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Prospects of information-computer technologies in teaching biology

The article deals with the problems of information support of biology lessons as plans for the implementation of a didactic approach to the development of the content of their technological composition of education, as it makes it possible to use computer videos, multimedia presentations in the lesson, which allows students to activate motivation and increase the effectiveness of learning. Today, the use of modern information technologies in the educational process makes it possible to improve the quality of the presentation of educational material and increase the effectiveness of training. The relevance of the study is related to updating the content of education, setting the tasks of the methodological organization of information and computer technologies in teaching biology. And a competent teacher is an important participant in the educational process, and he cannot but take into account such an intensive improvement of information and computer technologies in his work. The use of information and computer technologies makes it possible to significantly expand and diversify the content of teaching in the assimilation of biological material by schoolchildren. Information culture (literacy and competence) is the key to success.

Studies have shown that the practice of a biology teacher today includes active teaching methods using information and computer technologies, which opens up new opportunities for developing students' cognitive interest in the subject being taught.

The authors of the article consider the possibility and even the strategic necessity of using information and computer technologies (ICT) in teaching biology, which allows solving the problems of computerization of education from an organizational point of view and increasing the effectiveness of teaching.

Keywords: information and computer technologies (ICT), control and evaluation functions of the lesson, integrative form of assessment, developed creative potential, information technologies of education, school educational practice.

Introduction

In the current socio-educational conditions, information and computer learning technologies should take a leading position. Particularly relevant is the question of definitions that pedagogically ensure the high quality of the use of computer technology as an effective means of teaching schoolchildren on the basis of a subject-oriented environment. A complex of areas of activity, which include information and computer technologies, create new means and methods of managing technical means in the classroom, biologists and students freely transfer and disseminate information.

Foreign scientists-practitioners in this direction talk about the impact on the process of including computer technologies in the educational process of the world education system [1].

The computer is used at all stages of learning, they confirm this fact: when explaining, confirming, repeating new material, monitoring the progress of the lesson, giving it a playful character, which allows reaching a higher level of assimilation of the material, contributing to the educational and cognitive activation of students [1].

Of particular importance is the analysis of modern practice of using computers to solve various educational problems. Modern society sets a number of technological tasks for the teacher of biology: analysis, systematization of information to solve the task [2].

Of particular importance is the analysis of modern experience in the use of information and computer technologies for resolving ambiguous subject-educational problems. The modern educational system sets a

number of technological tasks for a biology teacher to create a comfortable learning process: to analyze the content of the subject as information, to systematize it to solve practical tasks [2].

The innovative introduction of ICT in biology lessons opens up the main target areas for the teacher, requiring certain competencies to solve them. The most needed opportunity is to look for modern information and computer technologies (ICT) to improve the quality of education. In this regard, a comprehensive renewal of the general education school system defines new strategic directions for the teacher.

The most needed search capability is modern information and computer technology (ICT) to improve the quality of education. In this regard, a comprehensive renewal of the general education school system defines new strategic directions for the teacher.

Firstly, it is not only academic knowledge of the subject of biology, but also the formation of a competitive personality. At each lesson, learning situations should be created that develop creative thinking, initiative in the student's independent work [3].

The use of computers to ensure the individualization of the educational process allows the teacher to control the learning activities of schoolchildren and more clearly observe the personal tempo of learning, as well as the acquisition by schoolchildren, within the framework of student-centered learning, of the skills to solve technical problems in the classroom. The gaming nature of computer technologies creates a comfortable emotional environment in the learning space and increases the level of assimilation of scientific material in biology, stimulates the process of critical reflection on electronic publications [4].

Experimental

The use of information computer technologies in biology lessons makes it possible to organize independent group work in the lesson with the benefit of each member of the group and typologize the learning process depending on the direction of the lesson topics [5].

Unlike conventional technical teaching aids, ICT with didactic support make it possible to fill in the volume of ready-made, correctly selected practical tasks with the activation of students' actions in the lesson.

The objectives of the study include generalization and systematization of the applied methods of information and computer technologies, methodological guidance of a biology teacher in organizing a lesson and creating a lesson plan [6].

In the educational practice of the school, information and computer technologies can be used as follows:

- ICT as a means of teaching and controlling knowledge, skills and abilities;
- adjustment of the results of educational activities by means of computer design and organization of educational activities;
- multimedia learning technologies are able to visually present educational material as a visual aid in learning new ones.

