The Importance of Using Information Technologies When Teaching the Topic of Vectors in Geometry

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ABSTRACT

The importance of information technology in the topic of vectors in analytic geometry is emphasized in the article. Features such as the student's mood, interests, lifestyle, worldview, thinking, mental, and professional talents come into play when planning education on the basis of new technologies. Engaging students as active participants in the class and encouraging them to act produces excellent results today. In today's fast-paced world, there is debate of expanding young people's access to computer educational technology, attracting them to work more on themselves, and increasing the use of ICTs in educational processes.

Keywords: video computer training, adaptive, program-algorithm, logical algorithm, computer technology, information technology, telecommunication technology.

Fundamental educational reforms implemented in our republic eventually provide for the training of competitive employees with knowledge and abilities at the level of world requirements. In order to carry out these objectives, the President of the Republic of Uzbekistan issued another decree on July 11, 2019 titled "On measures to introduce new management principles into the system of higher and secondary special education" [1]. A number of consistent tasks were defined in this decision in order to improve the quality of education in higher and secondary special educational institutions, to eliminate a number of problems that impede this system's active participation in the republic's wide-ranging reforms, and to update in the social and economic spheres. Adoption of modern information and computer technologies, the Internet system, modern methods of digital and wide-format telecommunications, such advanced achievements that determine the level of today's development are not only in schools, lyceums, colleges, and universities, but also in the life of every family. We must fully comprehend the significance of building the groundwork for.

The term "information" is derived from the Latin word "informatio," which meaning "to explain, introduce, and explain." In many circumstances, "information" is used instead of "given," which is a whole different term. The message of information is clear and actionable.Messages and observations are both types of information. It becomes information when there is a chance for some necessity, such as when learning about something.

Information in general - in a broad sense, it reflects the real world; in a limited sense, it is optional information that is subject to storage, transfer, change, and management.

In the current context, information is the exchange of information between people, between humans and live and inanimate nature,

particularly between ECM(electronic calculating machine), and is a scientific notion in a broad sense.

Information technology is a set of methods and tools for gathering, storing, sending, altering, and processing data. The term "new information technology of education" refers to only the most recent information technologies that can be applied to the educational process. New information technologies entail different types of users receiving services for information collecting and processing based on ECM(electronic calculating machine).

Information and telecommunication technologies in education are a set of ways and methods for transferring information to students via computers and telecommunications, as well as checking knowledge acquisition, processing, and application in real life.

The software is a commanding environment that reacts correctly to the student's actions. The software will be expressly built or customized for educational purposes. It is described as follows, depending on the role of the software used in teaching:

- automatic teaching systems based on electronic intellectual textbooks that include interactivity, multimedia, a significant volume of educational information, and hypertextuality.

The automatic training system allows you to master a training course or a substantial portion of it on your own. This system combines the features of a short textbook, problem sets, laboratory exercises, a reference book, and an expert evaluator of the material acquired:

- provides an excellent method of learning the content, in that it allows the student to autonomously plan the sequence of studying the theory and developing the skills of answering instances and sample problems, as well as to assess the quality of his own knowledge and skills;
- develops the abilities of analysis and research;
- helps the students save time.

A science-oriented environment is a set of training programs that enables you to deal with objects of a specific class, comprehend their relationships, conduct operations on objects and relationships, and visualize objects and their properties.

Testing programs are intended to check and assess the level of knowledge. They instruct the student to: enter the answer as close to the generally accepted form as possible; store, collect, print (copy on paper), and analyze inspection results statistically; regardless of the form of the answer and syntactic (sentence structure) literacy, it should allow for an adequate assessment.

A reference system is a program that stores and displays a range of instructional information, such as a reference book. In these systems, educational material is organized hierarchically, and information may be readily searched for using various symbols. They enable access to, storage for, and reproduction of context information [2].

Video computer teaching technology promotes students' active learning and knowledge acquisition processes. This technology enables the presentation of both verbal and visual forms of instructional information, allowing the teaching process to be tailored to the goals. When students are taught separately with a computer, they are unable to participate in communicative activities in class, and the heuristic aspect of problem-based learning is lost.

Other traditional methods of teaching can be added to the video-based style of teaching, which is viewed as an open system. Of course, the importance of verbal-visual and graphical information varies from instance to situation. All of this is dependent on the content and qualities of the computer and video technology imaging instruments, as well as the didactic aims to be attained in this topic's study.

Computers are currently used in the education sector primarily in four directions:

- as a learning object;
- as a method of technical instruction;
- to control the retention levels;
- in scientific and pedagogical research.

The advantages of computer-based teaching are many: the time required for students to develop certain skills is reduced; the number of practice tasks increases; the pace of work of students accelerates; as a result of

requiring active control by the computer, the student becomes an educational subject; students have the opportunity to model and directly demonstrate processes that are difficult for students to observe and observe; it becomes possible to provide the lesson with remote resources using communication tools; communication with the computer takes the character of a didactic game, and thus students' motivation for learning activities increases, etc.

