

Enhancement of biochemistry laboratory courses for medical students through the use of an electronic textbook

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Abstract. Today, at the main stage of reforming education, it is very important to create a new generation of educational literature that meets the requirements of modernity. In our time, new modern information technologies open up a lot of opportunities. For example, computer, printer, scanner, multiplication, animation presentation and so on. This, in turn, simplifies the creation of an active learning system and e-books. As a result, it is possible to organize modern informative lectures, practical and experimental laboratories.

1 Introduction

The education and upbringing of students and young people in a rapidly developing period requires great talent and great strength from the teacher. Especially the head of our state Sh.M. Mirziyoyev declared 2023 "the year of attention to people and quality education" and stressed that "improving the quality of education is the only right way for the development of New Uzbekistan", we need to understand and implement the main directions of fundamental reforms in the field of education. As stated in the petition, "Improving the quality of education is the only right way to develop New Uzbekistan." Given the current situation, the head of our state has constantly paid great attention to these important development factors throughout 2022. For example, on July 6 last year, presidential decrees "On approval of the Strategy for Innovative Development of the Republic of Uzbekistan for 2022-2026" and "On organizational measures for the implementation of the Strategy for Innovative Development of the Republic of Uzbekistan for 2022-2026" were adopted. "were accepted. Therefore, the future and development of our country directly depends on innovative factors and quality education.

At the moment, at the state level, attention is paid to the issue of providing the medical sphere with modern-minded, deeply knowledgeable, responsible, mature personnel in all respects. The President also touched upon this issue at meetings with medical workers. In particular, he emphasized the need to prepare proposals for further improvement of the system of medical education, having studied foreign experience [1].

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In order to increase the effectiveness of education, ensure that the person is at the center of education and young people learn independently, educational institutions need well-trained teachers who, in addition to solid knowledge in their field, know modern pedagogical technologies and interactive methods, as well as knowing the rules for their use. in the organization of educational activities. To do this, all teachers of natural sciences must be fully aware that it is extremely necessary to master pedagogical and information technologies, interactive methods and be able to use them effectively in educational activities. Therefore, a modern teacher needs to be able to adapt to situations and new processes of activity in any situation, to work tirelessly on himself. Because the teacher cannot stay away from new information in the face of rapid global changes. Moreover, if he does not go one step ahead of his students, he can very quickly lose his reputation and thereby weaken the enthusiasm of the younger generation for education.

Currently, new, modern information technologies open up many opportunities. For example, computer, printer, scanner, multiplication, multimedia, animation, presentations, etc. These, in turn, make it easier to create an active learning system and e-books. As a result, it is possible to organize modern informative lectures, practical and experimental laboratories [2].

2 Experimental part

The use of information and communication technologies (ICT) opens up new perspectives and opportunities for teaching chemistry. At the same time, the development of the ability to read independently is a necessary condition for the intellectual development of the student, focusing on specific literacy in working with information sources. The purpose of the work is the use of information and communication technologies in chemistry lessons. With the help of Internet resources, the teacher can remotely assign homework and check the assignments completed by the student. ICT is the most convenient way to manage educational material. Interactive methods in the educational process: interest and attention to improving the effectiveness of education using innovative pedagogical and information technologies is growing day by day. Trainings with the use of modern technologies were focused on ensuring that students themselves find the acquired knowledge, independently study and analyze it, and even draw their own conclusions.

Our main goal of creating an electronic educational program called "Laboratory classes in biological chemistry" is to automate laboratory classes in this subject for students of higher educational institutions. Biochemistry is one of the fundamental sections of modern biology that studies the chemical foundations of the functioning of living systems, namely: the main classes of organic substances of living organisms and the ways of their transformation. Course objectives:

1. Formation of ideas about the organization of living systems at the molecular level and the unity of their origin;
2. Acquaintance with the processes of transformation of substances and energy occurring in living organisms, and their regulation;
3. Study of the role and prospects of biochemistry in solving practical problems of physiology, biotechnology, agriculture and medicine;
4. Acquaintance with the basic principles and methods of biochemical research.