Information support for biology lessons gives the teacher the opportunity to implement a fundamentally new didactic approach to teaching, which greatly simplifies the work of the teacher and increases the satisfaction of students' needs for the subject.

Without expanding the use of modern technical means in education, the future of education is impossible, and the subject of biology in the school curriculum should have its own organizational, methodological and content features, respectively, the “moment of introduction” of information and computer technologies [7].

This includes the reflective abilities of students in educational and cognitive activities. Each of the selected criteria is characterized by a number of indicators (Table 1).

Table 1

Criteria and indicators of IR biology

Criteria	Indicator
Cognitive	Possession of knowledge in preparation for the subject of biology. Knowledge of heuristic and logical methods for solving problems in biology of a research nature in the learning process. Knowledge of the implementation of research activities of schoolchildren in the process of studying biology.
Praxeological	Possession of the skills that make up the content of biology training. Acquisition of knowledge in solving biological problems. Experience in solving biological problems Possession of the experience of research activities by students in the process of teaching biology.

Axiological	Attitude towards oneself as a subject of research activities. Interest in the subject area “Biology”. The importance of self-assessment of the results of solving biological problems. Self-development of activity based on reflection.

Thus, the hypothesis of the experiment was confirmed that the development of the activity of students in the senior classes contributes to the complex formation of the structure of cognitive, communicative and organizational competencies in the use of information computer technology (ICT) [8].

Diagnostics of these skills was carried out by analyzing the effectiveness of its use.

Subject results are expressed in the following qualities:

- the ability to use the means of information computer technology (hereinafter referred to as ICT) in solving cognitive, communicative and organizational skills and abilities.

The process of studying information and computer technologies should be designed in such a way that each student is ready to build a set of competencies in time, design the most complete training program at a certain level. Learning tasks are an integral part of learning, since it can be said that they develop the logic of thinking and communicative activity. Sometimes they act as a means of maintaining the cognitive, communicative and organizational skills of students in the study of the subject of biology [5].

In our study, we propose to consider the main results of the use of information and computer technologies (ICT) in order to expand the range of abilities and interests of students in the biology lesson. In the online survey methodology, there is no direct contact with students, which contributes to a completely new communicative form of communication, which often reduces psychological discomfort and increases the level of truthfulness of answers [9].

The main directions of the online survey help to achieve a real collection of information about the content of the process being studied [10].

When compiling an online questionnaire, attention was paid to the types of questions, their order, the form of presentation of meaning, the choice of the content of words. The most appropriate questions showed signs of simplicity of wording, and the questions reflected direct, unambiguous content. And to start online, the questionnaire was pre-tested on a small sample of respondents. We posed more complex questions at the end of the questionnaire so that students would not emotionally react to the rest of the answers. Finally, the questions had a pattern of logic and consistency.

As an example, let us describe the reproductive level of IC-1 (Table 2).

Table 2

Reproductive level of formation of IC-1 students in biology

Formation criterion	Formation indicators	Reproductive level
cognitive	Assimilation of knowledge constituting the content of the discipline of biology.	Demonstrates possession of a fragmented knowledge of the subject (may be unsystematic).
	Knowledge of heuristic and logical methods for solving biological research problems.	Knows some scientific methods of cognition, heuristic and logical methods for solving the essence of biological research.
praxeological	The skills that make up the content of biology.	Solves typical mathematical problems with research elements.

The identified criteria and indicators make it possible to comprehensively assess the formation of the IC components of students in biology. To assess the level of formation of IC in biology students, we used such integrative technologies as: brainstorming (brainstorm), round tables (discussion, debate), case-study (analysis of specific situations, situational analysis), master classes, business and role-playing games.

The main tool in the process of measuring and evaluating the IC of worldview knowledge was the tasks focused on competence, which we developed specifically for the high didactic potential of competence control.

On the one hand, they allow the subject of biology in the educational and cognitive activity of students to create tasks in the form of research. On the other hand, they allow you to simulate situations related to biological tasks in the lesson.

The methodological basis for creating such biological tasks was developed by A.A. Verbitsky theory of contextual learning [11, 12].

