Studying the Efficiency of Teaching the Chemical Technology Course Using Information Technologies

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ABSTRACT

The article describes in detail the importance of using information technology and the results of the pedagogical effectiveness of teaching chemical technology courses in universities.

Keywords: teaching chemistry, quality of education, methodology, information technology, pedagogical effectiveness

The course of chemical technology is of great importance in training chemists, chemist-teachers, specialists working in the field of chemical technology, and in forming students' worldviews in the field of chemical production.

The science of chemical technology is the effective integrated use of raw materials in industry, the structure and principle of operation of various equipment and devices used in their processing, the main chemical processes involved in the production of various products, as well as the technologies of processing these products and the most efficient production of the desired product. provides students with the necessary knowledge and understanding about the study conditions [1].

The use of new information technologies in the formation of knowledge, skills and competences of students about chemical technological processes carried out in industry, their laws, specific characteristics, efficient use of raw materials and thermal energy resources, economic efficiency, environmental safety. didactic possibilities are very high, and our articles, recommendations and instructions related to the scientific and methodical works carried out in this field are covered in the sources [2-8].

It is possible to achieve high efficiency of the lesson in students by implementing the materials studied in the course of education and training with the help of information technologies. In particular, programs such as Microsoft Paint, Microsoft PowerPoint, Adobe Photoshop, CorelDRAW can be widely used during lectures. If the materials prepared with the help of these programs are shown step-by-step on a multi-projector screen, more information and imagination will be formed in the minds of students. In addition, such prepared materials can be used by teachers and students and other professionals. Existing operating systems, graphics editors such as Microsoft Paint, Microsoft PowerPoint, Adobe Photoshop, CorelDRAW programs on modern computers can animate the dynamic models of images used in chemistry classes and solve the process of step-by-step creation of multimedia products.

Microsoft Paint has the ability to create various geometric shapes and images through the available tools and color palette in the graphic editor. It performs practical work such as changing pictures from simple to complex in

different views and can gradually introduce several dynamic views to the students. The execution of the image in such a modern way is easily accepted by the students, and they learn the chemical processes carefully in the sequence.

Image slides are created in Microsoft PowerPoint. The images in the sequence process are specially animated with the help of a computer, and a product of image views is prepared. Processes such as moving and changing the image are covered in the current section. By scanning a photo of any chemical process into this program, it becomes possible to change it, add additional fragments, and especially refer to the processes that must be performed by students.

In the Adobe Photoshop program, it is possible to perform simple or complex processes of images installed using scanners, video cameras, and video glass devices. Through this program, a sequence of ways to perform experiments on one device is shown in several ways, and a new image is developed. Similarly, with the help of CorelDRAW programs, it is possible to perform complex experiments on practical work.

The advantage of computer training with the help of programs is that the structure of described processes, the construction of equipment and their qualitative description are determined, and the student gets to know the realistic dynamic model of chemical processes, and this can serve as an example of work to be done. A student cannot get an effective result in such a short time in any other teaching method.

Computer devices that are considered information technologies, i.e. scanners, digital video cameras and cameras, multi-projects, displaying data from educational literature, magazines and other sources on the computer memory and displaying them on large screens are also used by students in lectures and classes. more effective. Because according to the folk saying "a sight is better than a hundred words", the presentation of the educational material is drastically different from the presentation of the text. Therefore, with the help of modern information technologies, the transition to modern methods of organizing the lesson process with the presentation of educational materials, and if the mastering of these materials is not sufficient, the level of mastering should be revised and demonstrated on the monitor. has the potential to improve. In addition, in addition to displaying the processes on the screen in the form of slides, creating a set of creative works of students and pedagogues and introducing them into the teaching process will give a high result.

The level of assimilation of knowledge is very high when educational materials about chemical-technological processes are taught using pictures. The essence of this is that students will be very interested in the processes that are shown on the screen through the video glasses connected to the computer. As a result, the process is easily mastered. At the same time, there is an opportunity to review the processes 2-3 times.

The audio organization of the chemical technology course with the help of multimedia tools helps to learn the processes that cannot be shown using theoretical traditional tools, and makes it easier for the students to master the educational materials.

