



CHEMICAL PROBLEM SOLVING AS A METHOD OF INCREASING STUDENTS' COGNITIVE ACTIVITIES

Iskandarov A.Yu.

Associate professor of TSPU named after Nizami

Makkamov N.,

Master's degree student of TSPU named after Nizami

Article history:	Abstract:
Received: 28 th February 2021 Accepted: 7 th March 2021 Published: 30 th March 2021	This article focuses on the problem solving importance in teaching chemistry. It is considered chemical task types used in the educational process. It is shown that computational and experimental problems mastering and solving skills contributes to an increase in the students' cognitive activity.
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Studying a chemistry course should contribute to the formation students' scientific outlook is designed to facilitate other general and special disciplines assimilation. Knowledge of basic chemistry laws, chemical thinking and scientific experimentation skills development, as well as proficiency in finding design solutions helps the student to solve a variety of practical tasks in the chemical field.

The methodology for solving problems in chemistry lessons in a modern school is undergoing changes that depend not only on the teacher's skill. Methodological support of the chemistry subject plays an important role. A variety of school programs, rich selection of textbooks, educational and methodological complexes encourages the teacher to study these materials more closely, analyze key positions: lesson technology, methodology for solving chemical problems, chemical experiment organization and monitoring the students' and their own learning success.

Depending on the lesson stage at which one or another calculation problem is used, its purpose and potential in the lesson will change. At the familiarization stage with the new topic, we will be more interested in the problem condition content, at the knowledge applying stage - the ability to solve, lead logical reasoning, and draw conclusions. Thus, a computational problem in chemistry is a logically organized material for teaching and testing students' knowledge in accordance with the studied program topic.

Based on the definition, there are two main computational problem parts: theoretical, requiring analysis and calculated - based on the use of logical techniques: analysis, synthesis, abstraction, transformation and computational skills.

Let's consider some teaching methodology features for solving problems. In order to cope with the computational problem solution, it is necessary not only to know how to solve typical problems, general formulas for solving computational problems, the basic chemistry laws. We must accept, as obvious, - this is a mandatory knowledge of the general chemistry basics and at least regular relationships knowledge between the substances composition, structure and properties; to be able to carry out access to the use and production of substances, their ecological and chemical characteristics [1].

An important requirement for solving problems is a preliminary study of the problem condition. Often, not paying attention to the content, the trainees are carried away by the numbers given in the problem; plan the path to the answer, regardless the need to evaluate the proposed condition.

An important place in the chemistry study is given to the experimental problems solution. By their structure, experimental problems, as well as calculated ones, consist of conditions and requirements. The main feature of these problems is that their solution requires a chemical experiment. They contain tasks related to the study of both inorganic and organic substances. Solving experimental problems requires students to have deep and solid theory, laws and chemistry concepts, factual material (composition, properties, production, and substances characteristic reactions), language and chemical science methods knowledge, as well as the scientists' contribution to chemical science [2].

The issues of students' cognitive activity enhancing in chemistry lessons are among the most pressing problems of modern pedagogical science and practice. The activity principle implementation in learning has a certain value, since learning and development are of an activity nature, and the teaching, development and students' education results depend on the learning quality as an activity [3]. Learning, being a reflectively transforming activity, is aimed not only at the educational material perception, but also at the students' attitude formation to the cognitive activity itself. The transformative activity nature is always associated with the subject activity. The obtained

knowledge in a finished form, as a rule, causes difficulties for students in their application to explain the observed phenomena and solve specific problems.

Therefore, the study and understanding of the theories, laws, and concepts essence are of the greatest importance for the students' development. Students comprehend this knowledge on the specific educational material presented earlier, in the computational and experimental problems solving process. The theoretical knowledge gained allows them to rethink a specific educational material at a higher level.

The students' development is provided not only by the subject content, but also by teaching methods [4]. Of great importance for the cognitive learning implementation are: various tasks of the directing difficulty; individual work, where the comparing substances and phenomena issues on two or more grounds are provided, the essential identification signs of the concepts and objects under study; equations for systematization, classification of the studied material, tasks for generalizing knowledge, on the composition assumption, substances structure and properties, based on previously acquired knowledge, concretizing what is being studied with new examples, solving various chemical problems, including problematic ones.

Thus, it can be noted that teachers, using a variety techniques to enhance the schoolchildren cognitive activity, proceeding from both the content and the chemistry teaching methods, including those illustrating the chemistry connection as a science and academic subject with the material culture products, with the material world, highlighting applied, creative, experimental, computational problems as a possible means of developing cognitive interest, cognitive needs, on their basis contribute to the schoolchildren cognitive activity formation.

Therefore, within the modern education paradigm framework, the pedagogical techniques and methods arsenal should be expanded in every possible way, aimed at improving each student's cognitive activity, to strengthen cognitive interest through the variability use of such traditional teaching aids, as a solution to computational, experimental, creative problems with a practically directed text part.

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