In accordance with this concept, competence-oriented tasks should be classified into two types: subject-based research and educational-cognitive. The complex of the designated integrative technologies allows for an objective, complete measurement and evaluation of the level of formation of the IC of worldview knowledge in biology students.

It should be noted that the proposed approach to the assessment of research competencies, in our opinion, can be used as the basis for the technology for assessing the competencies of school graduates in the format of modern SES.

Criteria-based assessment technology is designed to develop the research competencies of the worldview knowledge of senior students in teaching biology, their creative and research potential, creating the necessary conditions for educational independence and orientation in the flow of scientific information. All this is achieved by involving students in systematic reflection, determining the meaning of their actions.

Thus, the criteria-based assessment of worldview knowledge in biology is a system for assessing the educational achievements of students, which consists in comparing the educational achievements of a teacher with students according to clear criteria that are known in advance to all participants in the educational process. The criteria correspond to the purpose and content of education, contribute to the development of research activity of students [13].

The use of criteria-based assessment of worldview knowledge in biology also allows the biology teacher to clearly understand the strategic goals and tactical tasks of education, and also helps students understand the basic rules for using integrative technologies and learning objectives.

It is very important to understand the introduction of this integrative technology into the educational process in order to avoid misunderstanding and erroneous reaction of students in the control of knowledge.

An important principle of integrative technological forms of education is the presence of criteria-based assessment as a process of knowledge control by students who could not only see and know the criteria for controlling their learning activities, but also directly participate with the teacher in the discussion of the assessment of research tasks. To implement such interaction with students, the teacher may need the following action plan:

- the topic, goals and objectives of the lesson are announced;
- all students are encouraged to try to create conditions for assessing their debating skills.

This stage of the formation of research competencies can be done using the “Basket of Ideas” technique, because all students in a certain sense “throw” research ideas into a common piggy bank. Further, all ideas are analyzed by all students together with the teacher and priority learning tasks (criteria) are selected that should be included in the topic. Each criterion is divided into levels of success.

The final step is to discuss the grading scale and translate the scores into a final grade.

The technology of integrative forms of education as a form of assessment according to certain criteria takes time to be used in practice. When using these forms of teaching assessment, the teacher must comply with the following general requirements:

- the work being assessed and the procedure for assessing it should allow the teacher and student to jointly identify strengths and weaknesses, as well as to understand what the student can do to reduce their failures;
- evaluation is carried out in accordance with the general evaluation criteria for a specific subject group, achievements for each of the criteria are identified separately;
- students know the assessment criteria that must be met before starting an assignment, and, if possible, participate in descriptors and discussions for assessing assignments;
- students are given the opportunity to analyze their learning using assessment criteria and identify issues that require special attention and improvement;
- interaction of teachers is organized to assess the work of schoolchildren in order to develop common approaches to this process of research activity;
- evaluation of the work is carried out as objectively as possible, regardless of personal preferences and dislikes, which is achieved by creating detailed topics consisting of criteria and descriptors for each of the criteria.

Using the technology of integrative forms of teaching and assessment, the teacher changes the attitude of students to the subject. When creating descriptors, each educational task is evaluated by a certain number of points, which the student summarizes when completing tasks. As a result, the usual assessment is filled with real meaning and content for the student.

Thus, by analyzing the assessment of a certain aspect of the student's activity with a certain number of points, the teacher motivates the necessary aspect of the student's work. Of course, the effectiveness of this assessment system depends on the teacher's willingness to organize and manage the educational process.

Monitoring and evaluation should motivate students to show interest in the subject of biology and strive for students to improve their results. In this regard, when evaluating progress, the teacher should pay more attention to the pace of student development, increase his desire for self-improvement and deepen his knowledge in the field of education. The teacher must ensure that each student has equal access to the foundations of their subject, based on broad and flexible biology teaching methods and tools for developing students at different levels of biology education.

Pedagogical control serves as a tool for students to acquire new knowledge and master general educational activities, the formation of adequate self-esteem and the need to motivate the individual to self-improvement.

Taking into account all the above rules, the practical application of the technology of integrative forms of education as a system for monitoring and evaluating worldview knowledge in the subject of biology creates fundamentally new conditions for teaching students, which in turn affects the formation of motivation, self-esteem and personal qualities. emotional condition. At the same time, the growing role of reflexive factors and self-control creates the basis for reorientation to internal motives.

