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## **METHODOLOGY FOR CONDUCTING CHEMICAL EXPERIMENTS IN A HIGH SCHOOL CHEMISTRY COURSE.**

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### **Annotation**

This article presents the theoretical basis of the methods of applying the experience of pedagogical skills of the pedagogical teacher in the teaching of chemistry.

**Keywords:** modernization, technology, pedagogical technology, technologicalization of educational process, innovation, innovative educational technologies, innovative process, educational innovation process, stages of educational innovation process, pedagogical skills.

Today, an in-depth analysis of the development path of our country in the transition period of the new Republic of Uzbekistan, the sharp changes in competition in the world market and growing demand require a completely new approach and development and implementation of principles for sustainable development. At the same time, the concept of development of the higher education system of the Republic of Uzbekistan until 2030, developed on the initiative of the President of the Republic of Uzbekistan Shavkat Mirziyoyev, defines the priorities of systemic reform of higher education. To modernize higher education, to radically reform the education system based on advanced foreign technologies. For this, it is necessary to form a modern teacher on the basis of innovative technology. The upbringing of the young generation, which is the future of independent Uzbekistan, is an internal conflict process that requires great attention. Therefore, the teacher must observe the process of formation of the pupil or student with great enthusiasm and care. He must have pedagogical knowledge and skills while managing pedagogical processes. Only then is it important for the teacher to develop the essence of pedagogical research and the ability to apply the teacher's pedagogical skills in any didactic



process. Only innovations interest the student in the educational process, turning his personal interests into an internal need. Of course, the creation of innovation and whether the student's interest in it is more or less depends on the skill of the teacher [1]. Education takes place at different stages. **The first step** is to understand the learning materials. In this case, the student gets acquainted with the content of education and understands what his cognitive tasks are. Processes such as intuition, perception, imagination are actively involved in this. **The second step** is that they understand the learning material, understand its essence and generalize. As a result, they acquire new knowledge. To do this, they use analysis, synthesis, comparison, inference. **The third step** is reinforced by new knowledge, exercises, independent work, additional comments from the teacher. **In the fourth step**, they apply the acquired knowledge to practice as much as possible.

Relying solely on interest in education cannot be a substantial effect of motivation. The most important effective way to do this is to cast motivational-problematic situations or to set specific cognitive tasks that reflect the social nature of the subject being studied.

To successfully solve these tasks, a teacher must be competent in his or her profession. Competence is the ability to successfully perform pedagogical work. This is manifested, first of all, in the ability to clearly imagine the social role and necessity of the pedagogical profession. In addition, the teacher must be interested in the student as an object of his activity, be able to understand his needs and characteristics.

The following are the main requirements that provide the necessary and sufficient level of pedagogical training of a specialist: 1. Teaching skills; 2. Educational skills; 3. Personal qualities that provide a humanitarian factor in the educational process; 4. The ability to objectively monitor and evaluate the knowledge of students [2].

The concept of pedagogical creativity in the formation of innovative ideas in chemistry teachers should be formed in their professional activity:

1. Creative approach to Caspian activities;
2. Be active in creating new ideas;
3. Independent study of advanced pedagogical achievements and experiences;
4. Develop the skills to exchange ideas with colleagues about pedagogical achievements.



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Typically, the creative ability of educators is ensured through the pursuit of pedagogical problems, the implementation of research or research projects, and the achievement of mutual creative collaboration.

The educator does not become creative on his own. His creative ability is formed through consistent learning, self-study over a period of time, and he gradually improves and develops. As in any profession, the foundation is laid during the student years for future teachers to have creative abilities, and it is consistently developed in the organization of professional activities. In this case, it is important that the teacher is self-directed to creative activity and is able to effectively organize this activity. In the organization of creative activity, the teacher should pay special attention to solving problems, analyzing problem situations, as well as creating creative products of a pedagogical nature.

The teacher's creative approach to finding solutions to problems and situations helps to develop emotional and volitional qualities in him. By posing problematic issues, the educator is confronted with evidence that contradicts his or her existing knowledge and life experiences. As a result, there is a need to work on oneself, to study independently.