Biochemical research is an extensive section of laboratory research, including the determination of the content of various organic and inorganic substances formed as a result of biochemical reactions, as well as the measurement of enzyme activity. Biochemical analysis is a simple, affordable and effective method to help monitor animal health, prevent metabolic diseases and maintain performance at a high level that matches the genetic potential.

He can help:

- evaluate the correctness and usefulness of the functioning of internal organs;
- identify the main risk factors for health and predict possible diseases;
- evaluate the effectiveness of treatment measures;
- adjust the diet in accordance with the energy needs of animals;
- to determine the causes of pathological conditions, facilitates the choice of approach to treatment.

Advantages of biochemical blood tests:

- quick results;
- the ability to comprehensively assess the state of the body, as well as its individual systems and organs;
- availability and low cost of research.

Biochemical studies should be carried out in the following cases:

- when changing the diet and for the purpose of its correction;
- with a decrease in the productivity of animals;
- with reproductive problems.

During the learning process, topics can be displayed on the screen using an electronic board or a projector; it is also very effective to use an e-book by controlling a separate computer for each student [3-5]. In addition, through the generated e-book, the student can have the following options:

- Quick search for the desired lecture according to the plan (difficult to find in a regular textbook);
- Printing the necessary parts of the text on the printer;
- Animated viewing of technological schemes on the topic;
- Consolidation of knowledge gained in the laboratory (for example, control work, problem solving, filling in the table);
- Audio and video previews that are not found in books and textbooks: see and hear the events occurring in the experiments - gas evolution, combustion of substances, the color of the precipitate, its melting on video using live sound, color images and music;
- Acquaintance with scientists who conducted research in this area, getting to know them and obtaining information about them;
- They will be able to learn important dates in the field of biological chemistry.

In addition to saving the student's time, the electronic textbook allows you to reuse materials that are difficult for students to understand. It follows from this that it is desirable to place hypertexts in the form of an alphabet or in the form of a "tree". In comparison, in a regular textbook, the reference is given to the page number, while in the electronic textbook, it takes a lot of work to enter laboratory exercises and control type in the mechanism for sorting text, animation, and video clips. The most important issue here is to ensure consistency and continuity. In this case, instructions on how to use the electronic textbook can be given. Instructions may be provided on paper or as a file called "readme", as individual animations, or as HTML, FLASH and other documents.

The database tutorials are mostly developed in Borland Delphi and Visual C++ and contain a very large database. Such textbooks are mainly used in biology, physics, chemistry and similar subjects and fields of science where the database can be widely used. The main goal of our database application is that we can reduce the size of the e-textbook [6-8].

Most people think of e-textbooks as text written on a computer. But with the use of modern technologies, such an electronic textbook has been created, which is given with the help of sound and moving animation.

E-textbooks in HTML format are among the textbooks that mainly use a lot of text and fewer images and videos. The advantage of electronic textbooks in this form is that they are easy to use and print, and they do not require special instructions. Such textbooks mainly

consist of hypertexts and are distinguished by the small size of textbooks, as well as the ability to quickly search for information. Internet Explorer is required to use this guide.



Fig. 1. Fragment from the video of the laboratory work.

3 Results

Electronic textbooks should contain complete information on a subject or topic and should not be reproduced using animation or video images, enriched and filled with audio text. In addition to the use of multimedia technologies, an electronic textbook should be convenient for individual use by the reader or student. It can serve as a ready-made consultation for students. It follows that the electronic textbook should be in a continuous and ordered sequence. Any chosen topic or section can be effective and efficient only if it is supplemented with practical exercises and an exam (test).

4 Conclusion

With the help of an e-book, students will have the opportunity to test the knowledge gained in the lecture. The practical value of the e-book is that the student can at any time look at the technological schemes, read, listen and study the topic of interest to him. He will have the opportunity to observe the events taking place in the experiments. The student checks his knowledge on each subject in the test, questions related to the problem situation, and his answer is automatically evaluated.

Therefore, the creation of electronic textbooks will facilitate the educational process and increase students' interest in biological chemistry. When such e-books are posted on websites, they can be used and used in their classes by all schoolchildren, lyceum students, university students, even teachers.

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