In the process of computer-based education, education is organized, managed, and controlled according to the relationship between the student and the computer.

Organization of computer-based education - establishing a connection between the student and the educational material by means of a computer. Education is designed to create a connection between the learner and the learning material. Organization of students' educational work, stimulation of their activity is modeled on the basis of appropriate tools.

The incorporation of information technologies into the educational process results in the application of the principles of a differentiated and individual approach to teaching, and the teacher creates an opportunity for each student to work independently with educational materials on a new topic during the lesson. Based on the offered plan, students will have the opportunity to completely acquaint themselves with the new material. Distance learning is also made possible by the use of information technology. The incorporation of computer technology into the educational process aids in the enhancement of the quality of autonomous education, a creative approach to the educational process, and the ability to acquire new knowledge.

Many e-learning materials, such as e-textbooks, e-learning manuals, and educational software tools, have been developed for use in the educational process. They are useful in education because of aspects such as controllability, interactive styles, artificial intelligence elements, and emotional adaptability [3].

Using computers in classroom environment have its own the benefits, as it:
-stimulates the desire of students for learning;
-improves autonomous reasoning;
-gives students motivation for studying more on the subject;
-increases their computer literacy skills;
- introduces the world's latest scientific understanding methods relating to the use of computers;
-promotes the idea of self-study to students;
-improves their creativity;
-provide wide range of learning styles;
- increases the variety of educational materials available for use in educational institutions;
- enhances visual learning in education;
- Students' self-monitoring of the assessment process broadens the elements, etc.
Principles of computer-based learning:
-being scientific
-system and sequence
-visuality
-encouraging individuality
-mingle of theory and practice
-being understandable
- to ensure inter-discipline and intra-discipline connection
-relationship between science and real life
-enhancing the learning speed
-promoting self-taught mentality to students.

Pedagogical, computer, and information technologies are expressed in an integrated system that includes organizing and preparing the educational process, providing scientific and methodical resources, implementing the educational process, and assessing the quality of educational outcomes.

Programmable educational technologies are those that enable the independent acquisition of knowledge, skills, and talents through the use of educational instruments (computers, simulators, programmable textbooks, etc.) that are based on specially built programs. Programmed material consists of a very modest set of educational information ("frames", files, "steps", etc.) given in a specific logical sequence.

The five main principles of programmable learning are as follows:

- a specific hierarchy of a collection of control devices. The teacher is at the pinnacle of instructional leadership. It serves as an introductory general guide in the subject

(course) and demonstrates the proper approach in non-standard challenging teaching scenarios.
– The notion of designing the educational process management system as a cycle, with feedback on each phase (operation) of the educational activity. Feedback is required for both the teacher to make mistakes and the student to comprehend the learning material. For correction, external feedback is used. A link of this type is formed by the control devices that carry out the teaching process, or by the teacher. Internal feedback enables pupils to independently modify their learning outcomes and personality.
– The notion of a step-by-step technical approach for opening and transferring instructional information. In this situation, the educational content in the program will be made up of separate, independent, but interrelated and small-sized information and educational assignments that will aid in the effective acquisition of knowledge, skills, and abilities. The training program step is made up of the rules for executing positive and negative feedback information and learning actions, that is, three interconnected connections (frames) are contained in the step's content: information, feedback action, and verification.
A training program is made up of a sequence of step-by-step learning actions (procedures). This structure serves as the foundation for programmed instructional technologies.
-Instructional management and individual content. This principle states that each student is provided with an adequately oriented informational process and the opportunity to learn at a pace suited to his or her aptitude to absorb knowledge.
– use of specialized technology means for transferring pre-programmed educational content.

Computerization of analytical geometry, use of special software packages in experimental mathematics (Rosamund Sutherland), informational environment of mathematics education (David Tall), role of cognitive tools in mathematics education (Tommy Dreyfus), requirements for modern electronic educational literature and conditions for their use in educational processes (Gerhard Holland).

Programs for teaching technology may include the following: a linear program; a branching program; an adaptive program; a generalized program; a program-algorithm; a modular training program; and a program of complete knowledge mastery.

A linear program is made up of discrete blocks of training material that alternate with control tasks in a sequential fashion.

In a linear program, the student advances to the next step (block) of information when the answer to this step (block) of information is correct, and he returns to this step when the answer is incorrect, requiring him to study the beginning information again.

When a student's answer is erroneous in the networked program, he is provided extra educational information that helps him to complete the control job, give the proper answer, and move on to the next step (block) of educational information.

Adaptive software allows the student to select the level of complexity of the new learning material, adjust it as he masters it, and use reference books, dictionaries, manuals, and so on.

Fragments (fragments) of linear, branching, and adaptive programs are included in the generalized program.

The sequence order of mental (theoretical) and practical processes is determined by the program-algorithm. It can be used as a standalone training program or as part of another training program [4].

An algorithm is a set of explicit instructions to the executor for carrying out a series of operations targeted at attaining a specific goal or solving a specific problem.

