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IMPROVING THE METHODOLOGY OF USING THE INTEGRATION OF INFORMATION COMMUNICATION AND PEDAGOGICAL TECHNOLOGIES IN THE TEACHING OF ANALYTICAL CHEMISTRY

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The article explains the improvement of the methodology of using the integration of information communication and pedagogical technologies in teaching the science of "Analytical Chemistry". The article describes information and pedagogical technologies, integration, the meaning of integrated education and their content.

Keywords: information technology, pedagogical technology, communication, integration, integrated education, switching, animations.

The program developed by CSR Asia, one of the international organizations, recognizes the improvement of the quality of education on the basis of information and communication technologies (ICT) until 2030, in which it is envisaged to support and effectively organize the education of its students. . Rapid development in the field of ICT will radically change the way personnel communicate and interact in the future, both locally and internationally.

Globally, science and technology have become the main foundation of global development. Both subjects continue to improve the quality of life as these new discoveries emerge from science and technology. Although Analytical Chemistry plays an important role in the world of science, technology and natural sciences, it has always faced difficulties in mastering by students and teachers of general and vocational education. It is important to strengthen the material and technical base for mastering the science of "Analytical Chemistry" by students of general education, to further strengthen educational and scientific laboratories in the priority areas of higher education by equipping them with modern tools and equipment. works are carried out, it creates the need to develop the technology of performing chemical experiments on the basis of virtual laboratories and to improve the teaching methodology.

Today, political, social and economic changes are taking place in the life of our republic. These changes have an impact on the natural process of professional

education, which is carried out in accordance with the society's demand for highly qualified, solid and well-educated personnel who are able to work on themselves. Nowadays, the application of advanced pedagogical technologies in the teaching process of the new growing generation is rapidly developing.

Decisions of August 29, 2017 No. PQ-3245 "On measures to further improve the project management system in the field of information and communication technologies", the President of the Republic of Uzbekistan on February 19, 2018 "Measures to further improve the field of information technologies and communications" According to the Decree No. PF-5349 "on activities" with the help of modern information technology, at a time when there is an opportunity to "live" demonstrate the mechanisms of chemical reactions in the science of "Analytical Chemistry", create an animation on the topic with the help of a computer and present it in the lesson if introduced, it can have a great impact on the increase of the lesson efficiency. For example: development of computer animations of reaction mechanisms in "Analytical Chemistry" in HEIs, development of computer animations of laboratory processes in "Analytical Chemistry", independent work of students based on information, communication and pedagogical technologies to create educational-methodological complexes that provide, allow continuous self-monitoring of their activities and knowledge, save students' time, increase the effectiveness of training, and develop and implement the methodology of its use, and to the educational process consists of introduction.

Analytical chemistry program, computer animations of reaction mechanisms, 3D spatial views of structural formulas of analytical substances related to topics are developed in the educational process, electronic training in "Analytical chemistry" based on Macromedia Flash Professional v8.0 program creating a manual, creating audio video demonstrations of laboratory processes, creating a teaching-methodical complex that saves the student's time and increasing the effectiveness of training, and using the methodology of their use, it is necessary to develop a methodology for determining the spatial appearance of analytical substances.

Conducting experiments for the science of "analytical chemistry" in the HEI laboratory today has a number of problems. Including: currently, the laboratory rooms of higher educational institutions are not equipped at the required level;

that chimney cabinets in the laboratory are not in working order;

expiration date of analytical reagents;

it can be said that there is a lack of reagents when performing experiments and the safety of students is not ensured.

The advantages of performing laboratory processes in "analytical chemistry" with the help of information technologies are as follows:

students' interest in educational activities increases;

there are opportunities to manage the reception, collection, transfer, storage and processing of educational information;

students develop independent thinking skills, and their need to use information technologies increases at the next stages of education;

with the help of information technologies, it becomes possible to check practical work, in other words, to quickly and accurately implement "feedback", the ways of solving problems expand, and the skills of summarizing work are formed;

that the laboratory process is absolutely safe;

laboratory processes can be clearly seen in a color image;

that the laboratory experiment can be fully understood by repeating it;

it can be explained by the fact that it is fully ensured that the student performs the experiment correctly or incorrectly and imagines its consequences.

In order to perform laboratory procedures in the traditional way, students must have studied the laboratory text and theoretically studied the procedure.

Information is explained to students through pre-made animations while performing laboratory processes with the help of technology.

In short, the computer opens up great possibilities as a means of developing human abilities, i.e., intelligence, which are implemented through the processes of information reception, memory, imagination, and thinking. Therefore, an attempt is made to explain the laboratory processes in "Analytical Chemistry" using animation and audiovisual representations prepared using several programs ("Macromedia Flash Professional v8.0", "ChemDraw Ultra 10.0", "Chem3D Ultra 10.0" and "Camtasia Studio 5"). can be done. To perform this experiment, you will need a computer, a video projector or television, and animations prepared for the laboratory. "Macromedia Flash Professional v8.0, ChemDraw Ultra 10.0, Chem3D Ultra 10.0 and Camtasia Studio 5 and CorelDRAW_X5_ru" programs can be used for information technology explanation.

It is possible to draw dishes in the laboratory process based on the CorelDRAW_X5_ru program, and the "Macromedia Flash Professional v8.0" program can base their motion processes. Students can prepare a video view of laboratory processes using Camtasia Studio 5, their spatial conditions and simulation using the programs "ChemDraw Ultra 10.0, Chem3D Ultra 10.0".

Methods and tools of education are of particular importance in providing quality and guaranteed education in the educational process. It is important to use integrated, i.e. integrated technologies, in the organization of the educational process at the level of modern requirements.

