



FEATURES OF TEACHING CHEMISTRY SCIENCES

Khalilova Yoqtkhon Abdubannaevna,
Teacher

Ahmadjonova Gulhayo Rafiqjon kizi
Teacher, School №5 Fergana city

Abdurahimova Nargiza Qodirjon kizi
Teacher, School №58 Bagdad district
Uzbekistan, Fergana

ABSTRACT	KEY WORDS
In recent years, the school system has undergone significant changes. There are specialized classes (humanities, physics and mathematics, chemistry, etc.). This led to the need to restructure the curricula and content of many school courses. Differentiation of students begins from the fifth grade. However, very often the profile of the class completed by the student does not correspond to the profile of the university chosen by him in the future.	school system, chemistry, innovation, innovative approach, pedagogical skill, modern education.

The modern didactic educational model, which develops within the framework of the introduction of new educational standards, is based on the competence-based educational paradigm. A distinctive feature of the second-generation education standards is their focus on ensuring the transition from the retransmission of knowledge to the formation and development of students' creative potentials, preparing them for life on the basis of a system-activity approach.

Modern education should ensure the acquisition of knowledge throughout a socially active life, therefore, the problem of continuity of education becomes significant, the solution of which is impossible without the implementation of continuity. From the point of view of continuity and continuity, the educational process involves the acquisition by students of such knowledge that is necessary and sufficient to continue learning at the next stage. At the same time, there is a gap between the level of requirements in higher and secondary schools. Studying at school allows students to realize their abilities more fully, increase the level of motivation for choosing a specialty when entering a university, as well as adapt to studying at a university. The selection of educational material is based on modern requirements for applicants to universities of chemical and natural science profile.

One of the main forms of organization of the educational process in grades of the school is a lesson. To increase the productivity of lessons, the most effective is the combination of independent work with other types and methods of teaching. This is one of the most effective means of relieving emotional overload of students. A variety of active forms of student activity contribute to the creation of a favorable psychological climate in the classroom, for example, working with a textbook, with

additional literature, performing an experiment, solving problems, etc. Chemistry, as a science, has favorable opportunities for this, since the chemistry program includes both theoretical questions, practical work, and tasks.

Teaching chemistry in high school is as close as possible to the university system. A distinctive feature in comparison with a secondary school is a lecture-seminar system of education and a step-by-step system for monitoring students' knowledge. The work on the assimilation of knowledge and the formation of students' skills during lectures, seminars and practical classes is organized in such a way as to prepare them for the perception and taking notes of lectures, working with additional literature, as well as for independent cognitive activity.

The lectures present the main theoretical material, general methods and algorithms for solving problems. Students may have difficulties in perceiving lectures at the initial stages of training, therefore, special attention is paid to substantiating the importance of information for future professional activity, creating problematic situations that lead to dialogue, discussion, thinking out loud. In this case, students find themselves in a situation where not just listening to a lecture is required, but active cognitive activity.

Work continues on the formation of a system of theoretical knowledge and verification of their assimilation in seminars. The purpose of such seminars is to introduce students to the study, comprehension, presentation of theoretical material, the development of their chemical speech. The teachers of the school have developed teaching aids, the peculiarity of which is that they have become not only a source of information on the topics of seminars, but also a guide to the formation of skills for independent work with special literature. Some of the studied questions are submitted for self-study, which saves time and makes it possible to work out practical skills more deeply.

The chemistry course at the school provides for expanded practical training of students in comparison with the general education program. The practical orientation is emphasized by an extended course on solving computational, logical, experimental and other types of problems. A large role is given to demonstration and laboratory chemical experiments. Students independently investigate chemical phenomena and patterns, performing laboratory experiments and practical work, which contributes to the conscious assimilation of knowledge. Solving experimental tasks, students improve their skills and abilities, learn to apply the theoretical knowledge they have gained in solving specific tasks.

For differentiated control of knowledge, multi-level control works and multi-level tests are used, which allow you to quickly and effectively check the level of assimilation of theoretical material, skills in solving computational problems at the stages of introductory, intermediate and final control. Intermediate differentiated control allows timely and effective repetition of the studied material before the final control, which reduces the burden on the student.

A number of didactic requirements (principles) are imposed on the chemical content, which it is advisable to fulfill for the effectiveness of the learning process of students: scientific character; consistency; accessibility and visibility; connection of theory with practice; historicism. Let's take a closer look at these principles.