Having the creative potential of a pedagogical teacher can show the following skills: [1-5]

1. To be able to determine the essence and significance of the task.
2. Be able to analyze the problem statement.
3. Develop a plan to solve the problem.
4. Apply effective methods (analysis, synthesis, induction, deduction, comparison, etc.) to solve the problem.
5. To be able to choose ways to solve the problem.
6. Justify and re-examine the correctness of the decision.
7. Carrying out small researches in solving the problem.
8. Execution of evidence on the conditions of the problem, the course of the process and the generalization of the results of the problem.

The chemistry teacher teaches students the basic concepts and laws of chemistry, mainly through the changes in nature that all substances and the chemical elements that make up these substances are closely related to each other in the course of



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chemistry. they direct students to form different forms of matter by explaining that any new substance is a form of matter in nature. Through these materials, the teacher leads students to form a materialistic worldview. In chemistry lessons, the teacher demonstrates to students that all substances are in constant motion, and that the physical, chemical, biological, and other forms of changes in matter depend on the nature of that motion. In doing so, the teacher proves that new substances are formed in matter in the motion of matter by demonstrating the experiments.

Demonstration experience:

1. Boiling water in a glass and the formation of steam, all the water boils away and, as a result, it turns into steam;
2. The disappearance of the metal over time under the influence of zinc metal on the acid in the glass;
3. We put an alkaline solution in a glass and put a solution of phenolphthalein on it, and it turns red, and when we drop an acid solution on it, the color of the solution disappears, a new salt is formed in the solution;
4. The formation of carbon dioxide and water vapor by placing the spit in an alcohol lamp and lighting it;
5. The formation of a white precipitate of silver chloride solution when exposed to a solution of silver salt in a solution of silver chloride;
6. Put sodium carbonate salt in a porcelain cup. the formation of gas in the solution of hydrochloric acid, which slowly drips on it, and the dissolution of all the salt, the formation of sodium chloride in solution;
7. The formation of a new complex when a solution of copper sulphate in a glass is exposed to ammonia can be determined by observing the color change of the solution.

In the chemistry course, students understand the composition and chemical properties of substances, get acquainted with a variety of materials, from particles - electrons, protons and neutrons, to organic compounds with high molecular weight: mainly saturated and unsaturated hydrocarbons, oxygen-containing organic compounds - alcohols, aldehydes, ketones, carbonic acids, simple and complex esters, and petroleum particles. Students learn that the atoms of chemical elements are particles with varying degrees of complexity; even the most complex of organic substances have the impression that they are composed of the same chemical elements; reactions in solutions, types of chemical reactions, inorganic solvents, the theory of electrolytic dissociation, redox reactions, hydrolysis of salts, changes in amphoteric solutions and the formation of complex compounds.



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After that, the methodist teacher draws the following general conclusions on a scientific basis:

1. The interdependence of matter and phenomena in nature;
2. Continuous change and development of nature;
3. Transition of quantitative changes to qualitative changes;
4. Explains to students the theories of unity and struggle of opposites.

Through the study of the basic laws and theories of chemistry, the processes of formation of chemical elements and their properties, the study of the periodic laws and systems from the point of view of atomic structure, matter is constantly changing and evolving, and this eternal development takes place come to the general conclusion that.

The role of case-study technology is especially important. In doing so, however, in creating problem-solving and problem-solving learning tasks, the case-study really teaches students to study and analyze any situation with meaning. It is based on elements that reflect the general essence of the process of solving a particular problem situation. These are: forms of education, teaching methods, teaching aids, methods and tools for managing the educational process, methods and tools of scientific research on problem solving, methods of collecting information, their study, methods and tools of scientific analysis, teacher and student ( methods and means of educational communication between the student), learning outcomes. As a result, it is necessary to develop the following skills among students:

1. Development of analytical skills and critical thinking.
2. Ensuring the unity of theory and practice.
3. Demonstrate different perspectives on the problem.
4. Provide feedback on decision-making and its consequences.
5. Develop skills to evaluate alternatives in the presence of uncertainties.

