditional form) conditions. The funds spent should contribute to the creation of an educational space that surpasses in its capabilities what a traditional educational institution offers.

2. An Internet library with a clearly structured presentation of information should be created, which requires the development of specialized software that makes it easier for teachers and students to search the Internet, the formation of an individual educational space that includes, along with links to sources found in the library, additional electronic resources (databases, modeling programs with the implementation of heuristic approaches, etc.) designed to organize independent search and research activities. For the effective operation of such a library, it is important to prepare auxiliary pages containing review and methodological materials, lists of the most valuable sources of information (Internet links) on a given subject area. Of course, it is useful to involve the students themselves in the preparation of such Internet pages.

This work requires a certain amount of training in the field of creating Web pages, which can be realized when studying Internet technologies.

3. The educational and methodological work of teachers should reach a new level by creating, in cooperation with specialists in the field of pedagogy, psychology and information technology, new generation educational materials, placed in the network library. These materials should be created with the participation of students, which will ensure their preliminary testing. Cooperation between teachers and students, the multidimensionality of the products created (databases, modeling programs for virtual laboratories, theoretical reviews and lists of links to Internet sources), the possibility of obtaining independent expertise from numerous Internet users will give a new quality to educational and methodological work.

4. Students should have an idea of what is required to receive a quality education from them. Without observing the requirement of an active attitude to learning, no efforts to improve the quality of education will yield positive results. Traditional teaching methods that activate students' attitudes to the material being studied, promote their creative cognitive

activity, and develop independence and initiative are supported in the distance learning system by discussions in the virtual seminar mode, and by e-mail correspondence with the teacher and fellow students. The student becomes not only a "recipient" but also a "distributor" of knowledge, since he develops a need to form his own individual educational space, which can be implemented in the form of electronic resources based on modern information and telecommunication technologies (Web pages, databases, etc.).

5. Clear and uniform criteria for assessing knowledge for all teachers and subjects being studied should be developed. In addition to the test system for assessing knowledge used in distance education, independence, activity, and development of the student during cognitive activity should also be assessed. Final testing should be accompanied by ongoing knowledge checks using special systems that are open for work at any time. Such systems must provide feedback to the teacher - real or virtual, for example, using a system of detailed commentary on incorrect answers or systems that adapt to the student's answers and provide material for developing the correct answer.

And how to increase the availability of quality education? It is necessary to look at the problem of providing high-quality and accessible education from the other side, when the introduction of new information technologies is carried out in order to improve the quality of education for a limited number of students. This may be associated with the development and use of specialized modeling programs designed to conduct business games or computational experiments, the use of specialized equipment, other technologies and software products. Nevertheless, in this case, it is possible to formulate principles for their use that allow, while maintaining high quality education, to increase its availability.

1. The student should be given a choice of the most accessible and convenient form of training, including a combined one, in which full-time training is combined with elements of distance learning. For example, if full-time training does not provide the opportunity to re-study lecture material, then distance learning technologies, which provide video recording of lectures or the provision of training programs, allow working with them at a convenient time, repeatedly returning to repetitions if necessary. Many full-time students combine study with work, and providing them with such opportunities would certainly contribute to greater accessibility of quality education.

2. Information about existing educational resources, including those of other educational institutions, should be brought to the attention of all persons for whom such resources may be of interest. For example, even now the Ukrainian sector of the Internet contains thousands of educational Web pages that are interesting and useful for both teachers and students. However, the lack of full-fledged catalogs hinders access to these important materials. Joint development of specialized resources by teachers and scientists representing several educational institutions and scientific and methodological centers also contributes to greater awareness.

3. The cost and, accordingly, the availability of education largely depend on the correct strategy for purchasing, developing and using educational software. Quality education should use, if possible, the technologies of tomorrow. And in this regard, it is better to give preference and make the basis for developments widespread general-purpose products (spreadsheets, database management systems) presented by large companies than to use the developments of other educational institutions.

It is necessary to develop principles for the implementation of information and telecommunication technologies that improve the quality and expand access to education, connect scientists, teachers and students with effective resources within the virtual educational space.

