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CASE-STUDY AS ONE OF THE INNOVATIVE EDUCATIONAL TECHNOLOGIES AND ITS USE IN BIOLOGY CLASSES

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Abstract. Today, the Ukrainian education system is undergoing important large-scale transformations. Students of modern schools are required, as the main result of education, to master a set of universal learning activities that allow them to set and solve the most important life tasks that they may face directly in adult life. So, for example, in relation to different sections of biology, students must understand: what the subject teaches them, why they need biology, how the studied concepts are related to practical tasks and everyday life.

In this regard, a new approach to the construction of the content of education, as well as to the use of modern educational technologies of learning, is envisaged. As you know, one of such effective technologies is life-situational learning using the case-study method. Active use of case-study in education began relatively recently, and now this approach has become one of the most effective learning technologies. This method confirms the didactic significance and relevance of the use of case technology in the process of teaching biology as an effective means of increasing students' biological knowledge. Teachers highlight a number of advantages of the case-study compared to traditional teaching methods: practical orientation, interactive format, development of soft skills of students. Scientists have developed several classifications of cases. But, despite the variety of cases, they all have a typical structure, which includes: a plot part, a methodological part, and an informational part.

The article examines the features of the case-study and the possibilities of its application at biology lessons. Samples of cases from the "Human Anatomy" course are also offered.

Keywords: case-study, educational technology, evaluation criteria, case structure, biology.

1. INTRODUCTION

The modern line of development of Ukrainian society increases the requirements for school graduates. Today, in order to be competitive, it is not enough to have only certain theoretical knowledge, it is necessary to be able to apply it in real life. In new conditions, the role of the school in educating active, proactive, creatively thinking citizens of our country, who have well-developed skills and abilities to work with information, are able to think critically and solve various problematic tasks, and who strive and are ready for self-education throughout their lives, is increasing. Therefore, the next step in the natural process of the school's efforts to meet the requirements of the changing world is to focus on a competency-based approach to the content of education. A person's success in his future social and professional life is determined by the level of

development of his key competencies (social, communicative, substantive, informational, moral). Modern teachers in their pedagogical activity try to follow the trends of time, turn to innovative methods and techniques of teaching biology. One of such innovative methods is the case-study.

2. ANALYSIS OF RESEARCH AND PUBLICATIONS

There are quite a large number of definitions of the case-study method. For example, L. M. Kharchenko (Bogdanova, 2003) in his studies believes that a case is a set of necessary material, which can be both in a text version and in electronic form. A. M. Dolgorukov (Bogdanova, 2003) describes the case method as a tool that allows you to use theoretical knowledge to solve practical problems, which contributes to the formation of students' independent thinking, the ability to listen, take into account the point of view of others and express their own. In the business vocabulary, the concept of "case" refers to a description of a specific situation and a way to solve it, including a description of the initial situation and ways to solve it, chosen by the participants, their actions, materials related to the case, and the result obtained (Grytsaj, 2019).

Researcher Smolyaninova O. H. gives the following definition: "A case is a real description of a situation. A case is a "piece" of real life. A case is a "snapshot of reality", a photograph of reality. A case is an event that actually took place in one or another field of activity and was described by the author in order to provoke a discussion in the classroom, to "encourage" students to discuss and analyze the situation and make a decision" (Moroz, 2006).

Case-study or its elements have been used for a long time in school practice. For example, in the second half of the 18th century, V. F. Zuev recommended using a variety of dialogues between students. N. M. Verzilin, V. M. Korsunskaja, I. M. Ponomaryova, D. I. Traitak noted that discussions and debates at the lessons involve students in active work (Moroz, 2006). This proves that in the process of teaching biology, the use of cases is not only relevant, but also timely.

According to O. G. Tolochina, the case method is studying by doing. The essence of the case-study is that the assimilation of knowledge and the formation of skills are the result of the independent activity of students in solving contradictions, as a result of which the creative mastery of professional knowledge, skills, abilities and the development of mental abilities occur. A case is a description of a specific real situation, prepared according to a certain scheme and intended to teach students to analyze various information, summarize it, as well as the skills of formulating a problem and developing possible options for its solution in accordance with established criteria (Grytsai, 2019). A. M. Dolgorukov defines the case-study method as a tool that allows you to use theoretical knowledge to solve practical problems, which contributes to the formation of students' independent thinking, the ability to listen, take into account and express their point of view in a reasoned manner. With the help of this method, students have the opportunity to identify and improve their evaluation and analytical skills, learn to work in a team, find the most appropriate solution to the problem (Grytsai, 2019).

