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THE POSSIBILITIES OF INTERACTED USAGE OF INFORMATION TECHNOLOGY IN TRAINING

Abstract. Educational technologies are traditionally used in the education system for the purpose of transmitting information and teaching. In the learning process, students acquire information and interact with instructional technology. Interaction is often limited because a key is pressed and it is necessary to provide further information or answer questions posed by the program. The computer is programmed in such a way that it responds to the students' responses. This type of technology was developed by the designers who created the training machines. This kind of technology is used by teachers as "impenetrable teacher". It does not require teacher or student control over the learning process. It is important to know that students should use technologies not as programmed by teachers, but as tools for organizing knowledge. At the same time, students should use technologies as a tool which help them in learning process. Cognitive tools and learning environments combine databases, large-format spreadsheets, semantic networks, expert systems, and multimedia-hypermedia tools. But this is not all. Rather than using computer technologies to establish student interaction with the computer (which is programmed by a specialist or teacher), it is better to leave student-computer interaction to the student's discretion. This allows students to express their ideas independently. At this time, students play the role of inventors. Thus, they use the computer as a tool of understanding to analyze the world, to obtain information, to interpret their personal knowledge, and to present this knowledge to other people.

Educational information is often designed to partially relieve the student of the burden of heavy thinking. In this case, the information becomes a guide for the student and directs him to the learning process. Such

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systems have a certain "intelligence" that is used to make decisions about the form and volume of training material.

Keywords: educational technologies; computer; learning process; information technologies; multimedia.

INTRODUCTION / ВСТУП

Formulation of the problem. The second decade of the 21st century will undoubtedly remain an epochal period in history. The pandemic that swept the world at the end of 2019, its consequences, the role of these consequences in the economic and socio-political life of people left an indelible mark. Covid-19 has claimed the lives of millions of people, many countries have experienced economic difficulties. Thus, the pandemic has paralyzed all spheres of public life, education and health care have faced unprecedented challenges. A serious blow was experienced by the labor market, which is closely related to the life of the population.

The damage caused by Covid-19 to the global education system is incalculable. It takes a lot of time to figure this out. The pandemic has also forced some urgent work in the field of education. First of all, she singled out the actualization of distance education, especially online education, which is part of it and is becoming an important requirement of the population. It turned out that science and education are the only hope for society to compensate for the material damage caused by the pandemic. Only with the widespread use of modern technologies can people develop science and education and, accordingly, maintain their material life at least at the level that was in the pre-pandemic period. In this regard, a more efficient use of new information technologies is the need of the times.

In fact, the law classifies distance learning as a form of education [1]. But unfortunately, the distance learning mechanism has not been developed for more than ten years. It is distance education that requires the widespread use of new information and communication technologies. The country's leadership supported the development of information and communication technologies with other legal acts. Given the above shortcomings, the following task was set before the education authorities: to summarize the achievements of the leading countries of the world in the field of education and the advanced results achieved in our country. In particular, it is necessary to create an information base consisting of an international information exchange of the education system, especially the connection of scientific and public libraries to international information channels. In addition, the creation of a state

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monitoring system was implemented to monitor and evaluate the implementation of new standards and reforms. One of them is the State Strategy for the Development of Education in the Republic of Azerbaijan, and the other is the National Strategy for the Development of the Information Society in the Republic of Azerbaijan for 2014–2020.

Analysis of major research and publications. Theoretical issues of analyzing the idea of the process of informatization of education are reflected in the studies of such scientists as I. Akhmedov [6], S. Gamidov [7], G. Bashirov [5], F. Rustamov [11], Ch. Nabieva [9], A. Gasimova [8]. The use of new information technologies required the definition of psychological and pedagogical foundations for building an education system based on new pedagogical technologies.

AIM AND TASKS / МЕТА ТА ЗАВДАННЯ

The ***purpose*** of the article is to improve the effectiveness of subject teaching in order to enhance the effectiveness of subject teaching in a consistent, systematic and interconnected way.