It is possible to predict the upcoming difficulties, drawing analogies with the first stages of the development of education. As then, students receive additional broad opportunities in choosing the method of studying certain subjects, but find themselves even further from the teacher. And here we again encounter the passivity of students, a low level of communication skills and independence, and the teacher's misleading about his knowledge. And just as before, it is necessary to look for a solution to these problems in the organization of new forms of educational work. This may be the implementation of creative collective projects, during the assessment of which the contribution of each participant is discussed and assessed, the formation and presentation on the Internet of an individual educational space, including educational and scientific resources collected by the student himself on the proposed discipline, participation in joint work in virtual scientific laboratories and online business games.

Another difficulty that cannot be ignored is the increase in the responsibility of the student himself for the results of training in a situation when he is given many opportunities to choose between different forms of training, an avalanche of necessary and extraneous information in conditions of time shortage. And in these conditions, teachers must help students in the correct organization of their educational activities, taking into account their individual abilities and capabilities.

Problems are also caused by the expanding network of commercial organizations providing various educational services. Such training sometimes does not meet state standards and is very superficial, providing intensive, but fragmented training in individual narrow courses. The higher education system should take this phenomenon into account, since students often undergo additional training in such new educational centers, and graduates of the latter continue their education according to the traditional scheme in educational institutions of the Ministry of Education and Science of Ukraine. This requires an analysis of such innovations in education in order to improve the entire educational system.

One of the most significant negative trends occurring in the modern education system is the fragmentary nature of a number of accompanying processes.

• Many students (as well as specialists) develop a habit of not separating leisure (for example, computer games, correspondence or surfing the net) and actual work on the computer. As a result, both leisure and work are clearly

unproductive and fragmentary.

• In education based on the use of information technology, along with such a positive aspect as the systematization of knowledge, fragmentation of content often occurs.

• The loss of contacts between students, teachers and students, as well as among the teachers themselves, is extremely dangerous. In this situation, students and teachers cease to feel like members of a single community; they are left only with the roles of anonymous recipients and providers of knowledge.

The education system has outlined many new projects based on the wide use of information and telecommunication technologies. But to fulfill the main task - to ensure diverse continuous education - it is necessary to develop new concepts that ensure changes at the paradigm level. Such a changed educational system, in which modern technologies will be balanced and wisely combined with the achievements of pedagogy, will provide teachers and students with new opportunities and advantages: from passive perception of educational material to independent productive activity; from informative learning to discussions and joint creative search; from dry scores to an integrated assessment of the development of personal qualities; from limited assistance to students to large-scale educational services; from one diploma to many diplomas and certificates that make up a comprehensive professional portrait of a specialist. It is obvious that the solution to emerging problems is possible only if they are carried out at the level of the organizational structure of the educational institution, and not an isolated group of specialists. This is one of the main problems that can be solved only if there is a real need for all participants in the educational process to provide high-quality and accessible education.

Let us move on to considering the characteristics of the software tools of information technology of education.

In the modern understanding, information technology of education (ITE) is a pedagogical technology that uses special methods, software and hardware (cinema, audio and video media, computers, telecommunication networks) to work with information.

Thus, ITE should be understood as an application of information technology to create new opportunities for knowledge transfer (teacher activity), knowledge perception (student activity), assessment of the quality of education and, of course, the comprehensive development of the student's personality during the educational process (Fig. 2). And the main goal of informatization of education is to prepare students for full and effective participation in everyday, social and professional areas of life in the information society.