The principle of scientific character is a reflection of true processes and substances, their interrelationships, and the absence of chemical errors. It is known that scientific knowledge can be achieved only when students get acquainted not only with ready-made conclusions, but also with the methods by which these conclusions were made. Accessibility is characterized by the number of intra-subject connections of the studied material with the already studied. So, for example, it is not possible to explain to students the hybridization of orbitals, without the theory of the structure of the atom. In addition, accessibility is limited by the principle of taking into account the age characteristics of students.

The principle of consistency is very close to the principle of scientific. A "system" is defined as an integral unity of interrelated components. The requirement of consistency implies reflection of the key

components of the studied science in the minds of students. Any system, without exception, has its own structure. The teacher must clearly understand the structure of each concept, each law and theory. Systematicity characterizes the sequence of studying educational material, the consistent development of concepts. When implementing this principle, it is necessary to take into account the regularities of the process of ignorance, the movement from the known to the unknown, from the simple to the complex. So, for example, the study of the properties of substances is based on knowledge of their composition and structure, and their application on knowledge of their properties.

It is known that with the systematic construction of educational material, two logical approaches are possible – inductive and deductive. The inductive approach is cases where there is no base of facts that is necessary for theoretical generalizations, and the deductive approach is in cases where the theoretical base is sufficient and forecasting can be carried out. An example of a deductive approach is the approach to topics that are studied after students have mastered the periodic law.

The principle of connection from theory to practice is applied and provides motivation for the learning process.

Of particular importance is the principle of historicism, which contributes to the implementation of scientific logic in the learning process.

Chemical theories were not born simultaneously, but as facts arose that could not be explained on the basis of existing theories, thus new theories arose that expanded and deepened existing concepts. Many chemistry courses are built on this principle. Each of the main theories of the school chemistry course is a kind of boundary through which chemical concepts pass, which undergo qualitative changes as they pass a new level.

It should also be noted that systematic chemistry courses can be built in different ways, depending on how the system-forming factor underlies the formation of the course. Perhaps it will be a system of concepts about a substance, or a system of concepts about chemical reactions. The most common chemistry courses are focused on a system of concepts about a substance. For the most part, the first topic of such a course will be the topic "Initial Chemical concepts" - an introductory topic that will familiarize students with the simplest terms and concepts that will be necessary to understand many aspects.

Chemical reactions, as important chemical concepts, are viewed through the prism of the properties of substances. This topic also serves to establish interdisciplinary connections with physics.

It is obvious that such important concepts of the chemistry course as "substance", "chemical reactions", "chemical element" and "chemical production" are closely interrelated with each other and their comprehensive study is not possible in isolation from each other.

After the named topic, as a rule, the study of the periodic law and the system of chemical elements of D.I. Mendeleev follows. The periodic law occupies a dominant position in the chemistry course. It is he who determines the further study of inorganic chemistry by groups of the periodic system or by periods. By means of the periodic law, for the most part, the structure of the atom, the degree of oxidation and the chemical bond are explained.

All of the above will further serve as a basis for predicting the chemical properties of substances and the main one for forming ideas about chemical reactions. In the process of analyzing the key characteristics of innovative educational technologies, it was possible to identify specific methods and approaches to teaching at different levels of education:

- Design and research activities;
- Use of ICT;
- Personal-activity approach;
- Portfolio of achievements;
- Health-saving technologies.

Chemistry by its nature is an experimental science, and therefore, the teaching of this subject is based on chemical experiment as a source of knowledge; the promotion and testing of hypotheses as a means

of consolidating the knowledge gained. At the same time, it is important that the teacher is able to make the difficult educational work bring satisfaction to students and there is a desire to comprehend the unknown again and again. In order to effectively assimilate a huge amount of theoretical material, it is necessary to increase the independent work of students, because it is known that independently acquired knowledge is much stronger than passively obtained. Within the framework of this study, we will focus in more detail on the first two technologies, because they are the most effective and popular in the educational space today.

So, at different levels of education, the research activity of students has its own specific functions. In the main school – the formation and development of students' abilities to take a research position and independently set and achieve the goals of educational activities on the basis of the implementation of elements of research activities within the subjects of the curriculum. In high school – the formation and development of research competence and pre-professional skills as the basis of specialized training. In extracurricular activities – creating the necessary conditions for the formation and development of students' abilities in accordance with their needs in conditions of flexible educational programs and individual support.