To achieve the goal of the study, it is necessary to solve the following ***tasks***:

1. The study of modern problems of the use of educational software and the use of information technology in education, including the use of multimedia in teaching computer science.
2. Justify the consistent, systematic and related use of the application software environment in the field of computer science.
3. To identify the possibilities of developing a methodology for teaching applied programs based on multimedia technologies.
4. Develop multimedia training programs and guidelines for their use within the framework of applied software training technologies.
5. In the course of the pedagogical experiment, determine the level of proficiency in applied programs for teaching computer science to students of a pedagogical university (based on the study of the technologies of the programming languages MS Excel, MS Power Point and MS Access).

THE THEORETICAL BACKGROUNDS / ТЕОРЕТИЧНІ ОСНОВИ ДОСЛІДЖЕННЯ

The effectiveness of teaching the basics of information technology largely depends on the use of training programs. The design of educational programs is based on a certain psychological and pedagogical basis. First of all, it is

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necessary to design the learning process itself. Only then can it be implemented on the machine. The scientific basis of training programs is a multi-level process. Among them are the conceptual, technological levels and the level of practical implementation. The final level combines two components: pedagogical and program implementation.

When using educational computers, the learning process is controlled by these computers. Learning with a computer means that the computer and the student have an intellectual partnership. At this time, students study with the help of computers, but they are not supervised in the learning process. They expand the capabilities of the computer and at the same time the computer develops their thinking abilities and knowledge. As a result of such interaction between the student and the computer, the quality of education is significantly improved. Electronics professionals use their own tools to solve problems. Currently, the tools do not control the work of specialists. Similarly, computers should not control the learning process. First of all, computers are used by students to gain knowledge. The human brain has a number of properties: memory, intelligence, problem-solving skills – cognitive technologies are used as a tool to activate all of this.

Unlike other tools, computer tools can act as an intellectual partner and act together with the student in the learning process. When students use information technology as a partner, they give up some of their unproductive work (such as memorization) and give it to the computer. This allows them to think more productively. Perkins [14] shows that learning cannot exist without the support of external thinking. For this reason, students should be entrusted with such a part of the cognitive process that they can easily manage this part. The same can be said for technology, meaning technology should be trusted to overcome such problems.

Multimedia technology is a method and means of realizing the interaction of visual and sound effects under the control of an interactive program. Roughly speaking, it is a set of technologies. Here the computer inputs, processes, stores, transmits and displays. This can be text, graphics, animation, encrypted static and dynamic images, video, sound and speech. You can generalize in another way: these are hardware and software tools. With the help of these means, information can be presented in such a way that a person perceives this information simultaneously through several senses. Thus, perception is closely related to the genetic structure of a person. A person receives information mainly as a result of the joint activity of the organs of vision and hearing. Therefore, multimedia technologies are compatible with the

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cognitive feature of the human brain, that is, without communication between the sense organs, there can be no effective reception of information. Scientists of the world do not give an unambiguous assessment of the formative significance of different human senses.

Experienced educators often prefer the involvement of the organs of vision. This approach is often justified, but the teacher should pay attention to two points. These are the following:

1. What sensory organs the teacher prefers in the learning process depends primarily on the content of the educational material.

2. For effective assimilation of information, the teacher must consistently use the senses.

3. In practice, it is not always possible to follow the third principle. It depends on the individual qualities of each student. It is known that man, like any living being (we can include here the vegetable kingdom) is not a product of sex, but a unique being, there is no repetition of it. This means that one of the students has a well-developed visual memory, while others have an auditory memory. Those with good visual memory can roughly determine the number of dots on ten dominoes at a glance. One more real life example can be given. If we throw a live fish into the bath water, not everyone will be able to catch it easily because it is slippery. However, there are people who can catch a fish going with the flow in the blink of an eye. Since, the latter have highly developed sense organs. Naturally, the teacher often cannot take them into account in the educational process, because the lesson is a collective process. However, in separate training episodes, the teacher can take into account the individual sensitivity of each student. It was the approach to the parallel provision of audiovisual information that strengthened the role of multimedia in learning and played an important role for effective learning. Multimedia is often organized as hypermedia.