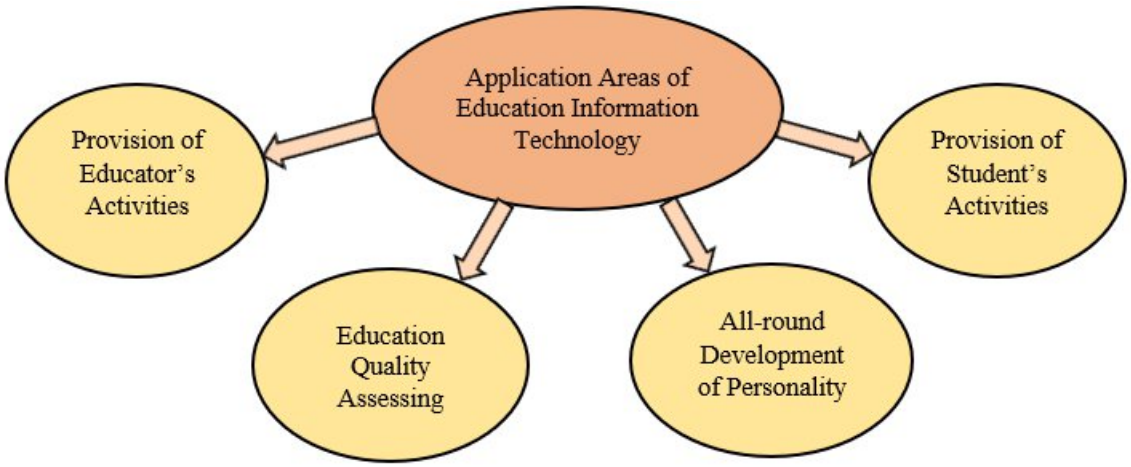

Fig. 2.- Application areas of education information technology
Рис. 2. Галузі застосування інформаційних технологій в освіті

For the corresponding ITEs, the following terminology is adopted in foreign practice:Computer Aided Instruction, Computer Aided Learning, Computer Based Learning, Computer Based Training, Computer Aided Assessment, Computer Mediated Communications (Fig. 3).

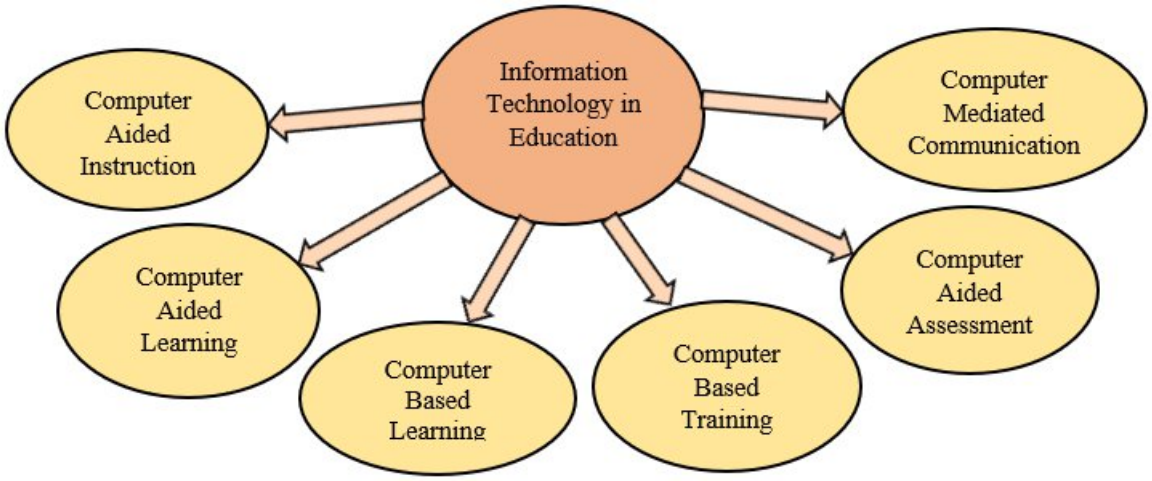

Fig. 3.- Classification of information technology in education
Рис. 3. Класифікація інформаційних технологій в освіті

In a certain sense, such a classification is very conditional, since it essentially intersects individual technologies.

The software used in ITE can be divided into several categories:

- training, monitoring and training systems,
- information retrieval systems,
- modeling programs,
- microworlds,
- cognitive tools,
- universal tools,
- communication tools.

Let us consider the integration of information technology in education into the educational process.

Despite the importance of information technology for the development of personal qualities of students, their implementation should be implemented not so much in an extensive way, leading to an increase in both the academic workload of students and teachers, and the overall costs of education, but by bringing the structure of education in line with modern goals.