L. N. Kharchenko believes that "the essence of case technology is the compilation of specially developed educational and methodological materials into a certain set of "cases" and their transfer to students". A case is a set of necessary material, which can be both in a text version and in electronic form (Moroz, 2006).

This technology is based on a set of certain didactic principles: first, a problem-type educational task is developed, oriented to a practical situation. Secondly, there is no unequivocal answer to a cognitive problem question, but there are several answers that can compete for the level of truth. The task of the teacher immediately differs from the classical scheme and is aimed at obtaining not one, but many truths and directing them into the problem field. Thirdly, the emphasis of educational activity is shifted not only to mastering ready-made knowledge, but also to its

formation, and to the co-creation of students and the teacher (Flynn & James, 2001).

The role of the teacher is to direct the discussion or conversation with the help of problematic questions, to motivate students to avoid superficial thinking, to involve all students of the group in the process of case analysis. Its essence is that students are offered to think through and find a solution for a situation related to real life problems and the description of which reflects some practical task (Herreid et al., 2011).

A distinctive feature of this method is the creation of a problem situation based on the facts of real life. There are no unambiguous solutions to this problem itself. To work with such a situation, it is necessary to correctly set an educational task and to solve it, prepare a "case" with various informational materials (articles, literary stories, Internet sites, statistical reports, etc.) (Herreid et al., 2011).

Therefore, a case is a situation taken from practice, a real-life incident on which theoretical ideas are considered. In general, a case, by its educational essence, is not just a description of real events, but a single information complex that allows you to understand the situation.

The purpose of our work was to investigate the peculiarities of using the case-study in biology classes.

3. ANALYSIS AND DISCUSSION

The case-study is a teaching approach that was first developed in the early 20th century at Harvard Law School and was later adopted by institutions in Europe. It has only recently been used in Japan. The case-study method is particularly popular in business schools. The teachers of the first business programs were scientists, not businessmen, and they faced the fact that it was impossible to teach students how to run a business exclusively through lectures and textbooks. An alternative to textbooks were interviews with leading entrepreneurs and top managers of various companies and detailed reports written on their basis about how they solved this or that situation, as well as about the factors affecting their activities. Since then, the analysis of business situations has become an important element of training future managers in business schools.

In medical education, an example of the use of the case method can be studies at Harvard Medical School. Traditionally, future doctors were allowed to work with patients from the third year, and the first two years they were given exclusively theoretical training with a huge amount of material to memorize. Students studied biology, physiology, anatomy, biochemistry and other disciplines. In 1985, the dean of the school, Daniel Tosteson, suggested using cases to reduce the information load on students and introduce elements of active learning into the program (Cliff & Wright, 1996).

Active use of case-study technology in Ukrainian education began relatively recently, and now this approach has become one of the most effective learning technologies.

Teachers highlight the following advantages of the case-study method compared to traditional teaching methods:

Practical focus. The case-study method allows you to apply theoretical knowledge to solving practical problems. This approach compensates exclusively for academic education and gives a broader understanding of business and processes than university lectures or practice in a narrow area of work.

Interactive format. The case-study method ensures more effective learning of the material due to high emotional involvement and active participation of students. Participants immerse themselves in the situation: the case has a main character; in whose place the team puts themselves and solves the problem on his behalf. Emphasis during training is not on mastering ready-made knowledge, but on its development.

Specific skills. The case method allows you to improve soft skills that are not taught at the

university, but which are extremely necessary in the real work process (Grytsai, 2019).

Although the case method and case-study sound similar, they are actually very different because they have different characteristics (Knechel, 1992).

For example, both the case method and case-study are based on the analysis of a real-life situation that is presented to students in the classroom, where they analyze it through problem-solving and discussion.

The difference, however, is that case method is often used in a teacher-centered class; in other words, students take notes on the main information about solving a certain life situation when the teacher gives a lecture based on the content of the thematic case and other reference materials.

In contrast, the case-study is a learning methodology based on student-centered rather than teacher-centered learning. At the same time, students independently conduct research and analyze educational materials, and then, in class, participate in a discussion and think about a solution to a life situation together with their classmates. The teacher is present, of course, but the role of the teacher is to facilitate the discussion, not to control it, and to maintain discipline.

Moreover, using case method, students basically learn to “respond” to a case by looking at how people in a particular situation dealt with a problem. As a rule, these are cases that revolve around success and failure. Therefore, students see only which solution is correct and which is incorrect.