Hypermedia consists of certain nodes. These nodes are used to store information and include text pages, graphics, audio information, video clips, and entire documents. While exploring the database, hypermedia users can access any part according to their needs. It should also be noted that hypermedia nodes may not be fixed, since in many systems they can either be deleted or changed by users, that is, the user can change and add information to the node, or create his own information nodes. In short, hypertext can be a dynamic database of knowledge.

This base continues to evolve and may give rise to a new, different point of view. Nodes can be accessed through links that connect nodes to each other.

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Relationships between hypermedia systems tend to be associative, that is, they describe the relationship between the nodes they connect. This means that while browsing one node, the user is interacting with another node of information (via "hot keys" or "hotspots"). After arriving at a new node, the user is free. It can return to the previous node or go to the next one. Therefore, links in hypermedia show that the user is free in the information space and often allows him to change his place to any node. This creates the conditions for flexible movement of the user in the database. The structure of nodes and links forms an imaginary network in the database. These structures can be quite rich [13].

Learning through multimedia learning programs leads to high motivation in students. It helps to use various means of communication to create communication between teachers and students. As mentioned above, multimedia can have a big impact on students. Multimedia forms skills that cannot be formed in other computer-aided learning environments. First of all, the advantage of multimedia courses is determined by the fact that the program has branching points, which helps the student to regulate the process of perceiving information, return to the repetition of educational material and go to any branching point. When there are many of these points, the level of interactivity and flexibility of the program in the learning process is also high.

This goal can be achieved by embedding multimedia training courses in hypertexts. Multimedia combined with hypertext creates a hypermedia system.

Hypertext has three main features:

1) set of nodal points;

2) a network connecting nodes;

3) multimedia systems connected to these nodes.

Nodes have dots that represent media information. With the help of a network, they are connected in such a way that information can be presented both in a structured and unstructured form of successive events. In text, nodes are specially separated words. You can exit the text and move to another node by hovering over it. Other forms of presenting information in a node are also possible. One of them is illustrations. They have their own exit points to go to other nodes of the system. Such images are called hypermaps. Any drawings can be saved as hypermaps. Drawings may be labeled with reference numbers, text, and other graphical explanations.

Hypermedia allows the integration of conceptual knowledge. This knowledge requires many examples and/or is the result of several contexts. The hypermedia system allows the course author to create the content of nodes

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using multimedia tools. It also allows you to organize different ways to traverse the course. This, in turn, helps passive students to anticipate the sequence of learning material and keep track of connections between network nodes. The greatest value of multimedia is due to the fact that it allows the student to choose several alternatives at any stage of work and evaluate each step. This current self-control plays a more important role in the process of self-education. Another advantage of multimedia is the sound accompaniment of educational information. This creates conditions for effective understanding of the material and interpretation of the studied objects. Both of them are displayed in parallel on the screen of a personal computer. The most effective means is the symbiosis of audio commentary with video information. At this time, you can gradually explain the most complex processes in the development of objects. Multimedia is fundamentally different from the traditional presentation of audiovisual information. Video recordings are an example of this. Of course, the VCR allows you to realize both sound and image in parallel. However, there is a rigid scene in the video recording, which excludes interactivity, since it does not allow moving from one part of the recording to another, that is, finding sections by content, organizing question and answer modes, using branching areas, etc.

All of the above operations can be handled by a teacher and a multimedia personal computer. Multimedia has many capabilities that span several areas, and we will list its general capabilities:

- access to a library of moving and still images, accompanied by sound in various ways;
- transfer of information.

