

Review Article

INFORMATION TECHNOLOGIES AS A MEANS OF ASSESSING THE KNOWLEDGE OF STUDENTS OF THE TECHNICAL PROFILE

Natalia V. Kamenez

Tyumen Industrial University, Russia

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Abstract

At the present stage of the development of education, taking into account the requirements for objectifying the control of knowledge of students, it is advisable to involve information technology of training in learning, self-learning, control and self-control of knowledge. Such technologies have advantages over local computer testing, have a wide range of tools for implementing objective control, in addition to controlling knowledge from the teacher, and are able to implement self-control of students' knowledge. It is noted that information technology can be used in assessment procedures at various levels - from the means of managing information about assessments obtained by traditional methods, to fully automated knowledge quality control systems, including diagnostic, generalization and correction modules. The teacher can evaluate the student's work according to the actually established scales and criteria.

Keywords: information technology, students, distance learning, teacher, tests, assignments, "virtual laboratory".

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INTRODUCTION

Information technologies daily acquire new opportunities for information processing: visual-graphic, partially three-dimensional construction, display of previously inaccessible objects and phenomena. A teacher who owns knowledge of information technology is a master at his classes [2]. Translated from the Greek language, technology means art, skill, ability.

In Wikipedia, technology is presented as a combination of methods and tools to achieve the desired result; in the broad sense, the application of scientific knowledge to solve practical problems.

As practice shows, most educators do not have enough time, desire, or the ability to master information technology (hereinafter - IT). According to the experience of using IT, for the implementation of educational activities we need not sophisticated training tools, knowledge control tools that would not require significant skills.

The rapid spread of computing systems is associated with their too rapid cheapening, which makes it possible to purchase computers for almost everyone and introduce research into serious projects.

Recently, the phenomenon of "Virtual Laboratory" in higher education is gaining popularity in the educational space. By definition, V.V. Trukhina, a virtual laboratory "is a hardware-software complex that allows you to conduct experiments without direct contact with a real installation or in the complete absence thereof. In the first case, we are dealing with a so-called laboratory installation with remote access, which includes a real laboratory, software and hardware for controlling the installation and digitizing the received data, as well as communication tools. In the second case, all processes are modeled using a computer" [1].

The modern period of development of society is characterized by a strong influence of computer technology on all spheres of human activity. An important part of these processes is the computerization of education. There is a tendency to gradually expand the field of use of "virtual laboratories" in the higher education system, not only as a process of visual modeling, but also as a result of completing a task and assessing the quality of acquired knowledge.

METHODOLOGY

Information technology provides for the structure of information processing, its storage, transmission. Information

is information, messages, explanations, knowledge, training, instruction, presentation of the organization method and the like. Combining the concepts of "technology" and "information" we obtain "information technology", which can be defined in applied terms - as a way of producing information products and services of the required quality and quantity with optimal costs for given conditions and time; in broad interpretation - as a combination of rational methods and means of information activity that provide a guaranteed result.

The purpose of informational pedagogical activity is training, education, education and development of students using information systems [9].

Information technologies based on personal computers, computer networks and communications form information and communication technologies [5]. The means of information and communication technologies are hardware and software - devices and electronic circuits, hardware programs for working with a computer, software devices operating on the basis of computer technology, as well as devices that cooperate with personal computers. Such devices make it possible to collaborate with the host computer, which makes it possible to create a survey system, to control large groups of students for short periods of time, followed by knowledge assessment. The technology of assigning a certain rank, value, standardized value judgment, associated with the value of "establishing compliance", which means establishing compliance with certain requirements [7]. Comparative characteristics of the obtained results and reference knowledge testifies to the quality of knowledge.

By the quality of the assessment of educational material using information systems, we can understand the volume of quality work performed by a student, which he was able to obtain using a software product, taking into account the needs of the educational process and contributing to the achievement of learning goals. The evaluation process can be divided into two components, each of which plays a specific role. The first component focuses on the assessment of the application of knowledge to solve problems. The second component is to evaluate mathematical and statistical data in accordance with the reliability of the results.

The quality assessment process involves a number of separate stages, without which it is impossible or difficult to implement a holistic vision of a certain phenomenon with respect to a certain value criterion. An important prerequisite for

successful assessment is the refinement and structuring of the assessment object, which can be a complex hierarchical system or set [4]. An orderly terminology plays an important role at this stage, due to which it is possible to more clearly define what exactly is meant by an object and what - by its components. Only after this there are questions of determining and parameterizing assessment indicators and criteria with which it will be possible to establish compliance with the requirements.

To consolidate the knowledge gained and to evaluate it, quite often multimedia environments (for example, visualization lectures at Power Point), training programs (FEPE), knowledge control programs (Educon - 2), etc. are used in higher education.

The "virtual laboratory" system contains signs of secondary nature with respect to substantive laboratory work. It follows that the subject of training must implement a two-step path for the transition from information obtained in the "virtual laboratory" to the formulation of a scientific fact.

Modern multimedia software tools have great potential in displaying information and have a direct impact on the motivation of students, the speed of perception of the material and, thus, the effectiveness of the educational process as a whole. Training and assessment methods are closely related to the nature of the presentation and perception of information, therefore the creation of a multimedia environment significantly affects the nature of the presentation of information, and, consequently, the teaching methods [3].