The word integration corresponds to the Latin word "integratio" and in Uzbek it means to restore, start again, fill. It is a concept that expresses the state of dependence of individual parts, elements, and their integration [3].

The word integration is also used to express the process of rapprochement and interconnection of disciplines. The concept of integration is one of the important scientific terms, it is a methodological tool for generalization and drawing conclusions. In science and technology, general harmony models and algorithms are created between the contents of a process or events with the help of this methodological tool [6].

The essence of integration is of particular importance in solving the problems of ensuring harmony in the content of education provided in the continuous education system. The main concepts of educational subjects taught through integration are summarized. The concept of integration is also used to establish a relationship between information on a research object and methodology.

Integrated technology refers to technologies resulting from combining, summarizing and establishing connections between two or more technologies.

The use of integrated technology in the educational process means the state of conducting activities by combining, summarizing and establishing connections between pedagogical, information and communication technologies.

Pedagogical technology is a product of the integration of pedagogical and technological approaches used in the educational process.

Pedagogical technology is a set of educational methods, methods and educational tools, it is a set of organizational and methodological tools of the pedagogical process. Pedagogical technology is a systematic method of creation, application and determination of the entire process of learning and knowledge acquisition, taking into account technical resources and human interaction, which sets itself the task of optimizing educational forms. Pedagogical technology consists of the process of transferring and assimilating information in a form and method convenient for assimilation. Pedagogical technology is a process that guarantees the student's independent study, learning, and thinking [5]. In the process of pedagogical technology, under the guidance of the teacher, the student independently acquires

knowledge, learns and assimilates. Therefore, pedagogical technology consists of the activity of influencing a person according to a predetermined goal.

Information technology is the total methods, devices, methods and processes used to collect, store, search, process and distribute information. Information technologies - ways, methods and methods of using a computer in the process of collecting, processing, storing, transmitting and using data. Information technology is a process related to the use of a modern computer in order to reduce the laboriousness of the processes that use this information for processing information and increase their reliability and speed. Therefore, information technology means a set of methods and tools for collecting, storing, transmitting, changing, and processing information [3]. Modern information technology is a technology that can enable young people studying in educational institutions to raise education to a new level of quality by organizing an educational process related to the formation of knowledge, skills and abilities based on new approaches.

The word "communication" is used in Uzbek in the sense of communication, message, means of communication, means of information, connection, dialogue, connection, methods and means of information transmission. A communication system is a system that, among other systems, performs auxiliary functions related to information transmission.

Communication technologies are technologies that perform the function of routing (assignment of characters) and switching connections for the transmission of information between computers in the network [10].

Information and communication technologies of the educational system fulfill the following basic functions and requirements:

registration of learners and their activities of using the information environment;

to take into account the support of the activities of educators and learners by way of consultation;

recommending to students for independent learning of the necessary educational materials;

organization of control of knowledge, skills and abilities acquired by students in the educational process with the help of tests, as well as oral and written control;

to create an opportunity to remotely use the information resources of the educational institution so that learners can use the recommended educational materials, additional literature and other tools in the information base;

organizing remote consultation and other assistance of the employees of the educational institution in performing virtual laboratory exercises and practical tasks, etc.

In the educational process organized on the basis of integrated technologies, the main content of educational subjects will consist of the following educational and methodological materials:

electronic teaching-methodical complexes;

test programs and sets of questions for self-control;

virtual laboratory works and their description;

independent work and control work;

computer programs, electronic references, electronic applications;

additional software [9].

As a result of the use of integrated technologies, training sessions are organized remotely using the capabilities of network technologies. This is the basis of distance learning [3].

The main task of network technologies in distance education is to ensure communication between the teacher and the student during the educational process. The educational process organized without constant communication between the teacher and students will not give the intended effect. In the daytime form of the educational system, the communication between the teacher and the student is carried out at the same time, in the same place, in the educational auditorium. In distance education, this process is carried out through computer network technologies based on telecommunication tools [5]. The integrated state of the three technologies considered above can be considered the most optimal technology for teaching and mastering. Creating an information-educational environment for learners using the possibilities of pedagogical and information technologies and delivering processes to learners based on communication technologies is the main task of integrated technologies.

The education system of our country is currently undergoing major changes, as the trend of education development is common to all developing countries.

The use of Internet information in "Analytical Chemistry" teaches students to express their thoughts in a group, to think and work independently, to be resourceful, and to be present. It increases their interest in "Analytical Chemistry", encourages students to be active. Therefore, it is aimed to introduce innovative technologies into the teaching process of "Analytical chemistry" and analyze and illuminate the issue of its improvement from all aspects [8].

The changes taking place in the field of education, the influx of a large flow of information, the emergence of the need for rapid acquisition of knowledge require the introduction of integration in the fields of education. Also, the use of modern information technology support in education is gaining special relevance [7].

When we studied the current cases of introducing the use of information communication and Internet data in the lessons of "Analytical Chemistry", most teachers noted that the lesson processes were interesting and effective. There are not enough scientifically based models and instructions for the introduction of information technologies into the educational process in continuous education.

The use of information and communication technologies (ICT) opens up new perspectives and effective teaching opportunities for teaching Analytical Chemistry. At the same time, developing the ability to read independently, focusing on certain literacy in working with information technologies, is a necessary condition for the intellectual development of students. In "Analytical chemistry" classes, using information and communication technologies, using Internet resources, homework can be given remotely by the teacher and tasks completed by the student can be checked. ICT is the most convenient way to control learning materials [6].

In short, integrated technologies are of particular importance in organizing the educational process at the level of modern requirements, summarizing and supplementing the educational content, and help to guarantee the achievement of the intended goal.

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