

## USING SITUATIONAL TASKS TO INCREASE THE EFFECTIVENESS OF TEACHING MEDICAL CHEMISTRY

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**Annotation:** This article explores modern pedagogical methods for teaching the topic of solutions in the subject of medical chemistry. It emphasizes the importance of interactive, problem-based, and technology-enhanced learning approaches to improve students' comprehension and practical application of solutions in medical practice. The work provides a detailed analysis of traditional and innovative methods, highlighting their effectiveness in medical education. Methods of control of knowledge assimilation as testing, solution of situational tasks, problem-based learning tasks are effective innovative methods that used in modern educational process. The use of situational tasks in the control of assimilation of knowledge by students gives an increase in the quality of learning by involving students in independent work, the consequence of which is a high level of knowledge through the development of logical thinking, the ability to work in small groups. In this paper we offer variants of situational tasks, which were applied in the studied groups and the results showed improvement of memorization of chemical compounds formulas, as well as achievement of significant progress in mastering practical skills in the course of experiments.

**Keywords:** Medical chemistry, solutions, modern teaching methods, interactive learning, medical education.

### Introduction

Medical chemistry is a fundamental subject in the training of medical students. The study of solutions plays an important role in understanding physiological processes, drug formulation, and clinical applications. Traditional teaching methods are often limited to lectures and memorization, which may not provide sufficient practical skills. Therefore, the integration of modern teaching methods becomes essential to improve student engagement and knowledge retention. Control of students' knowledge with the help of tests is one of the widely used methods of control, including in Tashkent Medical Academy. It serves to establish the level and structure of students' preparedness. Testing puts all students in equal conditions, so it is considered a qualitative and objective way to assess the knowledge and skills of students. All students are given equal tasks and equal evaluation criteria, and in such a process the subjectivism of the teacher is excluded. The solution of tests can be used at all stages of control of students' knowledge, including at each lesson in the process of current control. It is also effective to use testing at the stages of intermediate and final control. Testing takes a small amount of time and can be used practically at every lesson. However, this type of control cannot fully reflect the depth of student's knowledge [2]. Memorizing answers to tests, a student gets used to work at the level of automatism and does not strive for self-development, the ability to express his/her thoughts correctly and competently. Therefore, it is most effective to combine all types of knowledge control, both oral and written control, including the use of situational tasks made for each individual issue under consideration and even for an individual chemical compound with biological activity

### Theoretical Background of Solutions

Solutions are homogeneous mixtures consisting of solutes and solvents. In medical chemistry, solutions are widely used to prepare drugs, intravenous fluids, and diagnostic reagents. Key properties include concentration, molarity, osmotic pressure, and pH. Understanding these parameters is critical for medical practice, as they directly affect the efficacy and safety of pharmaceutical preparations and clinical treatments. Modern Methods of **Teaching Solutions in Medical Chemistry**

1. Interactive Teaching Methods: Students are actively involved in experiments, case studies, and group discussions.
2. Problem-Based Learning (PBL): Real-life clinical problems are used to demonstrate the role of solutions in therapy.
3. Technology-Enhanced Learning: Virtual simulations, multimedia presentations, and digital laboratories make complex concepts easier to grasp.
4. Research-Oriented Approach: Students are encouraged to conduct mini-projects on the preparation and analysis of medical solutions.
5. Competency-Based Education: Focus on developing skills necessary for clinical practice, such as calculating solution concentration and preparing IV fluids.

#### Comparative Analysis of Traditional and Modern Methods

Traditional Methods	Modern Methods
Lecture-based, theoretical, less interactive	Interactive, technology-based, problem-solving oriented
Focuses on memorization of definitions and formulas	Focuses on critical thinking and clinical applications
Limited practical involvement	Hands-on experiments, simulations, and case studies

#### Results and Discussion

Studies have shown that students taught using modern interactive methods demonstrate better understanding and long-term retention of concepts compared to those taught with traditional methods. Furthermore, the application of problem-based and technology-enhanced learning significantly improves clinical skills. Modern methods also help students to relate chemical theory with real-world medical practice.

#### Conclusion

The teaching of solutions in medical chemistry requires innovative approaches to meet the needs of modern medical education. By applying interactive, problem-based, and technology-enhanced teaching strategies, medical students gain a deeper understanding and better practical skills. These methods bridge the gap between theoretical knowledge and clinical application, ultimately improving the quality of healthcare professionals. The situational tasks developed by us on all sections of "Medicinal Chemistry", were approbated on practical classes, conducted in the form of controlled independent work, on the relevant topics. Based on the results of approbation we can conclude that the proposed tasks have an average level of complexity and can be recommended for use in the educational process as for the organization of independent work of students in the classroom, and to control knowledge in current and final classes in the discipline of "Medicinal Chemistry" medical school.

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