Research activities in chemistry lessons are carried out during the lesson itself and during extracurricular time. During the lesson, students develop a project on a new topic and cover the topic from various positions during the lesson. During extracurricular hours, students work on an individual project, on a topic that interests them personally, and present the product of their design and research activities at conferences, exhibitions, etc.

Another specific feature of modern chemistry lessons is the need to build a level differentiation of educational material by complexity, that is, first basic knowledge is created, then exercises for their application in standard and new situations.

A variety of modern pedagogical technologies, such as computer technology, design and research activities, problem-based learning technology, the use of tests, etc., contribute to the development of cognitive activity and creative potentials of students in chemistry lessons. The introduction of elements of research activity into pedagogical technologies makes it possible for a chemistry teacher not so much to teach, as to help students learn, direct their cognitive activity.

New educational standards also set new tasks for teachers in improving their professional competence, or to be more precise, their development of active and interactive technologies, psychological knowledge and skills that are associated with the use of digital and computer technologies, information competence.

References

1. Chernobelskaya, G. M. Theory and methodology of teaching chemistry [Text] / G. M. Chernobelskaya. – M. : Bustard, 2016.
2. Makhamadinovich S. M. Ethnic Factors And Attitudes Towards Human Capital Development //The American Journal of Interdisciplinary Innovations Research. – 2021. – Т. 3. – №. 01. – С. 118-130.
3. Numonjonov S. D. Innovative methods of professional training //ISJ Theoretical & Applied Science, 01 (81). – 2020. – С. 747-750.
4. Qizi F. N. F. Modernization And Integration Of National Culture In The Condition Globalization And Its Importance In The Restoration Of The New Uzbekistan //Turkish Online Journal of Qualitative Inquiry. – 2021. – Т. 12. – №. 6.
5. Farxodjonova N. F., Abdurahimov V. A. MODERN TECHNOLOGIES OF STUDENTS TRAINING IN HIGHER EDUCATION //НАУКА И ТЕХНИКА. МИРОВЫЕ ИССЛЕДОВАНИЯ. – 2020. – С. 5-7.

6. Tursunovich, R. I. (2022, November). THE SIGNIFICANCE OF PRAGMATIC APPROPRIATENESS IN ESL CULTURE. In *Proceedings of Scientific Conference on Multidisciplinary Studies* (Vol. 1, No. 2, pp. 157-160).
7. Markina, I. V. Modern chemistry lesson. Technologies, techniques, development of training sessions [Text] / I. V. Markina. – Yaroslavl. : Academy of Development, 2012.
8. Sodikjonov, M. M. "Some Thoughts On The Evolution Of Approaches To The Concept Of Human Capital." *The American Journal of Social Science and Education Innovations* 2.08 (2020): 144-150.
9. Farxodjonova N. SOCIO-POLITICAL CHARACTERISTICS OF THE HERITAGE OF THE MANIFESTATIONS OF THE JADID MOVEMENT //Scienceweb academic papers collection. – 2022.
10. Tursunovich, R. I. (2022). Teaching a Foreign Language and Developing Language Competence. *Web of Scholars: Multidimensional Research Journal*, 1(8), 8-11.
11. Ergashev I., Farxodjonova N. Integration of national culture in the process of globalization //Journal of Critical Reviews. – 2020. – Т. 7. – №. 2. – С. 477-479.
12. Farxodjonqizi F. N., Dilshodjonugli N. S. Innovative processes and trends in the educational process in Uzbekistan //ACADEMICIA: An International Multidisciplinary Research Journal. – 2020. – Т. 10. – №. 4. – С. 621-626.
13. Ugli N. S. D. Types of transformer overload protection //Asian journal of multidimensional research. – 2021. – Т. 10. – №. 4. – С. 552-556.
14. Фарходжонова Н. Ф. Проблемы применения инновационных технологий в образовательном процессе на международном уровне //Инновационные тенденции, социально-экономические и правовые проблемы взаимодействия в международном пространстве. – 2016. – С. 58-61.
15. Makhammadaliyeva A. N. Prospects and foreign experience in the development of the pedagogical process aimed at strengthening active civil competence in future teachers //Asian Journal of Multidimensional Research. – 2022. – Т. 11. – №. 3. – С. 63-69.