On the other hand, in the case-study, there is no single absolute answer, and students are free to consider what they would do if they were participants in the events. Thus, children must come up with their own answers and solutions to the problem. Through these activities, students significantly improve their practical learning skills through the use of analytical skills, logical thinking and decision-making skills.

There are five key criteria that can be used to distinguish a case from other educational material:

- ⊗ The source of creating any case is people who are involved in a certain situation that needs to be solved.

- ⊗ Selection process: the content must be relevant to the field described in the case, otherwise it will not be of interest to the listeners.

- ⊗ The content of the case should reflect the learning objectives. The case can be short or long, can be presented specifically or in general terms. The digital material should be sufficient to perform the necessary calculations.

- ⊗ Inspection in the class is an approbation of each new case in the educational process to diagnose its further use (whether the case needs a certain addition, change, reduction of the amount of information).

- ⊗ Aging Process: Most cases gradually age, as a new situation requires new approaches. Cases based on historical events are good to listen to, but work with them takes place inactively, since the events took place a long time ago. The problems considered in the case should be relevant for today and interesting for students (Grytsai, 2019).

The main task of the case-study is to obtain knowledge from those disciplines where there is no unequivocal answer to the question, but there are several answers that can compete for the level of truth.

Cases-study that activates the educational process includes:

- ⊗ incident method, the peculiarity of which is that the available information is not enough to solve a certain problem, so students independently find the necessary information and analyze it;

- ⊗ analysis of business correspondence method, in which students receive folders from the teacher with a description of the problem situation; a package of documents that help to find a way out of a difficult situation and questions that allow to find a solution to the problem;

- ⊗ situational analysis method is the most common, as it allows students to investigate a complex situation in depth and in detail. The students are offered a text with a detailed description

of the situation and the task that needs to be solved. The text may describe actions already taken or decisions made to analyze their expediency (Bogdanova, 2003).

Materials for the preparation of educational cases may be of two types: primary - social life in all its diversity, education, science, and secondary - fiction and non-fiction literature, statistical materials, scientific articles, local news, Internet resources. In the practice of constructing cases, the dominance of one of the sources is most often observed (Cliff & Wright, 1996). This approach is based on the classification of cases by the level of influence of their main sources:

1. practical, reflecting absolutely real-life situations;
2. educational, the main task of which is education;
3. research, oriented to the implementation of research activities.

Although each case fulfills an educational function, the degree of expression of all shades of this function in different cases is different. Thus, a case with the dominance of the educational function reflects typical situations that most often occur in life, and which will have to be faced in the process of practical activity. In the educational case study and educational tasks, situations, and problems are in the first place as they may be in real life.

A research case is similar. Its main meaning is that it serves as a model for obtaining new knowledge about a situation and behavior in that situation. The educational function of the case is reduced to mastering the skills of scientific research in the form of applying the modeling method. Such a case is being built according to the principles of creating a research model. Therefore, it is better to use it for work with a small creative group of students.

The main task of a practical case is to depict a life situation in detail. Such a case creates a practical, "working" model of the situation. At the same time, the educational goal of such a case can be reduced to training students, consolidating knowledge, skills and behavioral skills (decision-making) in this situation. Such cases should be as descriptive and detailed as possible. Their main content comes down to learning about life and acquiring the ability to perform optimally (Cliff & Wright, 1996).

In all the variety of types of cases, they all have a typical structure. The case includes:

- ⊙ the plot part – case, problem, story from real life;
- ⊙ methodological part – questions and tasks for working with the case;
- ⊙ informational part – appendices (glossary, textbook paragraph, scientific article, etc.)

(Knechel, 1992).

The volume of the case can be different – from a few sentences on one page ("western-European" cases) to a large number of pages ("American" cases). However, large cases cause some difficulties for learners compared to small ones, especially when working with case technology for the first time.

Based on the above, a good case must meet the following requirements:

⊙ using the principles of problem-based learning – acquiring skills for solving real life problems, the possibility of group work on a single problem field, while the learning process, in fact, imitates the decision-making mechanism in life. It is more adequate to the life situation than memorizing terms followed by retelling a certain text from a textbook, as it requires not only knowledge and understanding of terms, but also the ability to operate with them, building logical schemes for solving problems, arguing one's opinion;

- ⊙ meet the clearly defined purpose of creation;
- ⊙ have a certain level of complexity;
- ⊙ be relevant for today;
- ⊙ develop analytical thinking;
- ⊙ provoke discussion;
- ⊙ may have several solutions (Tomey, 2003).