A system aimed at interaction with the teacher and classmates may change the system of priorities and values in the learning process, and may not affect the overall motivational relationships and create a favorable emotional atmosphere in the classroom.

Results and Discussion

The experience of applying the methodology of integrative technological forms of education allows us to draw conclusions about the culture of control and evaluation of students' knowledge in the way that this process develops the skills of observation and self-control in older students; stimulates the implementation of educational and cognitive activities; makes control “open” and understandable for all participants in the educational process (students, parents, teachers).

This system of open control allows the teacher to focus on the student's progress, identify areas for growth, highlight what can be learned, and all this makes the process humanized and focuses on the development of the student, who is independent and responsible for their results.

Today in Kazakhstan, the modernization of the education system and its content is in full swing. This process is accompanied by fundamental changes in pedagogical theory and practice [14].

Qualitative changes in any sphere of our life, and even more so in education, are impossible without the formation of a new look at the place and role of the teacher in the educational process.

Without these problems, new goals and objectives may not be achieved, given the competence-oriented, student-oriented, activity-based and differentiated approaches to teaching, with updated content and methods in teaching, as well as new forms of assessment. Therefore, a modern teacher of secondary education has essentially “updated” the content and methods of state educational standards, in order to accept changes, software and didactic support of the educational process, teachers need to change the goals and methods of training [15].

Particular importance in the updated program is given to the concept of integrative forms of education as a form of control over the assessment of worldview knowledge. Much attention is paid to the study of the assessment system by teachers in order to achieve the expected results. If the traditional school curriculum uses a five-point grading system and the teacher has the right to decide for himself whether it will be four or five, then the system of criteria-based assessment under the control of worldview knowledge in biology requires a very open assessment, which is formative (without assessment) during the entire academic year, but with feedback, and summative, which involves the final grade for studying the section and for the quarter.

Assessment should be for students, parents and teachers. Now it is important for the teacher to teach the child and his parents feedback. That is, in a student's notebook, the teacher writes down what to look for. This will help parents understand the situation of the child's educational process. The teacher, in turn, has an excellent opportunity to accurately assess the progress of the student, because any task will be evaluated formatively. These evaluation criteria are defined, and the students know these criteria, and then there is no question why one received praise and the other did not.

Schoolchildren's learning outcomes require teachers to provide a comprehensive and objective assessment of each child's achievement in achieving expected learning outcomes, his or her attitude towards learning, and the dynamics of overall personality development.

The application of biological problems causes an invariable response from students. Often schoolchildren are instructed to select such examples themselves when studying various branches of biology. For example, when studying mammals, students can name representatives that live around them, a similar situation for other representatives of the animal world. One of the methods of stimulation is the comparison of scientific and everyday interpretations of individual natural phenomena in the study of the discipline “Biology”. For example, how does the duration of daylight hours affect the inhabitants of our planet. What happens to the flora and fauna with the advent of spring or autumn? On the one hand, these are simple questions, but for students these are full-fledged tasks that motivate them to get an answer [14].

To achieve the planned result, we used biological tasks. There are different types of biological tasks:

- “quiz” questions and tasks;
- tasks “for observation”;
- tasks like “guess who”;
- tasks “to establish connections”;
- tasks “for enumeration”;
- tasks “about functions”;
- tasks “about ways to solve”;
- tasks “on the connection of the structure with the way of life”;
- tasks “for comparison”;
- tasks “for global communications”;
- integrated tasks.

Speaking about the types of biological tasks with technical innovations, it is worth using interactive whiteboards, the main function of which is the demonstration and active work with all types of graphic and text files and videos, the creation of an electronic lesson protocol. There are several types of interactive whiteboards (Fig. 1):

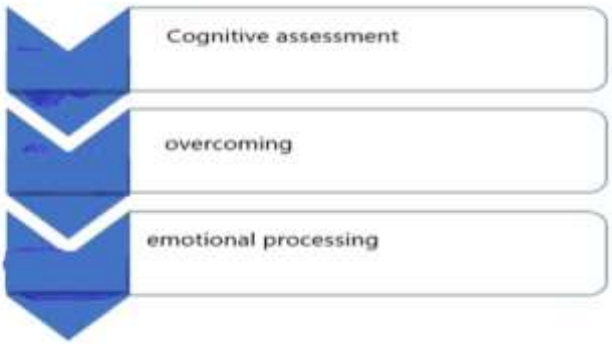

Figure 1. A variety of interactive whiteboards

• **Active whiteboard —** connects to a power source and to a computer. Working with files is carried out using a special stylus.