It includes text, graphics, moving charts, multiplication and video information. Various forms of educational work carried out with the help of multimedia systems make it possible either to present information in a complex way or to separate audio-video information at the moment. At the same time, this allows the use of this information for encyclopedic purposes. The multimedia capabilities listed above allow you to achieve certain pedagogical goals. Among these opportunities, it is necessary to highlight the diverse presentation of educational material, the emotional perception of educational material by students as a result of a number of independent educational activities. It is the latter that is of particular interest to students. Equally important is the employment of multimedia education. The formulation of the educational process in a progressive and complex form increases interest and attention to the educational material. This interest is important not only

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for students, but also for teachers. The use of multimedia in the learning process makes certain adjustments to the role of the teacher in this process. The teacher uses teaching time more efficiently by using the possibilities of technology. Efficient use of time creates the conditions for avoiding tedious repetition of information. The teacher gets the opportunity to help students individually, discuss information and mobilize the attention of students for a consistent approach to the learning process.

The analysis of existing multimedia programs reveals the following possibilities:

- selecting frames from the library of an audiovisual program and moving the selected frame to the desired location;
- taking into account the storyline necessary for the user;
- implementation of animation effects;
- its discrete transmission by removing (or adding) part of the information;
- presentation of information on one screen from several windows. At this time, it should be possible to activate any part (for example, video in one window, text in another);
- show the real course of events in real time;
- interactive dialogue between the student and the program.

It is safe to say that, by establishing an interactive dialogue between the user and the program, the capabilities of multimedia systems make it possible to comprehensively present audio-video information on a computer screen. At this time, the system creates such a state for the user that, analyzing his actions, he can lead the line of development of an imaginary plot in the right direction. As a result of numerous experiments, experts have long noted that there is a clear and strong relationship between the method (through which students learn educational material) and memorization of educational material).

For example, experimental studies show that only a quarter of what is heard is remembered. If a student wants to memorize this material through the visual organ, then the part remaining in memory is increased by a third. If this happens in combination (both vision and hearing), then the absorbed material is half of the total volume. If interactive educational programs (for example, a multimedia application) are used to actively involve a student in the learning process, then 75 % of the entire material is stored in memory. Summarizing the above, we can say that the pedagogical goal of using applied programs in combination with other methods depends very much on the possibilities of implementing intensive forms of education. These are modern means of

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processing information, increasing the level of emotional perception. All this shows that the multimedia capabilities are invaluable in the process of consistent use of applications.

RESEARCH METHODS / МЕТОДИ ДОСЛІДЖЕННЯ

To achieve this goal, it is necessary to use the following research methods:

- analysis of theoretical and practical research to determine the current situation in the field of teaching computer science;
- to analyze the work experience of advanced computer science teachers working in higher and general education schools, and to observe the learning process both in general education and in higher educational institutions;
- conversations with teachers, survey of pupils and students;
- analysis and generalization of the results of experimental work.

RESULTS OF THE RESEARCH / РЕЗУЛЬТАТИ ДОСЛІДЖЕННЯ

In the context of the rapid development of science and technology, the informatization of society, the deep penetration of computer technologies into all spheres of public life, the state sets the school the most important task of educating the individual. This necessitated the preparation of the subject content of curricula and programs at all levels of lifelong education, including pedagogical universities, and teaching according to new methods. That is why it is important to fulfill the tasks arising from the requirements of the educational reform being carried out in higher education, including pedagogical universities that train primary school teachers. In connection with the teaching of the course of computer science at the pedagogical faculties of universities, a number of serious problems have arisen that need to be addressed. One of these problems is the non-use of new methods of teaching applied programs in pedagogically oriented classroom specialties. An analysis of the pedagogical literature showed that the experience of teaching computer science with new methods in the universities of our republic is not sufficiently developed, teachers and methodologists of the republic addressed the issues of teaching the subject of computer science in universities to one degree or another and put forward certain methodological considerations. There is no experimental substantiation of the proposed methods and principles. The problem of determining effective methods and means of teaching applied programs in the course of computer science of pedagogical universities and

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their impact on the quality of training has not been studied.

Our research and our observations of the teaching of informatics courses in pedagogical universities show that the introduction of concepts related to applied programs is in some cases used mechanically according to the traditional methodology used in technical subjects in universities. It is clear that in each of these specialties the learning objectives, learning conditions, and the level of knowledge of students are different. Therefore, it is necessary to apply a different, justified and proven methodology here.