The following stages are distinguished in the use of the case-study:

Preparatory stage: preparation of the situation, additional information materials, determination of the place of the lesson in the subject system and the lesson's tasks.

Familiarization stage: engaging in live discussion of a real professional situation: introduction to the situation, description of the situation, study of informational material.

Main (analytical) stage: determination of the form of the event – individual or group; explanation of evaluation criteria; analysis of the situation; identifying the problem; discussion of problematic points, search for arguments and solutions; presentation of the results of the analysis, group discussion, summarizing the results of the discussion and the solutions found.

Final stage: final presentation of the results of analytical work (students can learn and compare several options for solving the same problem). It is at this stage that the ability to publicly present an intellectual product, advertise it well, show its advantages and possible areas of effective use, as well as withstand the barrage of criticism from classmates is a very valuable experience and skill for students (Tomey, 2003).

Students may present their results in two ways: orally or in writing.

An oral presentation has the property of a short-term effect and therefore it is more difficult to perceive and remember. The advantage of such a presentation is its flexibility. The speaker can adapt his style and material during the speech, feeling the mood of the audience. A non-public presentation is less impressive, most often it is a report on a completed task, while such student qualities as the ability to prepare a text, accurately and clearly make a report are stimulated. Written reports-presentations are usually more structured and detailed. The main rule of written case analysis is to avoid simple repetition of information from the text, the information should be presented in a revised form. The most important thing is your own analysis of the presented material, its appropriate interpretation and the suggestions made.

The next step of the final stage is the generalizing speech of the teacher – analysis of the situation; assessment by the teacher of students according to the following criteria: practical justification, decision-making independence, speech literacy, offering an unconventional and promising solution to the problem.

Activity reflection helps to increase educational motivation, which is the key to students' assimilation of biological knowledge, and also helps to optimize the educational process, because students use it to analyze their work, ways to achieve results, and therefore, they themselves participate in increasing the effectiveness of the educational process. The level and quality of case execution were determined based on the assessment matrix of S. V. Panin (Grytsai, 2019) (Tab. 1).

Tab. 1

Criteria for evaluating students' work with a case

Group	Evaluation criteria				Total points
	Understanding the presented information (task)	Offer the way of solving a problem	Justification of the problem-solving method (of your choice)	Offer an alternative way of solving a problem	
1					
2					
3					

Each criterion is evaluated in a four-point system: "no" – 0, "rather no" – 1, "rather yes" – 2, "yes" – 3. A student can score a maximum of 12 points for completing the case: from 11 to 12 – "excellent"; from 10 to 8 – "good"; from 6 to 7 – "satisfactory"; from 5 and below – "unsatisfactory" (Flynn & Klein, 2001).

Undoubtedly, the use of case-study technology in the educational process contributes to the development of students' thinking and perception, increases motivation to study and stimulates cognitive interest, but it requires serious long-term preparation and, of course, more time for teacher preparation for the lesson.

When implementing case-study in school biology, it is necessary to answer several important questions:

1) What should the structure of a biology case-study look like, taking into account the age characteristics and capabilities of the student?

2) What preparation on the part of the teacher and students is necessary for the implementation of the case-study?

3) Does the case-study make it possible to implement an individual and group approach in the process of teaching biology?

It is important for a teacher who wants to use this technology to consider the following: the formulation of the educational goal and tasks, the characteristics of the educational group, their interests and needs, the level of competence, age characteristics and many other factors (Cliff & Wright, 1996).

The case combines two components: educational and research. Therefore, in the process of learning biology, the teacher performs the work of both a consultant and a teacher at the same time. To work with the situation, it is necessary to properly prepare a "case" with various informational materials (articles, literary stories, Internet sites, statistical reports, etc.). The use of a case during biology lessons allows you to create situations that generate new knowledge, form students' collective skills of cooperation, friendly mutual assistance and mutual understanding (Herreid et al., 2011).

The peculiarity of the work of a teacher who uses the case-study is that he not only realizes his abilities, pedagogical skills, and experience to the maximum, but also develops them. The main content of the teacher's activity consists in the performance of several functions: educational, developmental, organizational and research.

Case-study requires students to prepare for the lesson in advance, to have the skills to work independently; activity of schoolchildren, level of training of students, work with sources, attentiveness, trust. It is necessary to take into account the age and psychological readiness of students to work with cases, to adequately perceive the information presented. For this purpose, it is advisable to reveal and consider the analysis of the psychological and pedagogical features of the 5th-6th grade students (Moroz, 2006).

