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TECHNOLOGIES FOR THE DEVELOPMENT OF STUDENT RESEARCH ACTIVITIES IN THE PROCESS OF CHEMISTRY EDUCATION

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Abstract:

In the article, methods such as designing in the development of students' research activities in the process of chemistry education, directing students from chemistry to research activities in the radical reform of the chemistry education system by creating problem situations, forming a scientific outlook in students during research activities , issues of creativity development are highlighted.

Keywords: research, research - competition, learning experience, creative tasks, intelligence – map

In the course of chemical education, various technologies are used to develop students' research activities. We provide suggestions and recommendations regarding the design of the research methodology and the wide use of problem-based educational technologies. Currently, one of the most important tasks in the education system is to guide each learner to fully master his personal experience. The main way to achieve this is students' creative, creative and creative activities.

The process of globalization leads to the informatization of education, creates the need to search for innovative approaches to the organization of the educational process, contributes to the self-awareness and development of the student's personality. This, in turn, determines the prospects of creating a global informational educational environment that creates wide opportunities for educational activities and affects the redistribution of roles among its participants. Modern approaches in the educational system require that students strive for creative work, have the potential to acquire professional-methodical competence and the world of professional social values at a high level. At this stage of the formation of a creative specialist, directing students to research activities deserves special attention.

In educational practice, most of the knowledge is provided ready-made and does not require additional research efforts, but the main challenge for students is to independently search for information and acquire knowledge. Therefore, one of the most important conditions for increasing the effectiveness of the educational process is the organization of educational methodical research activities of students and the development of research abilities as its main component. This not only helps students to fulfill the general secondary education qualification requirements, but also creates their internal motivation for educational activities, forming them as mature specialists.

The content of the scientific research tasks is to develop students' cognitive independence, to cultivate a careful attitude towards nature, to develop special learning skills, to study the diversity of flora and fauna, especially in their area, to study the educational base of the chemistry laboratory room. z is aimed at replenishing with reagents and equipment prepared as a result of independent activities.

The organization of research activity has the following structure: motive, problem, goal, tasks, methods and methods, action plan, results, reasoning. Research is based on the idea of solving a problem. This is necessary through various organizational forms of teaching: lesson, (lesson - seminar, lesson - defense of ideas, lesson - role playing, lesson - conference, etc.), additional training, project activities, formation of students' research activity competencies in group, individual, pair forms.

Types of research activities:

1. Express - research: the goal is to independently conduct research and design according to the description. For example - determination of various emulsifiers in food, determination of the amount of iodine in food products containing starch, etc.
2. Learning experience: this includes laboratory and practical training. Learning experience is one of the most effective teaching methods.
3. Research - competition. Also effective in classes. For example, finding errors in a test.
4. Creative assignments. Give a chemical explanation of the process that occurs during the occurrence of experiments such as "Artificial blood", "Burning foam", "Magic flame" and solve problem situations according to the PISA international assessment program.Organization of research, quizzes, presentations on the topics "A look at the chemical

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industry", "Chemistry in everyday life", "This is the bread of the chemical industry".

5. Vacation tasks: preparation of adsorbent from the peel of dry fruits, preparation of biofertilizer from pet dung and its testing, drawing up projects of research works such as extracting Ca from eggshell.

6. Types of research activities outside the auditorium: preparation and participation in chemistry Olympiads, competitions, participation in educational expeditions, environmental cleaning, creative works, writing abstracts.

When organizing educational work, it is important to organize it in such a way that students master the research process without difficulties: you can focus on the importance of expected results, offer an original or unexpectedly structured educational task. It is important to give students a "snapshot" of a more general problem than is reflected in the assignment. Ideally, students should create the problem themselves, but in practice this is not always effective. In my practice, I try to offer students significant, problematic assignments, which are a challenge in further work.

Laboratory work can be organized in several ways.

1. Independent work organized in the process of learning new material will have the nature of research and serve as a source of acquiring new knowledge. Example: Topic "Law of conservation of mass of matter". At the beginning of the lesson, a problem is set - how do you come across the law of conservation of mass of matter? Let's take the process of making dough at home and do the laboratory exercise using the instruction card, draw conclusions. Laboratory work conducted in order to consolidate the mastered material can strengthen the knowledge gained about the law of conservation of mass of matter, be a guide for familiar material and confirm the teacher's story.