• **Electromagnetic interactive whiteboard —** works on the principle of passive electromagnetic technology, which allows the use of special markers.

• **Interactive whiteboard based on infrared scanning technology —** a large display equipped with infrared sensors, which can be operated either with a special stylus or just with your fingers.

To work with interactive whiteboards, special software is used, with which the teacher can add notes on top of any image on the screen, focus students' attention on important details, use ready-made templates for documents and lessons for teaching, import and modify various graphic objects.

It is assumed that in the process of assessment using these criteria-based technologies, the student will gradually build up his own competence + potential and achieve the expected results at the level of “I am sure that he can do it”.

Thus, in accordance with the competency-based approach, the development of the curriculum is assessed through specific results that indicate the achievement of learning goals according to measurable and observable criteria for monitoring and evaluation.

Biological tasks are an integral part of learning, as they develop logic, thinking, and creative activity. The biological task is aimed at developing the logical thinking of students, and also helps to consolidate the studied

material. In some cases, biological tasks act as tools for expanding the knowledge and research interests of students, especially if their solution is assigned to homework [16].

Results and discussion

Let's consider the main results of the study, in which 23 students of the 10th grade took part.

As a result of the survey aimed at assessing the level of research interests as forms of initial research competencies in the discipline "Biology", at the ascertaining stage, the results presented in Table 3 were obtained. In the process of conducting the study, some students found it difficult to determine answers, which took them time (Table 3).

Table 3

The level of research interests in the discipline "Biology" at the ascertaining stage (%)

Level	High %	Medium %	Low %
Number of students	18	40	43

The answers of the students showed the predominance of an average and low level of development of research interests as forms of initial research competencies in the discipline "Biology", a high level, unfortunately, is represented by a low percentage (Fig. 2).

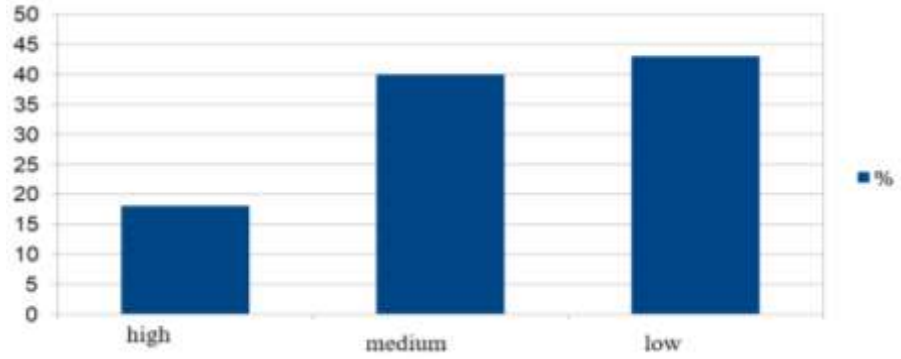

Figure 2. The level of research interest in the discipline "Biology" at the ascertaining stage (%)

Thus, at the ascertaining stage, the need to intensify the use of knowledge, skills and abilities and the use of information computer technologies (ICT) was identified (Table 2).

As part of the work carried out at the control stage, we carried out a re-diagnosis of the level of development of cognitive, communicative and organizational skills and abilities in the application of information computer technologies (ICT) in the biology lesson (Fig. 3).

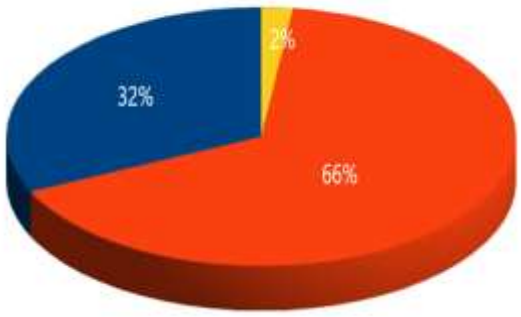

Figure 3. The level of research interest in the discipline "Biology" at the control stage (%)

The number of students with a high level of development of knowledge and their application in the biology lesson was 31%. 64% of students showed an average level and 3% showed a low level.

