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Development of Chemical Competencies of Students in the Process of Studying Analytical Chemistry

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ABSTRACT

The article is devoted to the actual problem - the implementation of competence approach in higher school. The problem of formation of chemical competence of future specialists is considered. The role of research tasks in teaching chemistry is determined.

The modern world is an era of innovation, in which it is unlikely to be possible to build a career, find a job and achieve significant success without appropriate education.

The modernization of the higher education system taking place in Uzbekistan today is a massive program of the state, implemented with the active assistance of higher school teachers.

In the context of the Bologna Agreements, the important contribution of the sphere of higher professional education to the process of lifelong learning is emphasized, the need for a competence-based approach to improve learning methods in accordance with modern production requirements is noted.

Analytical chemistry plays a huge role in scientific and technological progress, largely contributing to the development of many natural sciences.

Analytical chemistry is of particular importance in the development of chemical science itself — one of the most important areas of natural science.

Analytical definitions are necessary when performing each research work on chemistry. In

addition, analytical research methods are resorted to in the process of carrying out research work in the field of geochemistry, geology, mineralogy, metallurgy, medicine, biology, agrochemistry, etc.

The importance of analytical chemistry and chemical analysis is especially great in production, where constant monitoring is necessary to prevent defects, which are often caused by undesirable impurities in the raw materials, intermediates and finished products. According to the results of the analysis, the flow of the technological process and the quality of the resulting material are judged.

Analytical chemistry has a crucial role in the scientific substantiation and development of modern methods of automatic control, without which it is impossible to maintain chemical-technological and physico-chemical production processes at a given optimal level and to provide an automatic production control system [1].

Based on the chemical analysis data, geologists are searching for minerals. Based on numerous determinations of the isotopic composition of ore lead and meteorites, the age of the Earth's crust and the solar system has been established. According to the results of the analysis, the so-called trace elements that make up the soil and fertilizers play a role for the nutrition of plants and animals. According to the blood test data, doctors judge a person's health.

Without modern methods of analysis, the synthesis of new chemical compounds would be impossible. On the other hand, new production methods require more advanced analysis methods. The role of analytical chemistry is especially significantly increasing at the present time, when we are solving the grandiose task of creating a giant chemical industry.

We have established the role and place of the Analytical Chemistry course in the system of chemical education, its distinctive features from similar courses for universities, technical and pedagogical universities, and content and activity opportunities for the formation of general cultural and professional competencies [2].

The competence approach is currently being actively developed by many authors [3]. Research in the field of training future chemical analysts, chemical engineers for academic and professional activities and the role of chemical disciplines in this process are few.

The analysis of the scientific and methodological literature devoted to the study of the competence approach, its conceptual apparatus, made it possible to establish the need to clarify the content, structure of the integrative concepts of "chemical competence" and "chemical competence" of the future analytical chemist, "readiness for educational and professional activity". We have identified classification features of different types of chemical competencies formed during the study of analytical chemistry, including the presence of fundamental chemical-analytical knowledge, motivational and value attitude to them as professionally significant, the ability to use this knowledge for further development of specialized disciplines and solving professional tasks, the ability to independently acquire knowledge and work in a team [4].

Chemical competencies formed in the course of Analytical Chemistry are considered as a concept that includes a set of professionally directed chemical knowledge, skills, at the level of their conscious use in educational and professional activities, both in standard and non-standard situations. This is necessary for the development of personal qualities of students, such as self-development, independence, initiative, communication skills.

Chemical competence iyis a mandatory component of the professional competence of a chemical analyst. Chemical competence denotes the necessary level of chemical education, which allows students tap be ready for further educational and professional activities ın line with this specialty. By the readiness for educational and professional activities of students formed during the study

of analytical chemistry, we understand that they have fundamental chemical and analytical knowledge, a motivational and value attitude towards them as professionally significant, the ability tap use this knowledge for further development of specialized disciplines and solving professional problems, the ability tap independently acquire knowledge and work ın a team.

Today, the modern world needs people who are able tap think creatively, find new solutions - researchers. Preparing students for research work iyis an important problem of modern education.

Research activity has a creative nature, allows students tap self-actualize, achieve success within the framework of academic and extracurricular activities, which increases motivation for education ın general.

When carrying out research workshops and individual research works in chemistry, information competence is also formed. By examining the composition and quality of various goods, for example, medicines, food, milk, water and others, students draw conclusions about the reliability of information, confirm or refute these information.

Thus, educational research is a way of creative learning, which is designed in accordance with the model of scientific research, allows you to build an educational process on an activity-based basis.

During their studies at the university, students should not only gain knowledge, but also maximize their abilities, the ability to independently replenish their knowledge, navigate the rapid flow of modern scientific information. The formation of abilities is impossible without the participation of active, interested students. As a teacher, I am sure that it is impossible to develop all the abilities of students by one method. In our opinion, it is the research method that makes it possible to turn a student into an active subject of joint activity

Our work experience shows that students, engaged in research activities outside of classes, show non-standard thinking, initiative, activity in terms of creative search for information on the chosen problem. There is an increase in interest in the subject, awareness of the importance of chemical knowledge in professional activities and in everyday life.

When teaching students research activities, it is necessary to:

Develop the research competence of students by mastering the methods of scientific cognition and the skills of educational and research activities;.

To form students' ability to evaluate the information received and find various ways to solve educational and research problems;

Apply problematic technology as the basis of educational and research activities;

To consider the social and educational – scientific prospects of students' research work.

The research work includes all stages of scientific research:

- informational,
- analytical-activity,
- actually research,
- Reporting and presentation.

Students of different levels of preparedness are involved in research activities with pleasure and interest. At the same time, it is necessary to take into account the capabilities of students, predict the level of results, the pace of implementation of the research program.

Classes organized in a research mode open up new horizons for students for independent scientific research.

Outside of classes, research activities can be represented by the following forms of students ' participation in it:

- olympiads, contests;
- project activities;
- Research conferences of various directions.

The most common form of protection of research work is making a presentation on selected research topics and demonstrating videos, slides.

Research activity has no boundaries. A person has been studying all kinds of areas of both his own and natural activities for thousands of years, but it are impossible to say that he knows everything, because life will lose meaning and interest.

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