

DIDACTIC VALUE OF CHEMISTRY INDEPENDENT WORKS

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<https://doi.org/10.5281/zenodo.10358629>

Abstract. *In this article, based on the author's own experience, the theoretical and practical issues of activating students' cognitive activity in chemistry classes using independent work are highlighted.*

Keywords: *teaching process, content, teaching chemistry, independent work, independent education, cognitive activity, activation.*

One of the main requirements for a modern chemistry lesson is to activate students' cognitive activity. Activity should first of all be manifested in education and knowledge acquisition. Student engagement improves acquisition of knowledge, skills, and competencies. Activating students' cognitive activity in the chemistry class begins with setting specific educational tasks in front of them. Educational tasks can also consist of questions that create a problematic situation in the lesson. Another type of problematic situation is the connection of the studied material with life. Teaching to work with textbooks in chemistry education is of great importance in activating students' activities. When studying each chemistry course, it is appropriate to introduce the textbook and its methodical devices (textbook, attached materials, illustrations, forms, tables, questions and tasks) and show the ways of using them.

Activating students' activities requires paying special attention to their independent work. Independent works of students are the main means of activation of learning activities and thorough assimilation of knowledge. Because in a time when science and technology are developing with great strides, it is inevitable that the knowledge acquired at school will soon become obsolete. Consequently, it is necessary to continuously fill and enrich one's knowledge during work. This can be achieved only by constantly learning independently and working on yourself. Modern school chemistry programs, development of students' independence, use of educational tools as a source of knowledge.

One of the main requirements of pedagogy is the development of independent activities of students. If the student does not work in the process of mastering the educational material, he acquires knowledge superficially and cannot use it in further practical activities.

K.K. According to Platonov, students' independent work can solve the following tasks in the educational process:

- 1) to increase the awareness of students and the quality of acquired knowledge;
- 2) formation of knowledge and skills related to educational work methods required by the program (including independent work with knowledge sources);
- 3) being able to apply the acquired knowledge, skills and qualifications of students in life and production;
- 4) development of students' cognitive abilities (observation, thoroughness, logical thinking, creative activity and application of knowledge);
- 5) habituation to mental and physical work culture, independent work, and achievement of the set goal;

6) provides opportunities to prepare students for a productive and independent life in the future.

In methodological literature, the concepts of "Independent work" and "Independent education" are defined differently.

Some Methodists consider student activities that occur without the direct help of the teacher (reading, listening, solving a problem, answering a question) as independent work. This is not an exhaustive description. Many chemist-methodists consider independent work to be done on the basis of the teacher's assignment, during a certain allotted time, requiring mental activity. Taking into account the above points, education that tries to acquire new knowledge by creatively applying knowledge and skills can be understood as independent work.

The great Methodist M. K. According to Kovalevskaya: "If students apply their knowledge and experience to determine new facts and events, look for causes and consequences unknown to them before, or find new ways to solve a problem (that is, if they achieve new results in knowledge and skills), such work can be called independent work."

Some teachers and methodologists understand "independent work" and "practical work" as having the same didactic task. Not all practical work can be called independent work. The main goal of the practical work is to develop students' skills and abilities specific to the academic science of chemistry (basic concepts and laws of chemistry, properties and use of substances, working with substances, observing chemical phenomena). Consolidation of acquired knowledge forms the basis of practical work. Practical work determines the ratio of teacher and student activities. Practical work can be done by students both in public and with the participation of the teacher. After the students master the methods of performing practical work (for example, reading chemical formulas, writing reaction equations based on chemical formulas), there is an opportunity to do the work independently.

The descriptive feature of practical work is the practical application and strengthening of acquired knowledge, while the basis of independent work is the acquisition of new knowledge and skills, reliance on previously acquired knowledge in the search for new knowledge. Independent work involves more student activity than practical work. They include working with various sources of knowledge along with practical work. The main goal of independent work is to develop the independence of students, to prepare them for independent education, creative thinking, and at the same time to prepare young people for life. So, it can be said that independent work is a way to acquire new knowledge and skills, to improve acquired knowledge and skills and qualifications. Independent work consists of several elements that are interconnected. When organizing an independent work, it is necessary to consider their relationship with each other.