Conducting a comparative analysis of the results of the development of knowledge in biology and their application of information computer technologies (ICT) to the educational environment at the ascertaining and control stages made it possible to establish that the number of students with a low level of this indicator had a

negative trend of 42%, which is probably due to the transition of these students to a higher level of control and evaluation of their own knowledge of biology using information computer technologies (ICT) (Table 4).

Table 4

Comparative results of level diagnostics of research interests, ascertaining and control stages (%)

Level	High	Medium	Low
number of students	%	%	%
ascertaining stage	18	40	43
control stage	32	66	2

Thus, the results obtained by us prove the effectiveness of the completed set of tasks on the use of information and computer technologies (ICT), aimed at increasing the level of students' use of ICT in biology lessons and increasing their level of knowledge, skills and abilities in the use of ICT.

So, based on the results of the study, the following conclusions can be drawn:

- the use of information and computer technologies (ICT) in a secondary school is an effective means of developing motivational activity in the use of ICT and systematizing students' knowledge of the subject of biology.

- the use of various forms of ICT and their inclusion in the system of biology lessons contributes to the deepening of students' knowledge, since the studied material is considered in the context of a broader issue. This, in turn, creates optimal conditions for obtaining knowledge in the system of interdisciplinary connections. Work on these technologies not only preserves the structure of the general education cycle, fully meets the requirements of the mandatory minimum content of education, but also:

- helps to increase cognitive interest in the subject;
- contributes to the growth of student achievement in the subject;
- allows students to express themselves in a new role;
- forms the skills of independent productive activity;
- contributes to the creation of a situation of success for each student.

ICT works for a particular student, and he takes as much as he can learn, works at a pace and with those loads that are optimal for him. Undoubtedly, ICTs are developing technologies and should be more widely integrated into the learning process.

Table 5

Requirements for the mandatory minimum content of training

№	Temp loads	Learning content
1.	Use of electronic methodological materials in school practice	saving time in class
		immersion depth in the material
		increased learning motivation
		integrative approach to learning
		the possibility of simultaneous use of audio, video, multimedia materials
2.	The use of ICT in the classroom helps both the teacher and students in learning activities	value-semantic definition of students in the study of subjects of biology
		new goals of education are being implemented
		organization of productive activities
		formation of information literacy and competence
		process customization

The effectiveness of educational and cognitive activity of students is increased by expanding access to educational information and improving organizational forms and methods of teaching and visualizing the information provided. Using ICT, the teacher is freed from reloading in time for teaching students and keeps the increase in students' interest in studying the subject and doing homework, in the form of presentations on a given topic.

Conclusion

The methods of using information and computer technologies (ICT) that we have chosen are by far one of the most effective and necessary teaching aids, giving both the teacher and the student more freedom in choosing methodological ways to fulfill the requirements of the curriculum. It follows from this that it is

necessary to continue work in this direction, to achieve high results, to improve the quality of student education.

The productivity of the practice is aimed at a system of work that will allow organizing a potential space for interaction and cooperation between the teacher and students and conducting mutual control and self-control.

Further, to draw conclusions affecting the activation of the cognitive activity of the individual make it possible to create prospects for the process of globalization of integrated learning in the process of studying biology and ICT into a single pedagogical process.

The use of information and computer support in biology lessons allows you to expand the possibilities of teaching biology, organize the optimal combination of motivational and visual parameters of educational material, and make the learning itself more individualized in general.

At the end of the study, we made final conclusions about the degree of impact of information computer technologies on the system of general secondary education, since education acts, on the one hand, as a consumer of information.

However, computer technologies have already proven their effectiveness in school education, in combination with interactivity, offering various expressive means of displaying educational information, the computer provides a qualitatively new level of education.

The use of information computer programs in biology lessons contributes to the formation of students' learning activities in the lesson, as these technologies expand the possibilities for individual development in teaching ICT, allow students to expand students' interest in the subject of biology, and teachers to understand the methods and conditions for organizing interdisciplinary integration of biology and computer science.

