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THE USE OF INTERACTIVE LEARNING TECHNOLOGIES IN TEACHING ANALYTICAL CHEMISTRY FOR PART-TIME PHARMACY STUDENTS**Velyka A. Ya.***c.b.s., assistant***Kropelnyska Yu. V.***assistant***Stehnitska L.V.***c.ph.s, senior lecturer**Bukovinian State Medical University,**Chernivtsi, sq. Teatralna 2, 58000*

Abstract. *Today's pace of life prompts us to return the vector of attention in the educational medium to universal values. The primary approach to the organization of the educational process considers student-centered learning. Personality development and formation occur in the process of learning, which depends on certain conditions such as creating a positive mood state for education, feeling equal to others, ensuring a positive atmosphere in the team to achieve common goals, and the like. Innovative communication technologies meet all these requirements. In this article, the authors consider introducing such technologies in the educational process using the case-study method as an example.*

Keywords: *interactive technologies, the case study method, analytical chemistry, pharmacy students.*

Introduction.

Today in modern society, and especially in the labor market, the requirements for the professional competence of a specialist with higher education are growing. They should be able to think creatively, independently replenish their knowledge, and navigate the rapid flow of information. The need to improve the level of professional training of specialists is not only a demand of the present but also a characteristic feature required in the field of professional-pedagogical activity. Today, as many years ago, the most important goal of teaching in a higher educational institution remains to ensure maximum intelligence activity of students. We can suggest using the case method for an optimal solution to this problem in terms of reduced training hours. The word "case" is well known to be translated from English as "occurrence, case, a situation". However, the very name of this method comes from Latin, where the term *casus, us m* means "confusing, an unusual case". For this reason, the case study method is called either the method of studying situations or the method of business stories. Still, it is often called the method of specific problems [1].

This method contributes to the development of students' professional skills, enables evaluating the effectiveness of other teaching methods and technologies, promotes the activation of all residual knowledge to solve a problem, combines theory and practice, develops active professional and life position of students, develops person erudition and scientific awareness. It also enhances the development of ingenuity, problem-solving skills and ensures the ability to analyze problems. Cases describe a real-life situation that is used as a pedagogical tool to provoke discussion from the audience. Cases should reflect not only a specific practical problem but also update a particular set of knowledge that needs to be learned in the



process of solving a specific problem. The advantage of cases is the ability to optimally combine theory and practice, which is extremely important in the process of training a future specialist [2].

Our work aims to demonstrate the use of the case method for conducting a practical lesson in analytical chemistry with students of the Faculty of Pharmacy on the topic "Physical and chemical methods for studying the quality of drinking water."

The main part.

The case is a single information complex consisting of a description of a specific situation, an auxiliary part necessary for analyzing the case and its tasks. Forms of case presentation are diverse. It can be designed as compressed text on a single page (structured case) or large text containing redundant information (unstructured case). The case can be an article, a website on the Internet, a historical fact, a small literary work, or an extract from it, which allows the student not only to receive information and just solve a complex problem but also to immerse in the atmosphere of the event and imagine being involved in a real-life situation [3].

An inexhaustible source of information for cases is the Internet with its resources. This source is characterized by a significant scale, flexibility, and efficiency, which significantly facilitates the work of teachers in preparing cases. Using the Internet case during the lesson is possible if there are appropriate conditions for its provision. Commonly, it is represented as a list of internet links. Cases can be presented on paper (printed texts, graphs, tables, illustrations, diagrams), as well as multimedia cases and video cases (they can contain film, video, or audio materials).

Acquaintance with the case can occur in class or in advance (as homework). Students receive a case and start with answering the questions, studying the tasks of the case, using materials from the textbook, lecture course, and other available sources of information, and analyzing the material. This is followed by a detailed group discussion of the content of the case and the development of several solutions. The activity based on the case method involves group activities. Working in a team, students learn from each other. The immediate goal of the process is to analyze the situation jointly, the so-called *case*, and develop a practical solution. Testing of their communicative abilities during the discussion gives each participant the opportunity to identify their strong and weak points as well as stimulates the desire to work towards improving knowledge of the subject, enriching vocabulary, and the like. At this stage, the role of the teacher as a moderator in regulating the discussion should be emphasized [4].

Within the framework of the determined topic, offered an example of such cases was used when conducting a lesson in analytical chemistry on the topic "Physical and chemical methods for studying the quality of drinking water." Students were suggested to work in small groups to solve case problems. They received cases in advance and conducted a theoretical search within the scope of their task at the preparatory stage. Students needed not only to choose a technique for determining the given values in water but also to find in the literary sources the norms for finding specific indices which meet the sanitary and environmental standards adopted in Ukraine. Students should also try to predict how the reduced or increased values of



the index they determined would affect the ecological situation and what are the possible options for solving this problem. They presented the results obtained for general consideration to all group students.

Case № 1. Determine the content of sodium, potassium, and calcium ions in mineral water using the flame photometric method. Analyze how the content of the studied ions will affect the quality of drinking water.

Case № 2. Determine the acidity of drinking water by colorimetric and electrometric methods. Analyze changes in the studied water acidity depending on the place of its collection and the time of year.

Case № 3. Analyze mineral water for content HCO_3^- and CO_3^{2-} by potentiometric titration. Make a conclusion about the hardness of the water and suggest methods for softening to make it safe to drink.

Case № 4. Determine the iron content in drinking water. Specify external factors that influenced the content of this element in the test sample.

When implementing the case study method, the following educational goals are achieved when studying the selected topic of work:

- acquisition of skills in using theoretical material to analyze practical problems;
- developing skills in assessing the situation, selecting and organizing the search for basic information;
- development of skills which ensure creative approaches to the implementation of the action plan;
- formation of skills and techniques for comprehensive analysis of situations, predicting the ways of their development;
- formation of skills and abilities to solve a specific practical situation based on the acquired knowledge;
- formation of personal qualities: diligence, creativity, ability to be competitive, responsible, self-confident, purposeful;
- formation of group work skills, communication culture skills, formation of a socially active and life-competent person capable of self-development, self-improvement and self-realization.

While evaluating the results of a practical lesson with the implemented case study method, it is possible to conclude its effectiveness compared to the traditional scenario, namely:

- the emphasis of training is shifted not to mastering ready-made knowledge, but its development;
- contributes to the development of the system of values, professional positions, and life attitudes;
- students can share their knowledge, experience and ideas, that is, learn not only from the teacher, but also from each other, which increases self-confidence and abilities.
- such an activity will be of greater interest for students since it overcomes the classical "dryness" and introduces emotional and creative competition into the educational process.



However, the method also has certain shortcomings. Firstly, preparing a case is challenging research and systematic work that requires much effort. Since there are almost no ready-made practical classes based on case-study in the methodological literature, it is necessary to carefully prepare methodological support both for independent training of students and carrying out an experiment. Secondly, this technology requires the teacher to have some experience and profound knowledge in conducting a discussion and analyzing the "case" situation. Third, the case method requires students to be thoroughly prepared and possess skills to work independently.

Conclusions.

Case technology is an interactive teaching method based on real-life or fictional situations, aimed not so much at mastering ready-made knowledge but at forming new qualities and skills in students, developing opinions or solutions, and co-creating all subjects of the educational process. Introducing the case study method into a practical lesson in analytical chemistry is entirely reasonable and efficient. It ensures the active assimilation of theoretical provisions of the subject by students and the formation of skills required for the practical use of the studied theoretical material, allows implementation of competence-based, personality-oriented, and activity-based approaches, and enriches the content of the discipline in practice [5].

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