This age is considered a crisis age. Everything that a child is used to since childhood: school, peers, teachers – acquires a completely different meaning. Schoolchildren from the initial stage of education move to another level. There is a change in the nature of educational activities, multi-subjects, the number of teachers who teach different disciplines, their requirements for studying, the content of the educational material offered for assimilation. The subject of biology for a 6th grade student is new, complex, and sometimes difficult. At this age, an active physiological and biological change (reorganization) of the body occurs. This leads to increased fatigue, anxiety, conflicting feelings and reduced work capacity. In addition, schoolchildren have a positive phase of development, i.e., awareness of the feeling of closeness with nature, dreaminess, a sense of love is formed, the need to communicate with peers, high school students. The nature of cognitive interests changes and the intellectualization of such cognitive processes as attention, memory, imagination, thinking, language begins. Studying can acquire a new personal meaning, become an activity that will contribute to self-education and self-improvement (Moroz, 2006).

Before developing cases, it is necessary to clearly imagine what the task itself will look like, so that even at the first stages of learning, the student can become a participant in the discussion:

firstly, the student must clearly imagine what problem needs to be solved in the process of

performing the case. Thus, when developing a case, a specific situation that occurs in real life (main cases, facts) is considered,

secondly, the information may not be complete, that is, it may be indicative in nature,

thirdly, it is possible to supplement the case with data that can take place in real life. It can be a presentation, performance, etc. (Knechel, 1992).

Therefore, the teacher can independently develop cases according to the subject, taking into account the abilities and capabilities of schoolchildren.

To create a case, the teacher needs to follow a certain framework for building a case, which includes the following:

1. Name of the case (short, memorable).

2. Introduction (information about the main persons of the case is usually given, the background is told, the situation is considered, the personally significant meaning of the problem is determined).

3. The main part is a description of the situation itself (the situation proposed for analysis contains a problem).

4. Conclusion (here the situation can “hang” at the stage of development that needs to solve the problem).

5. Programs (contain important but indirect information related to the internal problem of the case in the form of text, illustrations, etc.).

6. Specially formulated questions that allow students to organize work with the case or tasks that need to be completed.

7. Conclusion regarding the situation (suggested solution to the situation) (Tomey, 2003).

It is necessary to create a problematic situation in order for the educational problem to interest students. For this, the case is distributed to students before studying the educational material. The text of the case contributes to the formation of a problem situation, actualization of existing knowledge, their systematization and determination of points of motivation of the educational material. During the analysis of the situation, schoolchildren learn to work as a “team”.

This is the active participation of everyone, that is, each member of the team participates in the analysis of the problem, offers his version of the answer, even incorrect and improbable, listens to the opinion of the opponent, learns to negotiate, exchange opinions, as a result of solving the task, all answers and views are taken into account. When organizing a team, the teacher must pay attention to how correctly and successfully the group is formed. The number of students can be different – from 2 to 6 people. Thus, the problematic situation contributes to the development of the students' intelligence, its emotional sphere, and the formation of a worldview on this basis. This is the main difference between case-study and traditional learning.

In biology classes in the 6th grade, the dominant technology is problem-based learning, which prepares students to work with cases. The active use of the case-study method occurs in the 7th-9th grades (Moroz, 2006).

In this age period of development, communication with peers becomes the main area of interest of teenagers (during lessons, teenagers tend to communicate and correspond). It becomes significant for them how their classmates see them (status in the class). Adolescents begin to think faster (develops formal and logical thinking), are happy to accept tasks in which they have to think, argue, come up with different solutions.

The most effective interaction with teenagers is based on respect for their sense of maturity and independence, respect for their desire for natural needs: attention, recognition and respect of the individual, sense of justice, desire for success.

The case-study is a tool that allows you to apply theoretical knowledge to solving practical problems. The method contributes to the development of students' independent thinking, the ability to listen to and take into account an alternative point of view, to express their own in a

reasoned way. With the help of this method, students have the opportunity to discover and improve analytical and evaluation skills, learn to work in a team, and find the most rational solution to the problem (Knechel, 1992).

Case samples for the 8th grade biology lessons.

Lesson type: learning a new topic

Case typology: exploratory (personal, plot case of medium size with a natural temporal sequence of events), incident method.

Section: Digestion.

Topic: Barrier role of the liver.