Example: the topic of the lesson: "Air. Ozone. Oxygen» Name the percentage composition of air? The problem is, why is there 21% oxygen and 72% nitrogen in the air? Where does the nitrogen go? Taking into account the modern requirements for the educational process, it is possible to put students in the place of inventors in chemistry lessons, to give preference to the first option of work organization as the most effective from the point of view of educational relations.

Student research using natural handouts can be organized in different ways.

Some work can be done outside the classroom or partly in the classroom and partly outside it, which allows to continue research work during the activities of the "Young Researcher", "Wonderkids Club", optional course and excursions.

Pedagogical situations help students to develop their research activities. During the learning process, I want the student to defend his opinion, to give instructions and arguments in defense of it, to use methods of gaining knowledge and experience that encourage the student to ask questions to the teacher and his friends, to clarify the parts he did not understand and to clarify the knowledge. I use situations that need deep understanding. Such situations include revising the answers of fellow students, actively searching for work and news related to the experience.

Practice shows that the use of elements of problem-based, research, research, heuristic teaching methods makes the educational process more effective. It helps to achieve certain goals in the development of students' research abilities and activities: to increase students' interest in learning, to direct them to achieve better results.

It is necessary to form research skills not only in the classroom, but also in work outside the classroom, which allows students interested in science not to be limited within the curriculum. The use of tasks related to observation and conducting experiments in works outside the auditorium develops students' inclination to research.

Students' research learning activity has great opportunities for forming their creative experience, because it involves not only mastering the actions performed on the basis of examples, but also independent research and the creation of knowledge of new subjective importance. includes Such an experience is formed on the basis of a person-oriented approach to students in teaching, one of the methods of its implementation is the use of the project method in teaching. The project method is a flexible model of organizing the educational process aimed at the creative self-realization of the individual.

The main requirements for the organization of the project:

- the project was created on the initiative of the students, and it should be meaningful for them and for those close to them;
- the problem to be solved with the help of the project and the expected results should be of practical (perhaps scientific) importance;
- students' work in the project has an independent and research character;
- the project is planned and developed in advance, based on specific goals and tasks, changes are allowed during its implementation.

The project method allows students, on the one hand, to independently acquire new knowledge and methods of activity, and on the other hand, to apply previously acquired knowledge and skills in practice.

The educational project includes the type of collective activity. One of its main tasks is to implement interdisciplinary communication and create some kind of educational product in the process of communication between students and the teacher. Thus, conditions are

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created for students' continuous self-education, intellectual and creative development.

The activity of the student is not only to satisfy the need for knowledge, but also to meet all the needs for the development of the student's personality.

Research task:

1. Determine the route to your institution or home.
2. Calculate how many cars, trucks, and buses can travel in 1 hour using gasoline or methane fuel.
3. Based on Table 1, determine the average amount of gases released into the atmosphere for 1 hour per day from this part of the road.

Determine the amount of toxic gases released into the atmosphere by one car during the day.

Exhaust gases from the car	Lorry(van)	Car	Bus
CO	502,2	225,8	227,9
HO_2	70,4	43,8	17,7
C	19,3	-	3
CO_2	4,5	-	0,7
Pb	0,2	0,27	0,08

4. Draw a conclusion.

Such tasks related to the development of students' research activities have a positive effect on scientific research and intellectual development.

IN CONCLUSION, the content of research activity among students of pedagogical higher education institutions is directed to the development of personal intellectual qualities in the process of educational and creative research tasks, solving problem situations. Based on the research activity of students as a set of interrelated components (organizational, content, activity, evaluation-result), this system served to improve the methodology of developing students' research activity based on a humanistic approach and to develop the educational content.

The structural structure of the development of students' research activities is presented as a set of interrelated components such as cognitive, axiological, creative, organizational-research, reflexive-evaluation, and is manifested at limited, permissible and optimal levels. ladi This serves to improve the methodical aspects of evaluating students' knowledge results and research competencies.

Problem-complexization and integration of the teaching content according to the scenario of local, modular, systemic changes based on technologies for the development of students' research activities (problematic, design, intellectual-map) and self-reflexive management of the teaching process in cooperation zi creative development methodology was developed. As a result, it was possible to improve the methodology of developing students' research activities by means of electronic educational resources.

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