Today, they have analyzed the issues of improving the scientific heritage, theories and scientific-theoretical foundations of chemistry by leading foreign chemists and methodologists in the integration of innovative components in the education system. In particular, the theories developed on the basis of research conducted at the school of the uzbek methodist scientist Professor X.T.Omonov. Based on the results of experiments conducted on the basis of these theories, it is determined that the



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pedagogical skills of the teacher depend on the following parameters. Based on this, we recommend the following to organize the pedagogical mastery of the teacher: 1. Organizational-social pedagogue: prepares students for independent life; 2. Class leader-creates and influences a positive psychological environment in the classroom; 3. Helps and supports students in solving the problem in the methodical-educational process; 4. The philosopher analyzes knowledge and experience, substantiates his views; 5. An experienced close friend helps students to overcome obstacles and problems; 6. Researcher-innovator-innovator-constantly works on himself, creates new ideas, implements them; 7. The leader of the educational process and the means of its motivation-purpose, anticipates, chooses teaching methods, teaches students to read, takes a creative approach; 8. Able to work as an interactive team and teach to work; 9. Counselor- teach a personal example. 10. Helps students to develop physically, mentally and spiritually; 11. Psychologist-knows and understands himself well; 12. Change-oriented — helps students improve their life skills; 13. Disseminates information to students and teaches them to apply basic new information in practice [6-8].

Today, after the formation of the pedagogical skills of a Methodist teacher, he focuses on improving the quality of teaching any chemistry class through the use of interactive methods of pedagogical technology.

In summary, interactive learning allows you to solve multiple problems at once. The main thing is to develop students' communication skills and abilities, to ensure the fulfillment of educational tasks by teaching them to work in a team, to listen to the opinions of their peers.

Based on the study of some experiences in the practical application of interactive training, we can show some of the factors that affect the quality and effectiveness of these training. They can be conditionally called organizational-pedagogical, scientific-methodical and factors related to the teacher, students, teaching aids. We need to keep in mind that they have a positive or negative impact depending on their nature.

In student-centered classrooms, students work together to understand important elements of the lesson and what they have not yet grasped.





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If a teacher really wants students to think, he or she must find materials that inspire additional strength and motivation that are relevant to students' social lives. When teachers force students to think, students return home with only the skills and broad outlook they want. To do this, related materials increase the quality of the learning process.

In the current educational process, the modern educator must carry out the following processes in the formation of innovative skills of the teacher: the inclusion of personal, professional qualities and attributes, the need to use them appropriately in the process of teaching and education.

They are: 1) personal qualities of the teacher, 2) professional knowledge, 3) professional qualities, 4) personal pedagogical skills, 5) organizational skills, 6) communicative skills, 7) gnostic skills, 8) creative qualities. In addition, in improving the quality of teacher education, the presence of important components of pedagogical skills for the successful implementation of innovative activities and its implementation through the following methods and techniques: 1) didactic ability, 2) academic ability, 3) perceptual ability, 4) speech ability, 5) organizational ability, 6) authoritarian ability, 7) communicative ability, 8) pedagogical creative imagination, 9) ability to distribute attention.

According to many methodist scholars, in addition to this, the teacher's striving for a noble goal, diligence, perseverance, humility, honesty, loyalty, exemplary behavior, demeanor, appearance, in short, a quality that meets his national and universal moral standards and we recognize that the acquisition of qualities are important factors that ensure his readiness for his professional activity and the effectiveness of the educational process.

The work of M.V. Klarin has a special place in the research on the preparation of teachers for pedagogical activity. In his work, he connects innovative activities with the need for continuing education, organized through the development and implementation of socio-cultural projects. This approach focuses on the individual's ability to make free choices, in which learning activities play a leading role and can be an important, leading tool in the development of the individual and a way to engage the individual in the learning process.



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The process of preparation of the educator for innovative activity is as follows: to predict the success of the intended innovation as a whole and its individual stages, to compare the innovation with other innovations, to select their effectiveness, to determine their most important and accurate, to check the success of innovation and assess the organization's ability to accept innovation.

The constantly evolving chemistry and pedagogical education in line with modern developments, a new approach to the professional training of students, the orientation of future teachers to pedagogical, cultural, educational, research activities; It was noted that it is necessary to ensure the achievement of educational results through the acquisition of competencies in the field of general culture, general professional, science. It was shown that the integrative methodology of ensuring the quality of professional training of students on the basis of the basics of chemistry is realized through the theoretical and methodological integration of teaching chemistry. It was determined that the content of vocational training on the basis of chemistry is the formation of innovative educational paradigms, development trends in the theory and practice of chemical education, the formation of chemical-methodological competence related to the acquisition of scientific competencies.

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