

## ADVANTAGES OF PROBLEM-BASED EDUCATIONAL METHODS IN TEACHING CHEMISTRY

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**Annotation:** This article is about chemistry - "chemistry" - a science that studies the structure and study of substances. Chemistry, along with other sciences, was created as a product of human activity, it was realized in the process of satisfying natural needs, producing necessary products, creating one from another and finally, knowing the secrets of various phenomena.

**Key words:** leather, burning, cooking, tempering, dry driving, melting, crystallization, separation

In ancient times, people knew how to extract metals from ores, prepare and use various alloys, including making glass, and use it for various purposes. It is known that crafts based on chemical processes developed in ancient Egypt. Preparation of leather, dyeing it, production of colored glass, preparation of medicines and aromatic substances from plants, and production of ceramic products have been established. In those times, the production of chemical products was launched. At that time, chemical products were rarely produced in India, China and Central Asia. A chemist with a "chemical craft" was engaged in the preparation of another product from one substance. From the 2nd half of the 1st millennium BC, along with trade, handicrafts entered the country through the Great Silk Road that passed through Uzbekistan. A large number of found items and monuments testify to the fact that people living in the territory of Uzbekistan have known about the art of chemistry since ancient times. A chemical laboratory dating back to the 8th century was found in the settlement of Poykent near Bukhara. In the 1st century treatises written in the city of Alexandria on the Nile, many chemical details are given, including the appearance of chemical equipment, combustion, cooking, distillation, distillation, melting, crystallization, separation, and other methods. In this source, the idea of extracting gold from base metals is also proposed, which is abstract this search hindered the development of science to a certain extent, diverted the thoughts of scientists in another unrealizable direction. Using information from the Alexandrian treatises, Arab scientists soon discovered several new substances, including nitric acid, salts, and more. Later, this word became popular in European countries under the name "Chemistry". In Abu Abdullah al-Khorazmi's book "The Key of Knowledge", a separate chapter is devoted to chemistry, which contains excellent information about various substances, tools, and experiments. Abu Ali IbnSina writes more than 50 types of plants, animals, minerals, salts, acids, metals, oxides and other compounds in the book "Al - law". It fully describes their names, properties, and uses. The material properties of substances are reflected in the work "Minerology" of Abu Rayhan Beruni. There are 18 manuscripts on mineralogy and 31 on chemistry in the fund of the Institute of Oriental Studies of the Academy of Sciences of Uzbekistan. In the development of chemistry in our republic, the service of scientific research and project institutes operating as part of the Academy of Sciences of Uzbekistan and as network institutes of various branches is important. The scientific research conducted in the chemical laboratories of the Institute of Chemistry (now the Institute of General and Inorganic Chemistry), the Institute of Plant Substances Chemistry, the Institute of Physics and Chemistry of Polymers, OZMU and other family educational institutions have brought the science of chemistry to the highest levels in our country. was one of the important factors in the development.

The classroom is a dynamic environment that brings together students of different abilities and personalities. Therefore, being an effective teacher requires the implementation of creative and innovative teaching strategies to meet the needs of students. For this reason, below we will talk about the use of some strategies in teaching chemistry to students.

1. Visualization For example, interactive whiteboards can be used to display photos, audio clips, and videos, as well as test students' knowledge gained from classroom experiences and local field trips.

2. Learning in cooperation. Encourage students of mixed abilities to work together by promoting small group or whole class activities. His thoughtsthrugh speaking and responding to others, students develop self-confidence as well as communication and critical thinking skills that are important throughout life. Solving math puzzles, conducting science experiments, and performing short dramatic skits are just a few examples of how cooperative learning can be incorporated into classroom lessons.

3. Instruction based on inquiry. Asking thought-provoking questions that encourage students to think about themselves and learn independently. Encouraging students to ask questions and explore their own ideas can help them improve their problem-solving skills and deepen their understanding of academic concepts. Both are important life skills.

4. Differentiation. Differentiate instruction by dividing tasks according to students' abilities so that no one is left behind.

5. Technology in the classroom. Incorporating technology into a teacher's teaching is a great way to actively engage students, especially when digital media surrounds the youth of the 21st century. Interactive whiteboards or mobile devices can be used to display images and videos to help students visualize new academic concepts. When technology is used, learning can become more interactive when students develop autonomy as they engage in physical activities during class and explore their own ideas in real-time. With the development of technology, only one computer is enough for teaching using technical tools. The computer has successfully taken over the functions previously performed by television, VCR, film projector, slide projector, etc. In addition, the quality of information transmission, storage, and imaging has increased significantly. By now, computer literacy has become an important sign of culture, and in the future it will become a necessity for everyone, no matter where they work. In the strategy of modernization of education, there are practical examples of changing teaching methods and technologies at all levels, analyzing information, self-study, encouraging independent work of students, forming responsible choice and responsible activity experience. It is emphasized that it is necessary to increase the weight of those who form their skills. There was a need for student-oriented education based on modern information technologies. Therefore, teaching computer work and computer usage from chemistry will undoubtedly become common work in the near future. Modern information technology tools include: computer, scanner, video camera, video camera, projector, interactive whiteboard, fax modem, telephone, e-mail, multimedia tools, Internet and Intranet networks, mobile communication systems, database management systems, sun It is possible to include intellectual systems. Information technology tools are used in the conscious and planned implementation of certain actions. This process includes: - a computer, as well as a printer, modem, microphone and sound broadcasting device, scanner, digital video camera, multimedia projector, drawing tablet, musical keyboard, etc. and their software; - hardware software; - virtual text constructors, multiplications, music, physical models, geographic maps, screen processors, chemical experiments, virtual laboratories, etc.;

- a collection of information - reference books, encyclopedias, virtual museums, etc.;

- technical skills trainers (entering information from a set of keys without looking at the keys, initial mastering of software tools, etc.). At the center of information technology tools is the computer. Wide introduction of modern information and communication technologies in education:

- informatization of science fields;

- intellectualization of educational activity;

- deepening of integration processes;

- leads to the improvement of the infrastructure of the educational system and its management mechanisms.

Effective organization of pedagogical education processes on the basis of modern information technologies: - unification of pedagogues, computer programmers, relevant specialists in a team creating distance learning courses and electronic literature; - distribution of tasks among pedagogues;

- requires improvement of the organization of the educational process and monitoring of the effectiveness of pedagogical activity. Pedagogical software tools are didactic tools designed for partial or complete automation of the educational process with the help of computer technologies. They are considered one of the promising forms of increasing the effectiveness of the educational process, and are used as teaching tools of modern technologies. Pedagogical software tools include: software products aimed at achieving specific didactic goals, technical and methodical support, additional auxiliary tools. Perhaps e-learning (ICT-based learning),

especially in areas where teacher-student interaction is important, will never replace face-to-face teaching, but e-learning Education is becoming a very important part of the educational process. Today, in order to provide high-quality education to students, modern information technologies, which are the product of scientific and technical progress, and its material basis, the creation of electronic textbooks and manuals with extensive use of computer services, and the use of Internet resources and software tools for distance learning are the demand of the time. remains. For this, it is necessary to apply information technologies that meet world standards to the educational process. One of the important requirements for the organization of modern education is to achieve high results in a short time without spending too much mental and physical effort. Delivering specific theoretical knowledge to students in a short period of time, forming skills and competencies in them for certain activities, as well as monitoring the activities of learners, evaluating the level of knowledge and skills acquired by them, requires high pedagogical skills from the teacher. is enough.

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