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С.Е. Шажанбаева, Н.В. Малиновская, Р.Х. Курманбаев, С.Ж. Ибадуллаева, А.Б. Карабалаева

Оқыту үрдісі жағдайында интегративті технологиялар мен оқыту формалары арқылы оқушылардың дүниетанымдық білімдерін қалыптастыру

Мақалада биология сабақтарын ақпараттық қамтамасыз ету мәселелері оқытудың технологиялық құрамының мазмұнын әзірлеуге дидактикалық тәсілді іске асыру жоспары ретінде қарастырылған, өйткені бұл сабақта компьютерлік видеоларды, мультимедиялық презентацияларды пайдалануға болады, яғни бұл оқушылардың мотивациясын белсендіруге және оқытудың тиімділігін арттыруға мүмкіндік береді. Бүгінгі таңда білім беру процесінде заманауи ақпараттық технологияларды қолдану оқу материалын беру сапасын жақсартуға және оқытудың тиімділігін жақсартуға мүмкіндік жасайды. Зерттеудің өзектілігі білім беру мазмұнын жаңартумен, биологияны оқытуда ақпараттық және компьютерлік технологияларды әдістемелік ұйымдастырудың міндеттерін қоюмен байланысты. Ал сауатты педагог білім беру процесінің маңызды қатысушысы болып табылады және ол өз жұмысында ақпараттық және компьютерлік технологиялардың осындай қарқынды жетілдірілуін есепке алмау мүмкін емес. Ақпараттық және компьютерлік технологияларды қолдану оқушылардың биологиялық материалды игеру бойынша оқу мазмұнын едәуір кеңейтуге және әртараптандыруға мүмкіндік береді. Ақпараттық мәдениет (сауаттылық пен құзыреттілік) табысқа жетудің кепілі. Зерттеулер көрсеткендей, бүгінгі таңда биология мұғалімінің тәжірибесі ақпараттық және компьютерлік технологияларды қолдана отырып оқытудың белсенді әдістерін қамтиды, бұл оқушылардың оқытылатын пәнге танымдық қызығушылығын дамытуға жаңа мүмкіндіктер ашады. Мақала авторлары биологияны оқытуда ақпараттық-компьютерлік технологияларды (АКТ) қолданудың мүмкіндігі мен тіпті стратегиялық қажеттілігін қарастырған, бұл білім беруді компьютерлендіру мәселелерін ұйымдастырушылық тұрғыдан шешуге және оқытудың тиімділігін арттыруға мүмкіндік береді.

Кілт сөздер: ақпараттық-компьютерлік технологиялар (АКТ), сабақтың бақылау-бағалау функциялары, бағалаудың интегративті түрі, дамыған шығармашылық әлеует, білім берудің ақпараттық технологиялары, мектептегі оқу тәжірибесі.

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Перспективы информационно-компьютерных технологий в обучении биологии

В статье рассмотрены проблемы информационного обеспечения уроков биологии как планов реализации дидактического подхода к разработке содержания их технологического состава обучения, так как это дает возможность использовать на уроке компьютерное видео, мультимедийные презентации, что позволяет активизировать мотивацию учащихся и повысить эффективность обучения. Сегодня использование современных информационных технологий в образовательном процессе позволяет улучшить качество подачи учебного материала и повысить эффективность обучения. Актуальность исследования связана с обновлением содержания образования, постановкой задач методической организации информационных и компьютерных технологий в преподавании биологии. А грамотный педагог — важный участник образовательного процесса, и он не может не учитывать столь интенсивное совершенствование информационных и компьютерных технологий в своей работе. Использование информационных и компьютерных технологий позволяет существенно расширить и разнообразить содержание обучения по усвоению биологического материала школьниками. Информационная культура (грамотность и компетентность) — залог успеха. Исследования показали, что практика учителя биологии сегодня включает активные методы обучения с использованием информационных и компьютерных технологий, что открывает новые возможности для развития познавательного интереса учащихся к преподаваемому предмету. Авторы статьи рассмотрели возможность и даже стратегическую необходимость применения информационно-компьютерных технологий в преподавании биологии, что позволяет решить проблемы компьютеризации образования с организационной точки зрения и повысить эффективность обучения.

Ключевые слова: информационно-компьютерные технологии, контрольно-оценочные функции урока, интегративная форма оценивания, развитый творческий потенциал, информационные технологии обучения, школьная образовательная практика.

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