Conscious and in-depth mastering of applied programs in the content of the subject "Informatics" in the primary pedagogical specialties of the pedagogical faculty of higher education is possible as a result of their comparative and related training. To ensure such activities, it is necessary to give priority to teaching methods that create favorable conditions for enriching the student's knowledge, developing his thinking, the ability to compare, make judgments, draw conclusions, the ability to search and research in connection with solving issues, and the formation of a scientific worldview. This can be ensured by the conscious and deep assimilation of knowledge of applied programs by future primary school teachers, the creation of visual representations of these programs, i.e., comparative and related training with graphic illustrations. The content devoted to the ability to use MS Excel, MS Power Point and MS Access programs to solve not too complex problems should be considered in the curriculum consistently, coherently and systematically and should be included in the program. Therefore, it is useful to connect questions related to the study of MS Power Point and MS Access programs with students' knowledge of the MS Excel application program.

If enough space is given to the interpretation and application of programs in various situations related to MS Excel, MS Power Point and MS Access, this increases students' interest in the lesson, increases learning efficiency, demonstrates the versatility of the associated method, which is a means of implementing intra-subject integration of scientific knowledge students, leads to the expansion of the worldview and overall development.

It is known that any goal set in teaching computer science is confirmed by practical tasks. From this point of view, application programs designed to teach content provide a deeper and more conscious assimilation of this material in comparative learning. A purposefully selected system of tasks, aimed at the development of cognitive processes in students, ensures complete assimilation of the current subject.

The system of classes has an intensive impact on the assimilation of

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knowledge by students and the development of their application skills when the teacher expects the following conditions in the educational process:

- the teacher must understand the didactic basis of the system of classes, the focus of training not only on the assimilation of knowledge, but also on the development of skills for their application;
- at different stages of the lesson, a special place should be given to independent cognitive activity of students;
- the teacher must coordinate group and individual forms of work in the lesson.

CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH / ВИСНОВКИ ТА ПЕРСПЕКТИВИ ПОДАЛЬШИХ ДОСЛІДЖЕНЬ

The article provides a methodological system of related teaching of applied programs in the course of informatics at the pedagogical faculty of higher education. In future studies, which will be devoted to the problems of teaching informatics at the pedagogical faculties of universities, such issues as: the impact of the integration of academic subjects on improving the effectiveness of teaching, clarifying the content of knowledge in informatics in order to obtain "the optimal level of ICT proficiency of future class teachers and other problems.

The proposed questions should be reflected in textbooks and teaching aids, the system of classes that require the assimilation of theoretical knowledge and their application in terms of teaching applied programs has been improved.

It is necessary to publish educational and methodological literature and prepare visual and didactic materials on the problem of related teaching of applied programs to students of the pedagogical faculty, reflecting the peculiarities of teaching computer science.

Prospects for further research in this direction. Thus, the results and conclusions obtained during the study have both theoretical and practical significance. The results obtained will increase the effectiveness of teaching informatics in the specialty of primary school teachers of the pedagogical faculty, the formulated methodology for teaching applied programs will ensure the further development of the methodology for teaching informatics in higher education.

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REFERENCES (TRANSLATED AND TRANSLITERATED) / СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

[1] M. V. Abdullayeva, *«Ümumtəhsil məktəblərində riyaziyyatın tədrisi prosesinin, şagirdlərdə qrafik bacarıqların formalaşdırılması üzrə işin sistemi (V–IX sinif)», pedaqogika üzrə fəlsəfə doktoru dis*. Bakı, ADPU, 2012.

[2] N. Ə. Abışov, *«İnformasiya-kommunikasiya texnologiyalarının tətbiqi ilə yeni tədris infrastrukturu, yaradılması və tətbiqi», Pedaqogika üzrə elmlər doktoru dis*. Bakı, 2013.

