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USING SITUATIONAL TASKS TO INCREASE THE EFFECTIVENESS OF TEACHING MEDICAL CHEMISTRY

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Abstract:

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: innovation, testing, situational tasks, problem-based learning.

Introduction

"Medical Chemistry" lays the foundation of knowledge necessary for the study of biochemistry, genetics, physiology, microbiology, immunology, molecular biochemistry, pharmacology, endocrinology, molecular diagnostic techniques and biotechnology. Modern medicinal chemistry is a rather extensive course, including the achievements of modern science. Studying this course in full is possible only with the active inclusion of the student in an independent mode of work and the development of a comprehensive approach to understanding the chemical basis of metabolic processes occurring in the body. Each university solves this problem in its own way [1]. The use of innovative methods of teaching fundamental subjects in medical school is possible only with the active inclusion the student in an independent mode of work and the development of a comprehensive approach to understanding the basic metabolic processes occurring in the body and their impact on its functional state. The use of innovative teaching methods remains relevant at all stages of education in medical school and provides for the joint use of both technical resources and the human factor in the person of the teacher. In the course of training the teacher should be in search of more acceptable teaching methods for the most favorable delivery of the topic of the lesson and the choice of forms of control to determine the degree of knowledge assimilation on the part of the student.

Medical education at all times has been characterized by its specificity and is often faced with the restructuring of training programs, which requires input from both the state and teachers. The teacher is required to utilize all the latest advances in modern technology. Electronic presentations, online journals, video and audio materials, multimedia technologies allow to make the presented material more colorful, demonstrative, make it possible to cover more material and in a more accessible form. The fundamental goal is to achieve the most complete assimilation of the material by students. The effectiveness of the methods used is controlled by the proper selection of methods for assessing the knowledge gained, including various methods of oral, written and computer control.

One of the effective ways of knowledge control is testing of the initial level of knowledge and the level of knowledge assimilation by students. Along with testing, no less effective type of control is the solution of situational tasks, reflecting the main essence of the topic, considering specific situations related to the application of the topic in clinical situations. All of the above methods are aimed at making the students' mastering of the subject the most complete, interesting, accessible and effective. This fully applies to "Medicinal Chemistry", when studying which a medical student is faced with the need to memorize a huge amount of material (formulas, reactions, etc.) in a limited period of time.

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.

One of the shortcomings of modern education is the dogmatic nature of teaching, when students are more oriented to automatic reproduction of educational material. This approach to the learning process contributes only to the development of the learner's memory, but not his/her thinking. The use of situational tasks and tasks contribute to the formation of professional competencies and is an effective method of improving student learning [3].

Situational tasks developed in the process of teaching medicinal chemistry at the department were applied in the classroom and showed significant effectiveness in increasing the activity of creative activity, independent activity of students. They contribute to the development of independent thinking and as a consequence of simultaneous increase in the level of memorization of formulas, reaction mechanism and biological significance of a given substance

or biochemical process. The proposed situational tasks include several guiding questions, here are also given reference answers to them, allowing to check the correctness of problem solving and performance of tasks [4]. The medical and biological significance of the topics was taken into account when compiling the tasks.

Examples of situational problems in medicinal chemistry:

1. When poisoned by an insecticide, this substance blocks a section of the mitochondrial electron transfer chain, the coenzyme NADH.

1) What class of compounds does the coenzyme NADH belong to?
2) What fragment in its composition is an acceptor of the hydride hydrogen ion?
3) What carbon atom attaches this hydrogen ion?

Reference Answers:

1) This compound belongs to the group of nucleotide coenzymes.
2) A fragment of nicotinamide is involved in the reaction.
3) It reacts with its 4th carbon.

2. Catecholamine - Adrenaline in the body functions as a hormone synthesized by the cortical substance of the adrenal glands.

1) What is the hormone adrenaline called in simple communication.
2) Describe the stages of adrenaline synthesis in vivo.
3) Name the enzymes involved in this process.

Reference Answers

1) Adrenaline is called the "fear hormone" because it is produced intensely in extreme situations.

2) The starting substance in its synthesis is phenylalanine, from which tyrosine is synthesized, then 3,4-dihydroxyphenylalanine, from which dopamine, noradrenaline and finally adrenaline are synthesized.

3) The enzymes are: hydroxylase, decarboxylase, dopamine-β-oxidase and N-methyltransferase.

3. Determination of gastric juice acidity in the laboratory is carried out using a pH-meter. As indicator electrodes are offered: platinum, chlorosilver, calomel, glass, hydrogen electrodes. It is necessary to choose the right electrodes for the galvanic cell for pH determination.

1) Which of the listed electrodes are reference electrodes and which of
2) Which electrode will you choose as the measuring electrode and why?
3) Which electrode would you choose as the reference electrode and why?

Reference answers:

1) Platinum and glass electrodes are measuring electrodes
chlorosilver, calomel and hydrogen electrodes are reference electrodes.
2) The glass electrode should be chosen as the measuring electrode because the potential of this electrode depends on the pH of the solution.
3) The chlorosilver electrode should be chosen as the reference electrode because its potential is known and constant

Naturally, it is impossible to give answers to such questions without knowing the formula of

compounds (tasks 1,2) or the scheme of galvanic cell (task 3). Thus, such construction of tasks motivates the student to more thorough preparation for the lesson. The results of using the given situational tasks in the educational process allowed us to evaluate the level of students' preparation and the degree of mastering the lesson. They were also used to organize independent work of students in the classroom.

Improving the quality of education includes the formation of competence of students in professional activities. In situational tasks there should be a problem question, which is formulated in such a way that the student wants to find an answer to it. The essence of situational tasks is the same as problem tasks and they are aimed at solving a problem situation. They reflect the real situation of the educational process, consolidate the knowledge, skills and abilities to conduct practical works [5]. Fixing of practical works with the help of situational tasks increases the degree of assimilation of the given topic and together with theoretical knowledge gives high results in controlling the survival rate of knowledge.

When carrying out work on the acquisition of practical skills on the topic "Oxidimetric titration" to consolidate the work done, it is useful to solve a situational task of the following content:

The method of oxidimetric titration allows you to quantitatively determine the content of iron in biological fluids.

To consolidate the method of work it is necessary to answer the following questions:

1) What working solution is used to determine the amount of iron in the sample by oxidimetric titration?
2) What indicator is used to determine the equivalence point?
3) What coloration does the solution acquire at the equivalence point?
4) What medium should be maintained during the titration process?
5) What amount of iron is found in human plasma blood?

Reference answers:

1) The working solution is potassium permanganate
2) The working solution is the indicator.
3) The solution changes color from crimson to colorless.
4) It is necessary to use sulfuric acid solution, because crimson-colored MnO_4^- turns into colorless Mn^{2+} ions in acidic medium.
5) The iron content in the human body should be between 5.83 and 34.5 μmol/l.

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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