

THE ROLE OF CHEMICAL EXPERIMENT IN SOLVING PROBLEM SITUATIONS

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Abstract. *This article presents views on the role of critical thinking, logical observation, conducting an experiment and the requirements imposed on it, various points of view on the experiment in the process of studying chemistry. Opinions are also expressed about the "creative situation" and "problem situation".*

Keywords. *experimentation, problem situation, critical thinking, educational and creative activity, psychology, pedagogy, methodology.*

At the current stage of the development of the educational system of Uzbekistan, the need to form a person who not only understands the experience formed by previous generations, but also is able to creatively and critically revise it is clearly manifested. In this regard, it is of great importance to study the "Critical thinking" of students, as well as to study the possibilities of its development in the educational process.

The potential of the science of "Chemistry" allows to solve these problems very successfully. The need for an inductive and deductive approach in the organization of chemistry education, the constant use of methods of mental activity such as analysis and synthesis, classification and systematization, abstraction, analogy, etc., the need to draw logical conclusions, form definitions and concepts activates thinking. Using a chemical experiment in teaching allows not only to identify evidence, but also to conduct research, which also helps to develop thinking.

D. I. Mendeleev, the well-known chemist, the "honorary father" of the periodic law and the periodic table of chemical elements, said the right thing when he said that "Experiment" is the art of questioning nature. In fact, the experiment is considered a powerful engine of the natural sciences.

The process of performing an experiment in chemistry is an important object. Therefore, when performing an experiment, it is important to understand the student's educational and creative activity from the following point of view:

- a) structure and content;
- b) types of experiments;
- c) abilities and qualities of the student in performing this or that experiment;
- d) effective methods of conducting experiments.

The experiment have played an important role in the formation of the scientific and practical base of chemistry.

A.L. Lavoisier, who made the first scientific revolution in the history of chemistry, discovered the oxygen theory of combustion through long-term experiments. The German alchemist G. Brant discovered the element phosphorus in 1669 by boiling urea, evaporating it, and pyrolyzing the remaining solid residue.

During the teaching of chemistry, it is necessary to draw the student's attention to the use of the term "Experiment" in a broad sense. For example, the term experiment is given different explanations.

These are:

1. Striving to achieve the set goal.
2. Assignment, duty.
3. Questions about an experiment that can be performed in chemistry based on certain knowledge and ideas.
4. One of the teaching methods of checking the student's practical skills and abilities in the process of performing an experiment, that is, the concept of an experiment can be viewed from different perspectives.

For us, the following point of view is more interesting: cybernetic, psychological, pedagogical. An understanding of the experiment from a cybernetic point of view is given in the research works of V. M. Glushkov.

From the point of view of cybernetics, an experiment is the result of an action that determines the solution to some problem situation. There are several attempts to explain the concept of experiment in the psychology literature. The most common of these is the concept given by A. N. Lermontov: "An experiment is a situation that requires an action from the subject." O. K. Tikhomirov says that an "experiment" is a work done in order to achieve a specified goal under certain conditions. There are broader expressions of psychological analysis of the concept of "experiment" and its components. For example. This is how L. L. Gurova expresses it. An "experiment" is an object of thought activity consisting of theoretical questioning or demanding practical changes by searching for conditions that reveal the relationship between its known and unknown elements.

If we analyze the concept of "psychological experiment" from the point of view of pedagogy, we can say this about the experiment that occurs in the process of educational and creative activity. The experiment can simultaneously be an object of educational and creative activity and a means of pedagogical organization of educational and creative activity.

When performing an experiment, conditions, goals and requirements of educational creative activity are given directly or immediately.

Analyzing and understanding the above-mentioned concepts from the point of view of pedagogy, it is shown that various situations may arise when deciding to conduct an experiment. In particular, students may experience creative situations such as productive ones that require the use of a previously known activity algorithm, way, and method.

A creative situation is a situation that requires the resolution of some dialectical contradictions. A creative situation requires the student to find a new way to get out of this situation. At the same time, it can be said that they stimulate the development of the student's educational and creative abilities. Examples of creative situations include: a controversial situation; critical thinking, a situation requiring evaluation, a situation requiring the use of analogies; guessing, hypothetical situations, etc. It is worth noting that creative and problematic situations can lead to chemistry experiments.

In our opinion, "creative situation" and "problematic situation", which are very close to each other, mean a broader concept. A problem situation means an opposition, a problem that the student knows, can do, what he should know, be able to do, and do to solve this opposition. Such

experience is not always the starting point of perception. Often some kind of conflict is the result of a performance review that later becomes a problem; it, in turns, takes the form of some kind of "experiment" considering the "purpose" and "conditions".

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