In today's conditions, curricula often fail to keep up with the changing world around us, and then the traditional structure of teaching academic disciplines can no longer meet the goals of education. Even conscientious training does not provide genuine knowledge that will allow one to independently navigate in a particular subject area in the future, but memorization skills. Such skills in themselves are very important and useful - as a kind of foundation for those aspects of future professional activity that are characterized by established traditional approaches regulated by certain rules, but now such education has ceased to be effective. Without the development of the student's skills in designing his education, without the ability to draw up a program of his educational activity together with the teacher, it does not give a person the opportunity to fully realize himself both in the course of receiving education and in future professional activity.

The Law of Ukraine "About National Informatization Program" adopted in 2022 links the main capabilities of the education system with the use of ITE.

The use of information technologies ensures the intensification and actualization of the educational process based on the solution of the following main tasks:

- identification and use of incentives for activating cognitive activity through the use of various information technologies selected depending on the personality type of the student;
- deepening interdisciplinary connections in solving problems from various subject areas through the use of such modern information processing tools as computer modeling, local and network database and knowledge technologies;
- active participation of the student in the design and further updating of his educational trajectory, which ensures a personality-oriented approach to organizing the learning process.

Effective use of ITE in the educational process is possible only if the relevant technologies are not some kind of superstructure to the existing educational system, but are reasonably and harmoniously integrated into this process, providing new opportunities for both teachers and students. On the other hand, it is necessary to integrate the established educational, scientific, administrative structures of the existing educational system into the external information environment that is formed and developed on the basis of modern technologies. Thus, it would be wrong to see only one direction of the informatization process of education: the possibilities of information and communication technologies enrich pedagogical technologies, contribute to the scientific and methodological activities of teachers, improve and facilitate the solution of management problems. And the experience, knowledge, and traditions accumulated in the education system add to the substantive, general cultural component of the information space – from the local network of an individual educational institution to the Internet, allowing us to talk about the formation of global intelligence.

Ideally, it is necessary to implement and ensure in all structures of the educational system (educational, scientific, administrative) the process of systemic integration of information technologies, which includes simultaneously:

1) adaptation of the structures themselves and existing educational technologies to the capabilities of the introduced ITE;

2) adaptation of ITE to the requirements of these structures;

3) creation of mutually compatible new structures and corresponding ITE.

In order to create conditions that ensure an integrated approach to the use of ITE even within the framework of studying a separate academic discipline, it is necessary to form the motivation of students to use ITE. Without taking into account the internal need of students to use the capabilities of modern technologies, even the most accessible electronic resources cannot become an organic part of the educational process, regardless of their technological perfection. Thus, the success of the integration of ITE into the educational process is largely determined by the motivation of students to use these technologies. At first glance, it seems that the very use of information and communication technologies is a generally recognized means of motivation for cognitive activity. But sometimes students are indifferent or even negative about innovations, and the teacher needs to find a way to both interest students and make the use of ITE organic and necessary for them.

Cognitive activity can be controlled by both external and internal motives. External motives, coming from teachers and parents, often have a declarative form (requirements, instructions, etc.) and may not only have no effect, but also lead to the opposite result: it is useless to try to simply forbid a teenager to play on the computer without understanding what exactly is most attractive for him in such a pastime - personal records, communication with other players, etc. At the same time, motives based on the internal needs of the student can become a real and very powerful "engine" of his development during the educational process. Motives are connected with needs in a rather complex way. Thus, a student tries to learn all the intricacies of e-mail. At first glance, he is driven by interest, curiosity. But in one case, the basis of his cognitive activity is the need for communication, in another - the desire to improve his information or general professional competence. Finally, it is possible that we are dealing with a future hacker, whose ultimate goal is self-affirmation. By the way, activities in the field of information and communication technologies are distinguished by this feature of the connection of one visible motive with different needs.

If we talk about the development of students during the educational process, then, when forming motivation, we need to proceed from the internal needs of the individual, and not situational ones. Here is how the American psychologist, the developer of the humanistic direction in personality theory A. Maslow says about it: “External learning is simply the assimilation of another association or new skill. But learning to be the best person possible for you is a completely different matter. The long-term goals of adult learning and any other learning are the ways or means by which we can help a person become what he is capable of becoming. This is what I call genuine learning..".

Let us dwell on the features of assessing the quality of learning.

The growth in the number of students enrolled in new forms of higher and secondary vocational education, the introduction of a testing system, and the widespread use of certification cycles in the professional training system are the main factors that have contributed to the growth of interest in the possibilities of information technology for assessing the quality of education.