[3] A. S. Adıgözəlov, *«Fasiləsiz təhsil şəraitində məktəb riyaziyyat kursunun tətbiqi funksiyasının fənlərarası əlaqə əsasında reallaşdırılması», Pedaqogika üzrə elmlər doktoru dis*. Bakı, 1992.

[4] A. A. Agayev, Y. R. Talibov [et al.] *Pedagogy*. Baku, Azərbaycan: Agiloglu, 2006.

[5] Q. İ. Bəşirova, *«Orta məktəbin V–VII sinif riyaziyyat dərslərində kompüterdən istifadə şagirdlərin idrak fəallığının artırılması vasitəsi kimi», Pedaqogika üzrə fəlsəfə doktoru dis*. Bakı, ADPU, 2012.

[6] İ. B. Əhmədov, *«Riyaziyyatın problemli-proqramlaşdırılmış təlimi (cəbr və analizin başlanğıcı materialı əsasında)», pedaqogika elmləri namizədi dis., avtoreferatı*. Kiyev, 1986.

[7] S. S. Həmidov, *«Ali pedaqoji məktəb tələbələrinə kompüterin öyrədilməsi metodikası (riyaziyyat fakültəsi üzrə)», pedaqogika elmləri namizədi dis*. Bakı, ADPU. 1998.

[8] A. M. Qasımova, *«Ümumtəhsil məktəblərində rayaziyyat və informatika fənlərinin əlaqəli tədrisində İKT-dən istifadə (V–IX siniflərdə)», Pedaqogika üzrə fəlsəfə doktoru dis*. Bakı, ADPU, 2017.

[9] C. O. Nəbiyeva, *«Kompüter texnologiyalarından istifadə şagirdlərin fəallaşdırılması vasitəsi kimi», pedaqogika elmləri namizədi dis., avtoreferatı*. Bakı, 2005.

[10] Ə. Q. Pələngov, *«Orta ümumtəhsil məktəblərində həndəsə kursunda müasir təlim metodlarının kompüter texnikası ilə tətbiqinin reallaşdırılması problemləri», pedaqogika üzrə elmlər doktoru dis*. Bakı, 2010.

[11] F. A. Rüstəmov, T. Y. Dadaşova, *Ali məktəb pedaqogikası*. Bakı, Azərbaycan, 2007.

[12] S. A. Zamanova, *«Orta məktəblərdə riyaziyyatın tədrisi prosesində kompüterlər təlimin fərdiləşdirilməsi vasitəsi kimi», pedaqogika elmləri namizədi dis*. Bakı, 1994.

[13] D. H. Dzhonassen, «Komp'jutery i instrumenty poznanija: izuchenie s

https://doi.org/10.58442/2218-7650-2023-25(54)

pomoshh'ju tehnologii, analiz tehnologii», *Informatika obrazovanie*, № 4, 1996.

[14] D. N. Percins, «Chelovek pljus: raspredelennoe predstavlenie o myshlenii i obuchenii»; Salomon, Red., in *Raspredelennoe poznanie: Psihologicheskie i obrazovatel'nye aspekty*. Izdatel'stvo Kembridzhskogo universiteta, 1993, s. 88–110.

МОЖЛИВОСТІ ВЗАЄМОДІЇ ВИКОРИСТАННЯ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ У НАВЧАННІ

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Анотація. Освітні технології традиційно використовуються в системі освіти з метою передачі інформації та навчання. У процесі навчання студенти отримують інформацію та взаємодіють з навчальними технологіями. Взаємодія часто обмежена, оскільки натискається клавіша, і необхідно надати додаткову інформацію або відповісти на запитання, поставлені програмою. Комп'ютер запрограмований таким чином, що він реагує на відповіді учнів. Цей тип технології було розроблено конструкторами, які створювали тренажери. Така технологія використовується вчителями як «непроникний вчитель». Не вимагає контролю вчителя чи учня за процесом навчання. Важливо знати, що учні мають використовувати технології не як запрограмовані вчителями, а як інструменти для організації знань. У той же час студенти мають використовувати технології як інструмент, який допомагає їм у процесі навчання. Когнітивні засоби та навчальні середовища поєднують бази даних, широкоформатні електронні таблиці, семантичні мережі, експертні системи та мультимедійно-гіпермедійні засоби. Замість використання комп'ютерних технологій для налагодження взаємодії учня з комп'ютером (що програмується фахівцем або викладачем), краще залишити взаємодію учня з комп'ютером на його розсуд. Це дозволяє учням самостійно висловлювати свої думки. У цей час учні виступають у ролі винахідників. Таким чином, вони використовують комп'ютер

