APPLICATION OF INFORMATION TECHNOLOGY IN TEACHING BIOLOGICAL SCIENCES

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Abstract: The use of educational information technologies in traditional lessons is relevant and timely, since new approaches in the educational process enable students to receive more educational information. Information technology for teaching can be included at the main stages of the lesson: explaining new material, consolidating it and testing students' knowledge, skills, and abilities.

Keywords: information, educational information technology, computer technology, multimedia technology.

Origin

The feasibility of using information technology in teaching biology is beyond doubt, but the effectiveness of this technical tool increases significantly if its use is not episodic, but systematic, throughout the course. Unfortunately, when developing a traditional biology course, the use of information technology was not intended, and therefore it was necessary to develop criteria for selecting educational topics that would be appropriate to study using information technology.

MATERIALS AND METHODS

By the term "information" we mean an educational message, awareness of various phenomena, the conditions of their occurrence, patterns, etc., perceived and realized by students.

The concept of "information" differs from the concept of "information flow".

In this case, two types of information flow can be distinguished [1]:

1) a set of material objects (phenomena, processes) that need to be analyzed and systematized by the student to understand the material being studied;

2) a set of various conditions and parameters that are selected (set, entered by a student or teacher, programmer) in order to obtain a certain result (completing a task) of a computer experiment.

Educational information technology should be understood as a technology in which students must work with a powerful specialized flow of educational information obtained with the help of computer technology and teaching staff.

At various stages of the development of pedagogical science, the problem of control and testing of knowledge occupied an important place. Significant contributions to its development were made by A.P. Pinkevich, S.T. Shatsky, E.A. Guryanov, M.M. Pestrak, M.I. Zaretsky, P.N. Gruzdev, M.A. Danilov, B. P. Esipov, E.I. Perovskaya and others. At the present stage, such famous teachers as I.P. are studying this problem. Podlasy, L.P. Krivshenko, V.V. Kraevsky, A.V. Khutorskoy, V.A. Slastenin, I.F. Isaev, E.N. Shiyanov, V.K. Dyachenko and others [1-4].

RESULTS AND DISCUSSION

Information technologies are used in modeling, design and analysis of subject information environments, their content and didactic components. Designing information subject environments is a fundamentally new task in teaching methodology, requiring special knowledge in the fields of didactics, psychology, and management. Unlike conventional technical teaching aids, ICTs make it possible not only to saturate the student with a large amount of ready-made, strictly selected, appropriately organized knowledge, but also to develop the intellectual and creative abilities of students, their ability to independently acquire new knowledge and work with various sources of information. The use of ICT in biology lessons will intensify the activities of the teacher and student; improve the quality of teaching the subject; reflect the essential aspects of biological objects, highlight the most important (from the point of view of educational goals and objectives) characteristics of the studied objects and natural phenomena. Methodological techniques for using multimedia in biology lessons. The advantages of multimedia technologies, compared to traditional ones, are manifold: visual presentation of material, the ability to effectively test knowledge, a variety of organizational forms in the work of students and methodological techniques in the work of a teacher [3]. Many biological processes are complex. Children with imaginative thinking have a hard time learning abstract generalizations; without a picture they are not able to understand the process or study the phenomenon. The development of their abstract thinking occurs through images. Multimedia animation models make it possible to form a holistic picture of the biological process in the student's mind; interactive models make it possible to independently "design" the process, correct their mistakes, and educate themselves.

A training module may also contain a training model. The development of a model begins with the delivery of a problem. The type of modules, the main stages of the "dynamics" of the modules, and how to output information are determined.

Next, they begin to assemble the module, which may include text information, graphic images, the type of control in each frame, etc. Finally, the correct functioning of the module is checked.

The criteria for selecting content can be summarized as follows [4]:

1) the selected content should contribute to the creation of a flow of information;

2) the selected material must be adapted for students of the appropriate age;

3) the selected material should include various types of visibility;

4) the selected practical content should contribute to the construction of models of objects of various kinds and the identification of patterns of their functioning;

5) the design of the content should contribute to the classification and systematization of the flow of information presented to students.

When studying biology, various visual aids are used, but with the introduction of computer technology, it was of interest to classify these teaching aids and give their detailed characteristics.

1. Visualization of the first kind is everything that students see on the screen when working with computer programs (tables, diagrams, drawings, photographs).

2. Visualization of the second kind is a symbolic (model) record, support diagrams made by students.

3. Visualization of the third kind is multimedia visibility, which allows not only to combine visualization of the first and second types in dynamics, but also to significantly expand and enrich their capabilities by introducing multimedia fragments through the use of information technology.

The process of introducing information technology into the education of schoolchildren is quite complex and requires fundamental understanding. When using a computer in school, it is necessary to ensure that the student does not turn into an automaton who can think and work only according to the algorithm proposed to him by someone (in this case, a programmer).

It should be noted that the computer, as a pedagogical tool, is used in school, as a rule, sporadically. This is explained by the fact that when developing a modern biology course, there was no question of linking information technology to it. The use of a computer, therefore, turns out to be advisable only when studying individual topics where there is an obvious possibility of variability.

An analysis of research on the problem of using information technology in the learning process has shown that little attention has yet been paid to the issues of considering the main forms of combining traditional and information technologies in education. An important methodological principle of using computer programs is their compatibility with traditional forms of education. When planning lessons, it is necessary to find the optimal combination of such programs with other (traditional) teaching aids. The presence of feedback with the possibility of computer diagnostics of errors made by students in the process of work makes it possible to conduct a lesson taking into account the individual characteristics of students. Control of the same material can be carried out with varying degrees of depth and completeness, at an optimal pace, for each individual person. Thus, we assume that information technology is most appropriate to use for preliminary control of knowledge, where quick and accurate information about students' mastery of knowledge is required, if it is necessary to create an information flow of educational material, or for modeling various biological objects.

CONCLUSION

Thus, students quickly learn to use a computer in educational activities. The use of information technology makes it possible to improve the quality of education, make it more complete, visual and accessible. The presence of stable feedback in the "teacher-student" chain makes it possible to timely identify and eliminate gaps in students' knowledge, which helps to improve academic performance. The organization of control using the training and control computer programs we propose is quite effective, and the programs themselves meet the requirements for software. The developed methodology for their use can significantly increase the level of student achievement in biology by individualizing the process of knowledge control.

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