But as an integral requirement for any assessment procedure, it is necessary to guarantee that the assessment methods used adequately reflect the level of achievement of the objectives of studying the course, the acquisition of relevant knowledge, skills and abilities, and the development of personal qualities of students.

Criterion-based assessment is based on the formulated goals and objectives of studying the course and allows determining the extent to which the subjects have mastered the identified components. In this type of assessment, the criteria for assimilation are set in advance.

Norm-based assessment is used in cases where it is necessary to rank the achievements in a selected group of students, determining the number of those who have achieved a certain score over a certain period of time. The corresponding tests are widely used not only to assess the progress and results of training, but also to assess intellectual abilities.

Various functional approaches are used to assess the results of educational and cognitive activity, which can be given the following meaning: diagnostic - to identify strengths and weaknesses; generalizing - to obtain a final assessment at the end of work with a unit of study. However, in practice, the first approach often acts as a subordinate one in the assessment procedure. For example, the results obtained during the diagnostic assessment (test) can be taken into account in the generalizing one, etc. Modern ideas about the essence of training diagnostics associate it not only with testing the knowledge, skills and abilities of students, but also with the possibility of considering the obtained results in connection with the methods of their achievement. Analysis of diagnostic data allows us to identify trends, predict the further course of the educational process and, ultimately, manage it effectively.

In the context of application in the assessment procedures of ITE, the main emphasis is placed on pedagogical testing - a set of methodological and organizational measures that ensure the development of pedagogical tests, preparation and implementation of a standardized procedure for measuring the level of preparedness of subjects, as well as the processing and analysis of the results.

The development of pedagogical tests is carried out with due methodological justification for their use and processing of test results, taking into account the basic psychological and pedagogical principles of training. Tasks in tests should be selected in such a way as to be able to check the main levels of knowledge acquisition by students. These include:

1) knowledge of the basic concepts and definitions of the topic being studied;

2) understanding and ability to apply the acquired knowledge in solving typical problems;

3) ability to analyze various situations, find solutions to non-standard problems;

4) the ability to generalize the studied material, establish connections with previously studied topics.

These levels correspond to certain types of test tasks. Tests with closed-type tasks, the content of which is accompanied by several numbered answer options, and the subject is asked to select the number (numbers) of the correct answer, can be used to check different levels of assimilation: choosing one correct answer from several proposed ones corresponds to levels 1 and 2; choosing several correct answers from the proposed list - levels 2 and 3. Open-type tasks, in which the subject is asked to independently indicate the correct answer without indicating possible answer options, are suitable for checking all levels of knowledge assimilation.

Conclusions

In addition to access to a particular technology, fundamental research into its capabilities and features is required.

The effectiveness of information and communication technologies depends on the methods and forms of application of these technologies, i.e. not on the interaction of the learner and the computer, but on the interaction of the learner and the teacher, and the learners among themselves. If information technologies make this interaction more effective, then it will be possible to talk about their influence on the education system.

The special appeal of modern information technologies is that we do not need many years of additional training to use them effectively. These technologies open up the widest opportunities for those who are interested in the operating principle of computers, and for those who want to develop their own programs, and, finally, for the overwhelming majority of users who seek additional means in information technologies to solve their professional problems.

One cannot help but notice many negative aspects in terms of organizing professional activities based on information technologies. Information technologies not only expand our capabilities, but also narrow and standardize many of our ideas: that the entire multifaceted world is narrowed to an edited virtual world shown to us on the Internet.

Providing access to large amounts of information does not make a person more informed without any additional effort, so it is more preferable for students to work with a teacher who is able to teach basic research skills and principles of working with large amounts of information - before the student directly gains access to certain information technologies.

The essence of modern information and communication technologies is their versatility and multifunctionality. But with all their great capabilities, these technologies only provide the means that can potentially make human activity more effective. The main multifaceted problem of improving education based on information technologies is how to reveal this potential specifically for the educational process. Its successful solution will contribute to improving the quality and accessibility of education at all levels – from schools to systems for training and retraining specialists, and integrating the national education system into the scientific, industrial, social, public and cultural information infrastructure of the global community.

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