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як інструмент розуміння для аналізу світу, отримання інформації, інтерпретації своїх особистих знань і представлення цих знань іншим людям. Навчальна інформація часто покликана частково звільнити учня від тягаря важких роздумів. У цьому випадку інформація стає орієнтиром для учня і спрямовує його на процес навчання. Такі системи мають певний «інтелект», який використовується для прийняття рішень щодо форми та обсягу навчального матеріалу.

Ключові слова: освітні технології; комп'ютер; процес навчання; інформаційні технології; мультимедіа.

REFERENCES (TRANSLATED AND TRANSLITERATED)

[1] M. V. Abdullayeva, "The system of work on the process of teaching mathematics in secondary schools, the formation of graphic skills in students (grades V–IX)", Ph.D in pedagogy dis. Baku, ADPU, 2012.
[2] N. A. Abishov, "New educational infrastructure, creation and implementation with the application of information and communication technologies", Doctor of Sciences in Pedagogy dis. Baku, 2013.
[3] A. S. Adigozelov, "Implementation of the application function of the school mathematics course in the conditions of continuous education based on interdisciplinary communication", Doctor of Sciences in Pedagogy dis. Baku, 1992.
[4] A. A. Agayev, Y. R. Talibov [et al.] Pedagogy. Baku, Azerbaijan: Agiloglu, 2006.
[5] Q. I. Bashirova, "Using computers as a means of increasing students' cognitive activity in V–VII grade mathematics classes of high school", Ph.D. in Pedagogy dis. Baku, ADPU, 2012.
[6] I. B. Ahmadov, "Problem-programmed learning of mathematics (on the basis of the beginning material of algebra and analysis)", Candidate of Pedagogical Sciences Dis., abstract. Kyiv, 1986.
[7] S. S. Hamidov, "Methodology of teaching computers to students of the Higher Pedagogical School (mathematics faculty)", Candidate of Pedagogical Sciences Dis. Baku, ADPU. 1998.
[8] A. M. Gasimova, "The use of ICT in the related teaching of mathematics and informatics subjects in secondary schools (grades V–IX)", Ph.D. in Pedagogy dis. Baku, ADPU, 2017.
[9] C. O. Nabiyeva, "Using computer technologies as a means of student activation", dissertation of the candidate of editorial sciences, abstract.

https://doi.org/10.58442/2218-7650-2023-25(54)

Baku, 2005.
[10] A. G. Palangov, "Problems of implementation of modern teaching methods with computer technology in the geometry course in secondary general education schools", Doctor of Sciences Dis. Baku, 2010.
[11] F. A. Rustamov, T. Y. Dadashova, Higher school pedagogy. Baku, Azerbaijan, 2007.
[12] S. A. Zamanova, "Computers in the process of teaching mathematics in secondary schools as a means of personalization of training", Candidate of Educational Sciences Dis. Baku, 1994.
[13] D. H. Dzhonassen, «Komp'jutery i instrumenty poznanija: izuchenie s pomoshh'ju tehnologii, analiz tehnologii», Informatika obrazovanie, No. 4, 1996.
[14] D. N. Percins, «Chelovek pljus: raspredelennoe predstavlenie o myshlenii i obuchenii»; Salomon, ed., in Raspredelennoe poznanie: Psihologicheskie i obrazovatel'nye aspekty. Izdatel'stvo Kembridzhskogo universiteta, 1993, s. 88–110.

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