Algorithms can be given verbally, in tabular form, or as a block diagram. Natural language support is used by a spoken algorithm to describe words and sentences based on natural language attributes. The purpose of presenting an algorithm on the basis of a table is to represent it in the form of a table and calculation formulae. The depiction of an algorithm in a block diagram is a method in which the algorithm is expressed using

geometric forms known as blocks. The block diagram is made up of the series of blocks and the lines that connect them.

For example, in the form of a succession of basic concepts, the algorithmic steps required to learn the concept of vector could be as follows:

1. Linear operations on vectors.
2. Linear arbitrary vectors.
3. Vector with linear connection.
4. Colleniality.
5. Coplanarity.
6. Coordinates of the vector.
7. Modulus of a vector.
8. Guide cosines.
9. Scalar multiplication of a vector.
10. Vector multiplication of a vector.
11. Mixed multiplication of a vector.

A logical algorithm is the sequential logical structure of a text. A logical algorithm acts as the primary guide to attaining the aim of studying the material, namely understanding the content of the material. At the same time, the text structure itself is considered an algorithm.

Algorithmization of education entails determining solutions to tackle educational difficulties and developing an algorithm for student mastery. In this view, algorithmization is a didactic principle of the construction of instructional content, the order of student activity, and the development of their thinking ability.

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Distance learning is the remote delivery of all or most training sessions using information and communication technology.

Distance education is a relevant sort of education for people who wish to study without leaving their jobs, those who are unable to study at educational institutions due to health issues, students of personnel retraining and advanced training courses, and those who want to earn a second speciality [5].

In the United States, around 1 million people study via distant education. Television is primarily used. In Spain, the National University of Distance Education operates. It is used to implement part-time education and to increase instructors' qualifications.

An open university has been established in Germany, through which it is possible to improve skills and obtain higher education by correspondence. Didactic system of distance education:

-purpose of the education;
-meaning behind the education;
-learners;
-educators;
- educational methods (informative-instructional, reproductive, problem-based, heuristic, exploratory);
- educational tools (books, online learning materials, computer educational systems, audio educational materials, video educational information materials, remote laboratory practicums, virtual stands, simulators, didactic materials, etc.);
- educational and material subsystem (laboratory rooms, educational and methodological materials, technical means of education, etc.);
- control - identification subsystem (identification of the learner control forms that help to identify, video conference, etc.);
- forms of education (lecture, seminar, laboratory training, supervision works, term papers, notes, exams, advice, independent work);
- economic and financial subsystem;

- legal-normative subsystem;
- marketing subsystem.

Principles of distance learning:
- interactivity;
- basic knowledge;
- individualization;
- identification;
- strict regularity of education (regularity);
- the purpose of using new information technology tools
orientation;
- openness and flexibility of education.

Distance learning technology consists of:
- technology of providing educational information;
- educational information transfer technology;
- technology of educational information storage and processing.

Finally, the key directions of employing ICT in mathematics education at higher education institutions are discussed:

1. Presentation of educational material using a computer.
2. Use of multimedia.
3. Diagnosis and rating control.
4. Creation of electronic OMM.
5. Distance education.
6. Organization of communication.

Computer technology in the process of teaching mathematics

as an example of using its capabilities, we will introduce electronic developments used in teaching the topic "Elements of the Theory of Groups".

The teacher prepares an electronic lecture to explain a new topic in a room outfitted with sophisticated computer equipment.

When an experienced instructor presents new concepts, the history of the concept, a brief description of its role in life, the studied subject and other subjects supplying information, and varied drawings, in some cases from ready-made posters, are used. An electronic lecture's text can conceal such information (hypertexts), "animate" posters, and drawings on slides (multimedia, video).

Drawings and pictures prepared in different colors in the text of the electronic lecture, proofs of assertions, examples, and solutions to problems should be displayed in turn, opening hypertexts in their place during the lecture, and commented on, so that the students' attention is not distracted.

The introduction of basic concepts and examples of introduced concepts, the presentation of assignments for each student to work independently or in pairs, the use of multimedia capabilities buried in hypertext throughout the teacher's speech, and the retention of these concepts in students' memories for a long time will be retained. During the discussion of the new topic, properties of operations on sets are provided, as well as the demonstration of one of them. With the proofs of all the statements included in the hypertext in hand, the teacher asks the students which property they find the most difficult to prove and shows the proof of the assertion they select.

When the teacher draws a diagram on the board or writes a proof, it is preferable for the drawing or proof text to be created sequentially while maintaining speed. The teacher will be able to devote more time to writing proofs, creating diagrams, and interacting with students, as well as monitor each student's learning activities focused at grasping new topics.

Repetition of prior themes, individual questions for each student aimed at reinforcing a new topic, test tasks, examples, and problem texts can all be created as handouts and handed to students during class, or their electronic counterpart can be exhibited. The time allotted for each job is stated, and the tasks' replies are provided for monitoring oneself or a partner after the time limit has passed. The display of the points assigned for each correctly completed control task allows students to identify how many points they have accumulated during the course.

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