Providing students with ready-made knowledge is a widely used form of education. But this situation should be considered as a tragedy, because this type of education cannot develop students' cognitive abilities. Psychologists say: "...such knowledge is an unnecessary burden." If the student understands what kind of knowledge he is getting, how he knows, how he acquires knowledge methods, it can be called independent education. So, the didactic task of independent work in chemistry education is to ensure the mastery of the unique methods of educational work, as well as the mastery of research methods of the science. Independent work in the chemistry class can have different didactic goals. Independent work should be organized mainly in the process of learning new material and in order to acquire new knowledge and skills. In the lesson, under the guidance of the teacher, students can learn a certain part of the new material independently.

Independent work of students in the process of learning new material is carried out in two different ways:

1. The teacher explains the new material, and the students at the same time, while listening to the teacher, do some independent work. For example, they take a synopsis based on the new material being presented or write down the reaction equations of the properties of the studied chemicals.

2. The teacher gives tasks to students for independent work, then explains the new material, then students do independent work.

Independent work can be used at all stages of the educational process, when checking the knowledge and skills of students, learning new materials, strengthening it, repeating it, as well as on an excursion.

Independent work requires a certain preparation from the chemistry teacher, as well as from the students. Students should be taught to work independently in the course of the lesson, starting with simple elementary tasks and gradually increasing them to complex ones. The teacher helps the students to work with the textbook text, illustrations, tasks, to use the periodic table independently, to work with pictures and drawings, to use searching engines and dictionaries, chemical tables (solubility, activity of metals), to observe and develop the results of observations of natural phenomena, to develop any chemical it is necessary to teach to give a description of the object based on the plan, to draw up a synopsis. After mastering certain skills in performing the above tasks, other, more complex independent tasks can be recommended to the students.

If the students do not have sufficient training, certain skills and experience to do independent work, they will have difficulty in doing independent work, it is difficult to achieve the expected results.

The following methodological requirements are imposed on the independent works performed by students.

1. Independent work should be suitable for students' abilities and preparation, which they can do, and at the same time, it should develop their thinking ability and creative initiative.

2. Knowledge and skills previously acquired by independent work of students. It should also require the use of experiences and develop them further.

3. The type and content of independent works must correspond to the age characteristics of students, their preparation and individual characteristics.

4. It should be assumed that the content of independent works will be diverse and interesting. Their results should be informative to students.

5. It is appropriate to analyze and discuss the results of each independent work in time, and use the results of independent work in the educational process.

Independent work should gradually become more complex from lower grades to higher grades. Assignments on independent observation of natural phenomena can be given in the elementary course of general chemistry.

In inorganic and organic chemistry courses, independent works become more complex and their importance in the educational process increases.

1. Students can be asked to establish causal relationships. The activity of students in doing independent work, the effectiveness of the work depends on the given task. Therefore, certain requirements are imposed on independent work assignments:

2. It can be aimed at reflecting important concepts, causal connections, worldview ideas, that is, at fulfilling the educational goals of the course topics.

3. Assignments should cover all components of knowledge (general and specific concepts, causal connections, laws, facts, issues of interaction between nature and society, methods of education and intellectual activity).

4. Various educational tools: textbooks, additional literature (newspapers, magazines, popular science books, chrestomaties), photos, pictures, photographs, on-screen manuals with chemical tables of various content, television broadcasts, samples of minerals, herbariums, statistical data –to ensure formation of skills of independent work with data.

5. To develop students' cognitive abilities and to enable creative thinking.

6. Arousing students' interest in chemistry.

Independent work of students is effective only if it is carried out regularly and on the basis of a well-designed task system.

In conclusion, it can be noted that independent work has a great educational and educational value in the formation and strengthening of chemical knowledge, skills and qualifications. Independent work develops students' mental activity, allows them to think more deeply about the studied issue, to search for its most important part, and to make final conclusions. Without independent work, it is impossible to provide solid and conscious education, to form relevant skills and qualifications, and to obtain independent education. It should not be forgotten that independent works are of great importance in students' educational activities, solving various didactic issues: forming theoretical knowledge, determining chemical laws, acquiring knowledge and skills and applying them in practice.

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