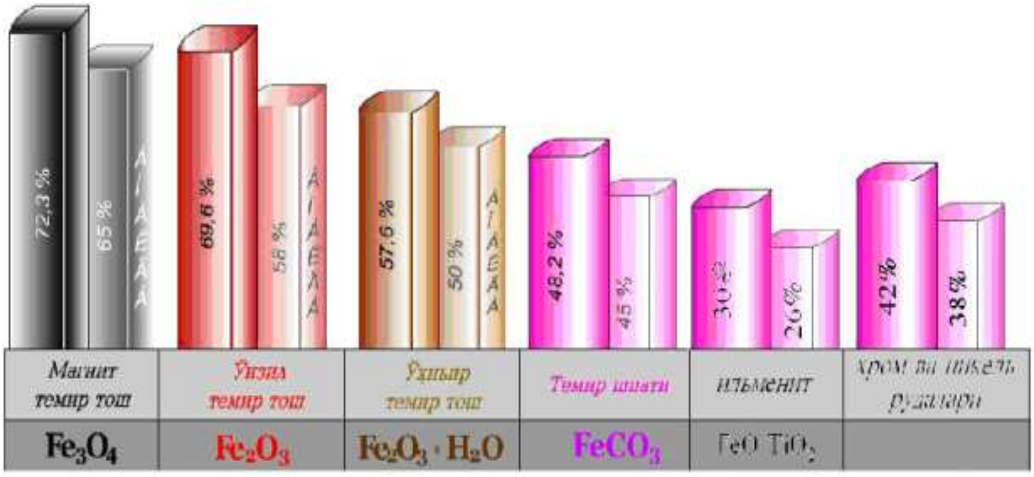
With the help of modern information technologies, visual and audio delivery of educational materials leads to a new form of organizing the lesson process, introduction of new pedagogical technologies.

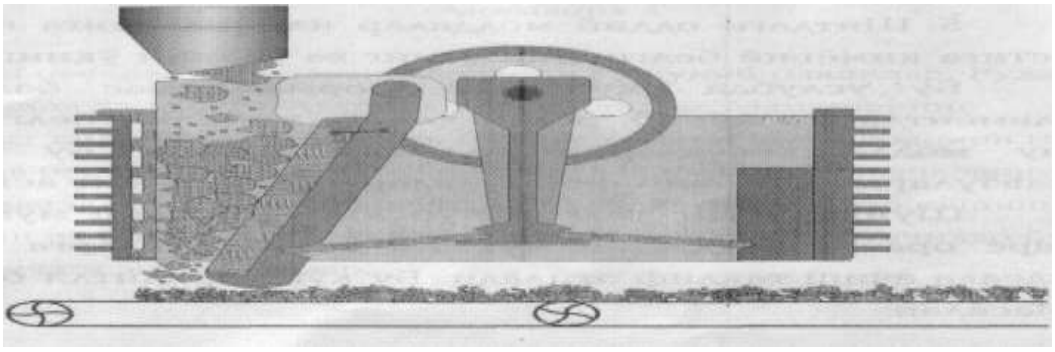
Using a computer, we animated the processes of iron and steel extraction in the metallurgical industry, from the selection of raw materials, from its extraction to the process of iron and steel extraction.

First of all, we developed a diagram showing the raw materials, what kind of ores there are, the amount of Fe element in them and the actual amount. We voted for the diagram and gave information about ores.

The students learned which minerals contain a lot of iron and which ones are convenient to use.

Then we showed the animation of the process of crushing the obtained ores with sound. They got a complete idea about this apparatus from the movement of the grinding mechanism.





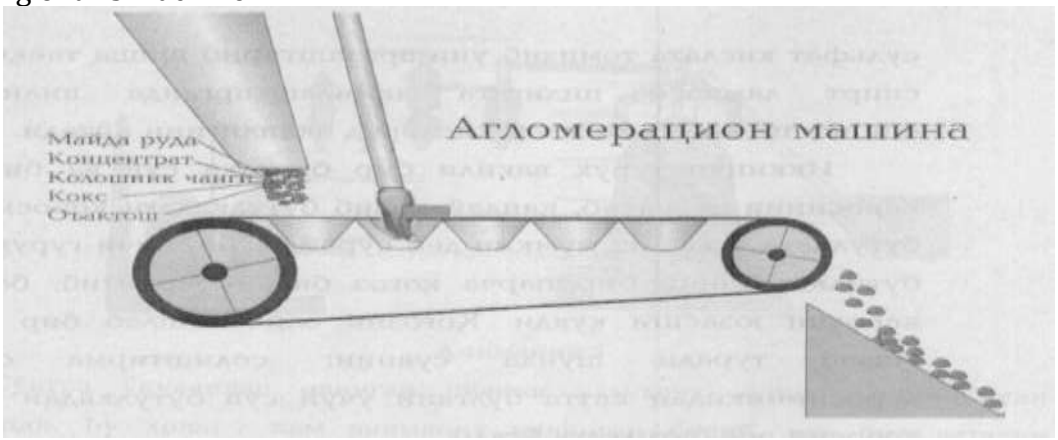
Animation 2

Thanks to the sound given to the animation, they understood the essence of the process going on in it. After that, an animated animation of the crushed ore beneficiation mechanism was shown.

Animation 3

They understand the process on the screen from the given voice. They also had their own understanding of ore enrichment. They saw how the car moves. Then they saw the process of processing ore in an agglomeration machine. The students who saw the movement of carts in the

machine, the ore coming to the carts, what is added to it, the combustion process, etc., gained an understanding of this machine.