From this point of view, in multimedia visualization, the combination of a visual image, text, and a teacher's oral explanation leads the student to stereoscopic perception, which is greatly enhanced when using the capabilities of a computer.

The polysensory environment provides the most favorable perception of educational information for each student, which stimulates the development of a representative perception system that is secondary to the future engineer. Therefore, when creating multimedia material, it is necessary to take into account not only methodological principles, but also the psychological and pedagogical features of vocational training for students of a technical university.

The form of visual presentation of educational information based on the integrated use of multimedia in order to more efficiently present material and determine the level of knowledge is a progressive method, in contrast to traditional methods. The main didactic unit is the audiovisual image as a multimedia computer model of the material studied.

Thanks to this, it became possible to track processes studied over time, to simulate long-term processes, and the ability to interactively change parameters.

When using multimedia programs in the classroom, the structure of the class itself does not fundamentally change. It still preserves all the main stages, changing, if necessary, only their temporal characteristics. Pedagogy from the empirical accumulation of facts and the selection of the most effective methods from a number of existing for the first time proceeded to a quantitative analysis of the material under study. The second distinguishing feature of programmed instruction is that it gives the teacher much more information about the progress of students learning the material than traditional methods.

Recognizing the undeniable advantages of the use of information technology, a number of comments should be considered. Programmed instruction is not a universal method with the possibility of replacing it with all other methods; its use in one or another educational situation is determined by purely pedagogical considerations. Software tools are more designed to support the processes of monitoring the level of students' knowledge, diagnosing errors, providing recommendations for correcting them, evaluating the results

of repeated surveys, and adjusting the level of complexity of questions depending on the stage of training.

The most common control method using computer technology is testing. Test control is attracting more and more attention of teachers in various fields by the universality of the form of knowledge control, which can be applied at all stages of training. The advantage of test control is that it is a scientifically based method of empirical research. Unlike ordinary tasks, test tasks have a clear, unambiguous answer and are evaluated by default - in the simplest case, the student's assessment is the sum of points for correctly completed tasks. Properly written test items should be clear, correct, not suggesting ambiguity. The test should be a task system of increasing complexity. Test control can be used as a means of all types of control: basic (initial), current (thematic), milestone (test), final (examination) and self-control [6].

Test control has another advantage. Without much time, it allows you to interview all students in all sections of the training course. The sum of the grades makes up the rating of knowledge, at the discretion of the teacher, can become the basis for exemption of the student from passing part of the discipline, and in some cases the entire course. Tests also attract students - by their unusualness compared to traditional forms of control, the incitement to systematic classes in the subject, the creation of additional motivation for learning.

At the present stage of development of computer technologies and the level of their implementation in society, including in the educational sector, researchers often turn to the topic of ensuring the effectiveness of automated knowledge control, part of which is the automation of the process of monitoring and processing test results.

The most widespread in the world are two forms for assessing the quality of assimilation of educational material, closely related to models of programmed instruction: answers constructed for a linear model B.F. Skinner and the sample form are for branched Dr. Norman Crowder of the University of Chicago. In the first case, the student must supplement the text of the assignment with a missing word or words, in the second - choose the correct answer from a number of proposed ones. In the proposed set of answers, one is correct and the other is erroneous. If possible, the number of incorrect answers includes typical mistakes known from the practice of training. It is the selective type of response that is most often used today with automated control, since it is easier to implement in comparison with other types.

The practice of using closed-form tasks shows that the optimal number of possible answers is 4-5, therefore, the authors of automated knowledge control systems decided to take the maximum number of possible answers no more than five [10]. To increase the reliability of the results of knowledge testing, from 7 to 25 tasks are usually included in the work. In the latter case, a whole full-time lesson is allocated for their implementation. Taking into account the different abilities of students to memorize, about half of the questions included in the final assignment are devoted to the reproduction and formulation of definitions, rules, laws, the second half should contain tasks in which students could show their ability to use theoretical knowledge in practical activities or to illustrate the practical application of theory [11-13]. These tasks should be divided into 3 links: 1) tasks according to the algorithm; 2) tasks that differ in some elements of novelty (for example, the condition of the problem is non-standard, but the algorithm of action remains the same); 3) tasks requiring a search for a way to obtain the desired result [8].

CONCLUSIONS

Thus, already at the present stage of the development of education, taking into account the requirements for objectification of students' knowledge control, it is advisable to involve distance learning systems [3] to study, self-study, control and self-control knowledge. Such systems have advantages over local computer testing, have a wide range of

tools for implementing objective control, in addition to controlling knowledge from the teacher, are able to implement self-control of students' knowledge.

Test tasks for each individual discipline have their own specifics. For example, test tasks in economic disciplines contain a large amount of not only factual, but also analytical information, it is difficult to formalize, therefore, it is advisable to use all of the above types of tasks to create economic tests.

Undoubtedly, the development of engineering thinking should primarily and to a greater extent be based on activities related to material objects. However, the virtual world, a computer-based learning or game-learning environment, if properly organized and used, can contribute to this development.

New information technologies, primarily mathematical and computer modeling, have given rise to new types of teaching aids, but the methodology for their use is not fundamentally new. We believe that while preserving the essence and updating the form of the teaching methodology, the virtual environment can significantly increase its effectiveness under the following conditions: 1) systemic use, first of all, of highly interactive virtual educational objects; 2) the use of virtual educational objects in individual work, with various forms of organization of classes, their inclusion in all types of educational activities.

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