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INTERACTIVE LEARNING TECHNOLOGIES IN TEACHING CHEMISTRY AT BUKOVINIAN STATE MEDICAL UNIVERSITY

Velyka A. Ya.

c.b.s., assistant

Kropelnytska Yu. V.

assistant

Yakymchuk V. V.

lecturer

*Bukovinian State Medical University,
Chernivtsi, sq. Teatralna 2, 58000*

Annotation. *The switch from passive to active education model, when students are able to acquire the knowledge independently and think creatively, is highly important in order to prepare a competitive specialist. Interactive learning technologies are the best choice for reaching this goal. The authors of the article discuss the main problems of the traditional presentation of the material in the study of analytical chemistry, as well as proposals for the use of interactive learning technologies in order to improve the efficiency of the educational process and enhance the cognitive activity of students.*

Key words: *interactive learning technologies, discussion, analytical chemistry, pharmacy students.*

Introduction.

The current stage of the development of human civilization strengthens the requirements for the scientific competence of a specialist with higher education. They must be able to think creatively, to replenish their knowledge independently and navigate the rapid flow of scientific information. The necessity to increase the level of scientific training is also a characteristic feature of the modern field of professional-pedagogical activities. Nowadays, as many years ago, the most important goal of teaching at higher education institutions is to ensure maximum mental activity of students. Introduction of innovative technologies into the educational process, an important place among which belongs to the interactive ones, is the main direction of improvement in the study of chemistry at medical universities. The essence of interactive learning is highlighted in the works of A. Pometun, L. Pirozhenko, G. Voloshina, N. Pobirchenko and others. The problem of using interactive methods has been reflected in the scientific works of such scholars as N. Azarov, I. Beh, N. Matveeva, L. Nikolayev, O. Panchenko, N. Stetsur and others. In our opinion, the solution to this problem, in terms of reduction of pedagogical hours, is the introduction of interactive learning forms into the educational process. Interactive learning technologies can be used to conduct classes inside or outside the classroom in the form of extracurricular activities. The method of conducting a lesson is active, that is, no student is left without attention and, in a favorable atmosphere, even passive students tend to be active participants.

However, given the realities of today, we must make new use of the features of dialogue technologies that help to create a communicative environment of those who learn to develop cooperation at the levels of "teacher-listener", "listener-listener", "teacher-author" or "author-listener" in the process of setting and solving educational



and cognitive tasks [1]. In order to achieve this, one needs to learn "polemical mastery".

Main body.

Interactive learning technologies are currently dominant in the educational space of Ukraine (they own the lion's share of classroom hours in the work plans of educational and professional programs of higher and postgraduate education institutions). With the entry of our education system into the Bologna educational process, this situation has undoubtedly changed, which contributes to the increased quality of education and the level of professionalism of specialists, their mobility and competitiveness in the labor market [2, 3, 4].

The lecture is an integral part of the organization of the learning process in higher education institutions. Its main didactic goal is the formation of an indicative theoretical basis for further mastering educational material by students [5]. It is important to move away from the traditional model of teaching lectures, which is mostly focused on the passive perception of students of the content of educational material, in order to enhance the cognitive activity of students. For this purpose, it is necessary to use the latest technologies that will involve students in active discussion and mobilize their cognitive activity.

In our opinion, an important circumstance that will increase the effectiveness of the lectures might be the introduction of such teaching methods as discussion and conversation.

While organizing a discussion during the lecture, the teacher must determine in advance its purpose, formulate questions and determine the place of the discussion in the structure of the lecture and its duration, the final generalization should be a linking bridge, connecting with further presentation of lecture material [6].

For instance, when presenting the subject material "Qualitative reactions of cations" for the 2nd year students, the following topics can be used to organize a discussion: "Macro- and microelements and their role for the human body"; "The use of inorganic compounds as medicines"; "Pollution of the environment by heavy metal ions", etc.

The use of conversation during lectures will remove the monotony of learning, activate thinking and increase interest in learning. The teacher can address directly to one of the students or to the whole audience. The use of the so-called "lecture with blanks" has significant opportunities for the conversation. At the first stage, students get acquainted with the topic content of the lecture, symbols and tasks offered for individual studying. During the lecture, the teacher organizes an active discussion of students' issues and gives them the opportunity to express thoughts that they would like to add. Students write down the necessary points to their lecture notebooks and receive answers from the teacher to questions that could arise in preparation for the lecture. [7].

Practical classes have much greater opportunities for the use of interactive methods. During the traditional class, the student usually answers the prepared question, often peeping into their lecture notes. At the same time, the rest of the students in the group can prepare for the next question without following the answer of their colleague. This approach to the preparation of the class significantly reduces



its effectiveness, especially if you can interrogate no more than 3-5 students, and another 3-5 can add something. This leads to the passivity of the main part of the academic group.

When planning a discussion at a practical lesson, the teacher must take into account several important points: the time required for its implementation, the place that provides the opportunity to carry out all the movements of students who discuss, and monitor the discussion of others; materials necessary for the work and visual presentation of its results. Throughout the work, the teacher keeps in mind the following elements:

- the goal from which one should not deviate;
- time limit that is to be kept;
- clarity of the organization of the introductory part of the discussion since it creates the emotional and intellectual mood of the conversation.

In the possibility of using discussion as a method of consolidating educational material and stimulating the cognitive activity of students, we can identify several aspects of planning learning topics based on the discussion: studying the topic as the preparation for the discussion to take place in the next class; including the component of discussion into separate topics at the stage of preparing for the class and reviewing the newly studied material; education in the form of students' individual or group work with the subsequent discussion of its results.

One can offer several options for discussions for the purpose of conducting classes of analytical chemistry for 2nd-year pharmacy students at the Department of Medical and Pharmaceutical Chemistry. The most popular is the discussion in the form of "Questions and Answers"; it can be used, as a rule, after the lecture as an element of knowledge acquisition and clarification of doubtful points. Students can ask questions to the teacher and vice versa. Many pedagogical trainings use questions and answers as an independent method of educational work. Properly and logically selected questions, asked in good order, allow the group to come to the expected solutions on their own. Participants may be reassured that they have solved the problem on their own rather than getting it already presented. You can also suggest a discussion in subgroups. It is better used for a class with a large audience where not everyone could actively participate. Subgroups can implement the same task, discuss the same problem, and may have different assignments. The discussion in subgroups is an element of the whole and should end with a plenary summary. It is essential to set tasks accurately for subgroups and make sure they are understood in the same way. The teacher can act here as a presenter – not only do they lead a discussion and give the word, but also they are an active participant in the discussion, choosing the directions and contents of the speech and, making conclusions and summarising the sufficiently discussed elements. Another fascinating experiment in the activation of the educational process could be considered conducting a free discussion. While analyzing the topic in this manner, the role of the teacher is reduced to a minimum, they are just introducing the subject material and then they have left aside, not interfering with the discussion; they are only monitoring the class, trying to find a solution in order to discuss this process later together. A free discussion is suitable for teaching the integration and creating the united teamwork.



Conclusions.

Based on all of the above, we can conclude that the introduction of interactive technologies makes the usual system of studying analytical chemistry at the Faculty of Pharmacy of Bukovinian State Medical University suitably modernized for students, changing traditions of subject teaching, and most importantly – achieving educational standards in more intensive and holistic manner. The interactivity, originality and effectiveness of these technologies makes them popular among both teachers and students and ultimately their systematic implementation increases the efficiency of the educational process.

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