



ORGANIZATION OF INDEPENDENT WORK OF FUTURE TEACHERS OF CHEMISTRY ON THE BASIS OF PROJECT ACTIVITIES

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Annotation

The development of modern science and technology poses new challenges for the education system. An alternative to traditional teaching methods can be the method of projects. The project method is based on the development of students' cognitive skills, the ability to independently construct their knowledge and navigate the information space, and the development of creative thinking. The use of project activities in the independent work of students in chemistry allows you to independently acquire the necessary knowledge, skillfully applying them in practice to solve urgent problems; think critically, be able to see difficulties and look for ways to overcome them; competently work with information; be sociable, contact in various social groups; independently work on the development of their own intellect, cultural and moral level.

Keywords: chemistry, chemical reactions, teaching methodology, project method, project activity, independent work.

Abstract

The development of modern science and technology poses new challenges to the education system. An alternative to traditional teaching methods can be the project method. The basis of the project method is the development of cognitive skills of students, the ability to independently construct their knowledge and navigate the information space, the development of creative thinking. The use of project activities in the independent work of students in chemistry allows them to independently acquire the necessary knowledge, skillfully applying them in practice to solve urgent problems; think critically, be able to see difficulties and look for ways to overcome them; work competently with information; be sociable, contact in different social groups; independently work on the development of their own intelligence, cultural and moral level.

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Increasing attention to independent work determines the relevance of the methodological development of mechanisms and tools for organizing and controlling students' independent work in order to ensure its compliance with the requirements of educational standards [1].

Considering the independent work of students as a special type of educational activity carried out with methodological guidance without the direct participation of a teacher, we note that it is aimed at deepening and expanding knowledge, ensures the formation of interest in cognitive activity and the development of cognitive abilities and can have an educational, research or socially significant focus [2].

Effectively organized independent work has a significant didactic potential associated with a more complete assimilation of educational material, the formation of skills to work with various types of information, the development of students' analytical abilities, the development of skills for monitoring and planning study time [3].

The purpose and main tasks of organizing and implementing independent work of students are:

- Systematization and consolidation of the received theoretical knowledge and practical skills;
- Deepening and expansion of theoretical knowledge;
- Formation of skills to use normative, legal, reference documentation, special and additional literature, periodicals;
- Development of cognitive abilities and activity of students;
- Formation of independence of thinking;
- Development of research skills.

When determining the content of independent work of students in teaching chemistry, the level of independence of students and the requirements for the level of independence of graduates are taken into account in order to achieve it during the period of study.

For the organization of independent work of students, the following conditions are necessary:

- Readiness of students for independent work;
- Motivation to gain knowledge;
- Availability and accessibility of all necessary educational and methodological and reference material;
- A system of regular quality control of the performed independent work;
- Consulting assistance.

The form for providing a report on the completion of an extracurricular independent work task for students corresponds to the type of work and is specified in the task.





The forms of implementation of such independent work are educational, research and project assignments that provide the development of skills for the creative transformation of reality, the development of innovative ways of activity, form the ability to solve problems for which there is no solution yet [2].

In this regard, effectively organized independent work of students can take on the character of a project activity.

The project activity of students is also one of the methods of developmental education, it is aimed at developing independent research skills, helps to develop creative abilities and logical thinking, combines the knowledge gained during the educational process, and attaches to vital problems.

The main purpose of the project method is to provide students with the opportunity to independently acquire knowledge in the process of solving practical problems or problems that require the integration of knowledge from various subject areas.

For a student, a project is a chance to maximize their creative potential. This is an activity that allows you to express yourself personally or in a group, try your hand, apply your knowledge, make a great difference, show the publicly achieved result. This is an activity aimed at solving an important problem that the students themselves have formulated. The result of this activity is the discovered method of solving the problem, which is practical and significant for the discoverers themselves [4].

Another difference of the project is the preliminary planning of the forthcoming work. The whole path from the initial problem to the implementation of the project goal should be divided into separate stages with their own intermediate tasks for each; as well as to identify ways to solve these problems and find resources; develop a detailed schedule of work indicating the timing of the implementation of each of the stages.

The main goal of creating a project from the point of view of pedagogy is the development of all types of student activity (creativity, ingenuity, practicality), leading to the fact that students begin to apply the material received in real life situations and, as a result, invent the latest intellectual or practical product (film, album, poster, article, presentation, theatrical performance, game, website). The work on the project is aimed at a comprehensive and systematic study of the problem [5].

The implementation of the project work plan is associated with the following actions:

1. Study of literature and other sources of information, selection of information;
2. Conducting various experiments, experiments, observations, studies, surveys;
3. Analysis and generalization of the obtained data;
4. Formulating conclusions and forming on this basis your own point of view on the original problem of the project and ways to solve it.
5. Presentation of the result of the project





Independent work has a big role in modern educational activity. First, it encourages students to acquire deep and solid knowledge, with the study of details, as opposed to knowledge acquired with the help of a teacher. Secondly, independence develops thinking, analytical, cognitive and creative abilities of students, skills of control and planning of study time. Thirdly, under the condition of a well-designed methodology for conducting independent work, students develop practical skills and independent work skills, which leads to less time spent on learning [6]. Independence acts as a means of self-regulation of the individual, increases the emotional and intellectual load. Therefore, its organization should be given special attention. The organization of projects for independent work requires significant external incentives (encouragements, the opportunity to demonstrate the results to a wide range of people) and significant additional time expenditures from both students and teachers [7].

In teaching chemistry, you can also use the method of projects (information project) for independent work of students. The study of chemistry contributes to the formation of students' worldview and a holistic scientific picture of the world, understanding the need for chemical education to solve everyday life problems, and the education of moral behavior in the environment.

When working on an information project, the structure (algorithm) of the work changes: goal setting, justification of relevance → search for information sources → information processing → presentation. Information projects can be integrated into research projects. Consider the project activities of students on the topic "Chemical reactions and their significance in everyday life." In doing so, the following tasks are set:

- To find out what chemical reactions take place around us,
- To study additional literature,
- Prove that chemical reactions surround us everywhere
- Create a presentation on a topic.

Students before starting work on the project receive instructions: 1) requirements for the project,

- 2) methodological recommendations, memos - how to draw up a project correctly,
- 3) a scale of points for evaluating a project.

When performing project work, students should consider and analyze scientific, non-fiction, popular science literature, as well as Internet materials.

As a result of independent research on fundamental and problematic issues, students will answer the question of what kind of reactions are discussed in the poetry and





prose of famous authors, about what chemical errors were made in literary and scientific works.

The result of the project should be:

- a) knowledge and skills on the topic "Types of chemical reactions";
- b) find information on the topic in various sources;
- c) obtain the necessary information about the application of chemical reactions using Internet resources and the ability to safely use Internet search services.

At the defense of the project, students will make presentations on the application of various types of reactions and the defense of an individual project.

When evaluating prepared presentations for the project, a criteria-based approach is used, in which only the work of the student is evaluated, and not his personality, the student's work is compared not directly with the work of other students, but with a standard (an image of an excellent job). At the same time, both project activity and information competence of students are evaluated [8].

The method of projects, in the organization of independent work of students in chemistry, allows you to achieve significant results in learning. involves the rejection of memorization of the material, the development of a creative approach to obtaining information creates the prerequisites for laying in-depth knowledge and practical skills for solving problems.

Thus, as practice shows, project activity really contributes to the formation of a new type of student who has a set of skills and abilities for independent constructive work, who knows the methods of purposeful activity, is ready for cooperation and interaction, and is endowed with self-education experience.

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