Animation 4

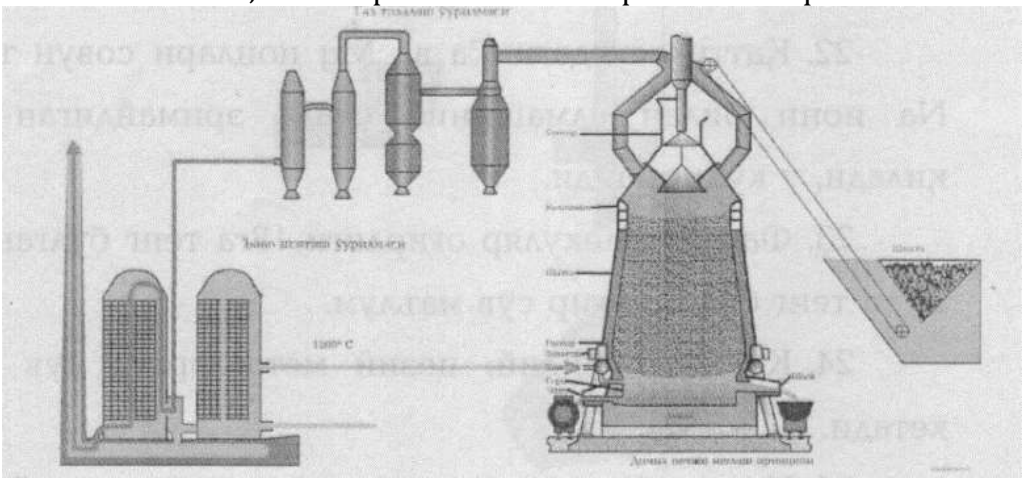
This animation was also voiced, and the computer itself explained the process that was going on there thanks to the voice recorded in the program.

The transformation of agglomerate from the agglomeration machine into cast iron takes place in a blast furnace.

First, the structure of the blast furnace, its parts, and detailed information about it are given on the screen. Then the processes that take place in it were shown in a dynamic way.

See how the agglomerate rises to the top of the blast furnace, how it ofalls into the blast furnace, process reactions in the blast furnace, the formation of pig iron and slag, their separation, sending heated air to the blast furnace, etc. was shown.

The animation was voiced, and the processes were explained in sequence.

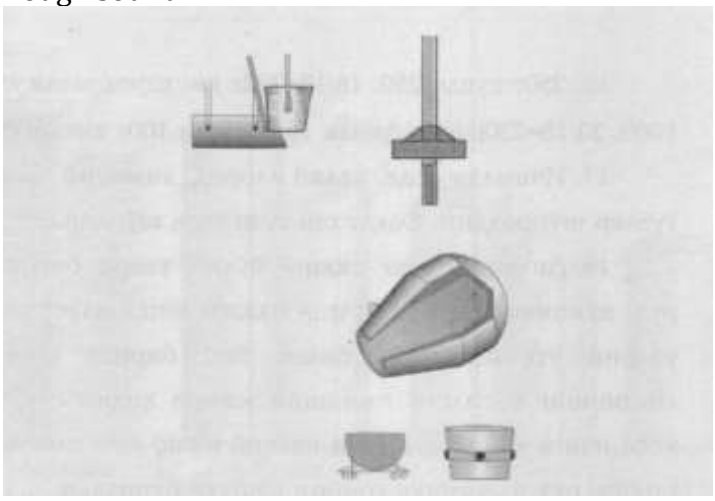


Animation 5

Then the students saw the mechanism of continuous casting of cast iron. This situation is also animated, and every detail of the movement has been carefully considered. With the help of the given vote, they got a clear understanding.

Animation 6

We also showed the process of extracting steel from cast iron through animation. In this, the students saw the structure and working principle of the converter apparatus and formed their understanding about it through sound.



Animation 7

At the end of the lesson, the test included in the electronic program appeared on the screen, and the students tested their knowledge by marking the test answers on paper.

The results of the test showed that the average mastery rate of students was 75%. This result showed that the level of education of students has changed for the better.

It can be seen from the obtained results that this way of teaching takes less time, provides more knowledge, and serves as a factor in increasing students' attitude to the lesson.

During our pedagogical activity, we used multimedia tools created by ourselves and obtained from the Internet in the educational process. We have organized control and experimental groups to determine the pedagogical effect of multimedia tools. In the control group, we used the method of the teacher's statement, and in the experimental group, we conducted lessons using multimedia tools. After the 8-hour lesson, we prepared 25 tests on the subject and conducted a test. The test tasks were created to meet the requirements of the State Standard on the knowledge, skills and qualifications of students on the subject. 25 students from each group took part in the test.

Table 1 summarizes the test results.

Price		Experimental group

	Control group	
Excellent	1 (4 %)	4 (16%)
Good	4 (16%)	16(64%)
Satisfactory	19(76%)	5(20%)
Unsatisfied	1(4%)	-
Quality indicator	20%	80%
Assimilation	96%	100%

The obtained results show that the quality and general indicators of mastering the subject are much higher in the experimental group than in the control group. This proves that the chemical experiments and multimedia educational tools we used are effective.

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