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## DEVELOPING STUDENTS RESEARCH COMPETENCE IN CHEMISTRY LESSONS

**Annotation.** *The goal of a competent approach to learning is to bridge the gap in knowledge and practical activities of the student so that he can effectively solve practical issues with the help of acquired knowledge. The article examines the development of students' research competences in chemistry lessons.*

**Key words:** *competent, competence-based approach, research competence, research, students.*

**Анотація.** *Метою компетентнісного підходу до навчання є подолання розриву в знаннях та практичній діяльності студента, щоб він міг ефективно вирішувати практичні завдання за допомогою набутих знань. У статті розглядається розвиток дослідницьких компетенцій учнів на уроках хімії.*

**Ключові слова:** *компетентний, компетентнісний підхід, дослідницька компетентність, дослідження, студенти.*

**Introduction.** Today, education should be accessible at all levels, which requires improving the country's education system. The traditional approach, which has been in place for many years, focuses on providing students with as much

knowledge as possible during their school years. However, modern requirements for graduates of general education institutions have changed, and the level of education can no longer be measured solely by the amount of knowledge a student possesses. Instead, knowledge, skills, and abilities should be viewed as units of culture. These units must evolve from cultural elements into components of a market-oriented, socially oriented economy.

The introduction of a competency-based approach into the educational system of general education institutions enables students to learn how to act independently in uncertain situations and solve pressing problems. Naturally, all the changes occurring in the global economy are reflected in the education system. This necessitates a revision of the content of education in general education institutions.

**The purpose of the article** is to examine the development of students' research competencies in chemistry lessons.

### **Research Results. Competency-Based Approach and Research Competence.**

The issues of a competency-based approach and research competence are addressed by scientists from Tajikistan and other countries. In the works of Tajik researchers, significant attention is paid to new methods and forms of education in general education institutions, as well as to the development of students' intellectual and creative abilities, which undoubtedly contribute to the formation of their research competence.

The issues of modern didactics are studied and discussed in the works of scientists such as M. Lutfulloev, F. Sharifzoda, U. Zubaydov and T. Guseynova/ Among these, Lutfulloev M.'s book *Modern Didactics* holds a special place, as it pays particular attention to new methods and forms of education in the country's general education institutions. Tajik scholars in the fields of pedagogy and psychology, including M.S. Akhmedov, M.A. Dadabaev, D.Z. Rakhmonov, L.Q. Naziri, D.Ya. Sharipova and F. Sharifzoda, have explored the development of students' creative abilities in their works [4].

Additionally, renowned Tajik scientists and educators such as Kh.S. Afzalov, S.Sh. Bazarova, B. Rakhimov, Kh. Buydokov, U.Z. Zubaydov, B. Qodirov, K.B.

Qodirov, M. Lutfulloev, A. Nurov, A. Pakhlavonov, T. Rajabov, S. Tabarov, A. Hamrokulov, T. Shukurov, and others have discussed various aspects of this topic.

**Subject Competence in Chemistry.** In the context of chemistry, subject competence includes the following knowledge, skills, and abilities:

1. Understanding chemistry as an integral part of the natural science worldview, as a fundamental science of nature closely related to other natural disciplines.

2. Recognizing that the world around us consists of materials with specific structures that can transform into one another, and understanding the relationship between the structure, properties, and uses of these materials.

3. Developing chemical thinking, the ability to analyze real-world phenomena using chemical research methods, and the ability to communicate and reason using the language of chemistry.

4. Understanding the role of chemistry in everyday life and its practical applications in addressing global challenges such as food security, energy, and environmental issues.

5. Acquiring practical skills in handling materials, objects, and chemical processes in everyday life, as well as managing chemical processes.

**Learning Competencies and Research Activities.** The system of learning competencies takes into account an individual's ability to independently select knowledge and skills for analysis and application in various situations and spheres of life. During the learning process, students acquire various competencies.

Competencies are functional tasks that are interconnected with activities and can be solved by individuals. The ability to solve such tasks lies within the subject of activity, enabling a person to address specific problems [3]. E.F. Zeer defines competencies as the result of learning and views them as an integrative quality of an individual. These integrative qualities encompass a system of knowledge, skills, and abilities necessary for performing a specific type of professional activity [1].

According to V.A. Slastenin, in competency-based learning, the components of research competence should align with the components of research activity. The unity of theoretical and practical skills constitutes the totality of students' competencies [2].

Most researchers associate research competence with research activity, considering it the result of well-planned work. Research activities may include writing scientific projects, preparing test reports, and analyzing their results. For example, during experiments, students learn to identify problems, analyze theoretical questions, and construct logical chains of reasoning. At the same time, students independently conduct practical research, record observation results, and formulate conclusions.

Students who can conduct experiments will later be able to apply their knowledge in formulating hypotheses. The ability to propose hypotheses indicates well-developed critical thinking. Conducting chemical experiments allows students to develop and solve problem situations and test hypotheses. This demonstrates that experimentation positively impacts the development of students' abilities. On the other hand, teachers can guide the development of students' thinking and facilitate the assimilation of new knowledge.

A chemical experiment in the classroom serves various didactic purposes. It can be conducted through group work involving two students, while simultaneously employing various teaching methods and tools. Scientific research with students should follow a specific sequence. The process of implementing research work consists of seven stages:

1. Defining the research topic.
2. Outlining the goals and objectives of the study.
3. Conducting theoretical research.
4. Performing experiments.
5. Analyzing and correcting the obtained results.
6. Conducting scientific research and verifying its outcomes.
7. Presenting research results at student scientific project competitions, scientific and practical conferences, and other events.

**Conclusions.** In research, success depends on a well-defined topic, clear goals and objectives, and an appropriate research methodology. Attention should also be given to collecting materials during observations or experiments. Sufficient time must be allocated for processing the material, analyzing, summarizing, comparing, and

writing the final text. Experimental and research work can be conducted during classes or as part of extracurricular activities.

Research activities contribute to the formation of research competence. Improving the quality of education, both nationally and globally, is one of the most pressing issues of our time. In this regard, the competency-based approach can be considered one of the ways to enhance the quality of education. It represents both a natural evolution and an innovative approach to educational content.

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