The method of creating a problem situation: the organization of interdisciplinary connections; comparison of facts and phenomena.

Problem: The liver is said to be the "silent killer". Is it so? Why?

The general structure of the case:

Title: Barrier role of the liver

Case: After celebrating the New Year, a person named X developed the following symptoms: general weakness, bitterness in the mouth, vomiting.

Facts: (objective information (statistics, excerpts from documents, survey results, expert opinions, photos, etc.)).

The following dishes were prepared for the New Year's table:

1. Sandwiches with capelin caviar (ingredients: black bread, capelin caviar, pickled cucumber, crab sticks, pitted black olives, fresh dill).

2. Tongue filling (ingredients: beef tongue, carrots, eggs, olives, quick-dissolving gelatin, salt, greens).

3. Chicken baked whole in the oven with oranges (ingredients: chicken, oranges, soy sauce, curry, natural honey, a mixture of peppers).

4. New Year's dessert with kiwi (ingredients: sour cream, marshmallow, kiwi, chocolate for decoration).

Drinks: cranberry juice, Coca-Cola, tea.

Case questions:

1) After studying the New Year's table menu, determine the cause of these symptoms.

2) Determine which organ of the human body was affected in this situation and why?

3) What mistakes, in your opinion, did person X make when making a menu for the New Year's table? Justify your answer, taking into account the knowledge of the chemical properties of some substances included in the composition of the products used.

Solution (each student presents the results of working with the case in the form of answers to questions, recommendations for proper nutrition, drawing up a New Year's menu taking into account nutritional norms, etc.).

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3. Zverev, I.D. (Ed.). (2018). A book for reading on Anatomy, Physiology, and Hygiene of the human body. Student's guide. 268 p. (in Ukr.)

4. Menu for New Year 2023: the best festive recipes with photos. *Kolizhanka*. <http://surl.li/gebuc> (in Ukr.)

Lesson type: learning a new topic

Case typology: Prognostic (training, plot case of medium size).

Section: excretion. Thermoregulation.

Topic: Skin diseases and their prevention.

The method of creating a problem situation: the deliberate collision of students' life ideas with scientific facts; encouraging students to compare facts, phenomena, data.

The general structure of the case:

Title: Skin disease

Facts:

Fact 1. Today, herpes is considered the most common viral disease in the world. According to some scientific data, about 90% of the world's population is infected with it, according to others, every person older than 4-5 years has encountered herpes. There are about 35 varieties of this viral infection, of which, according to various sources, only 8-10 are potentially dangerous for humans. In addition to the usual virus of the first type (bubbles on the lips) and the second type (the virus affects the genitals), there is a herpes virus of the third type, or chicken pox.

Fact 2. The herpes virus is the causative agent of herpes simplex in humans, which has different clinical forms. These are extremely common human pathogens that cause long-term infections. The herpes simplex virus of the first type causes damage mainly to the skin, mucous membranes of the oropharynx, while the herpes simplex virus of the second type mainly affects the urinary and reproductive systems. Contagiousness of both types is extremely high. This virus causes chronic fatigue. Despite the difference in manifestations, there are only two main ways of herpes infection – airborne and household route.

Case:

1. Very often, each of us can observe such a picture – on the porch of a school, at a stadium or simply at a bus stop in the company of young people, one bottle of carbonated drink is passed from hand to hand.

2. At the school evening (disco) it turns out that only one girl took cosmetics with her and, as often happens, her friends decided to evaluate her advantages on themselves.

Problem:

1. Is there a risk of herpes virus infection in both companies? Justify your answer.

2. Think about how you can avoid infection with the first type of virus?

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4. CONCLUSIONS

The case-study method can be presented as a complex system into which other, simpler methods of cognition are integrated. This gives students the opportunity to master and consolidate forms of cognition and analysis of reality in a complex manner. The combination of different teaching methods is one of the reasons for the effectiveness of using the case-study.

This method involves a creative approach and creativity on the part of schoolchildren, since not only the final result is important here, but also the process of acquiring knowledge. Analyzing a case, students actually get a ready-made solution to a certain problem situation that can be applied in similar circumstances. An increase in the number of analyzed cases increases the probability of

students using a ready-made scheme for solving a problem situation, and also forms skills for solving more serious life problems.

The teacher's role consists in supporting the conversation or discussion in a certain direction with the help of problem questions, in controlling the working time, in encouraging students to abandon superficial thinking, in involving all group members in the process of case analysis.

When applying the case-study method, the classic "defect" of traditional teaching, related to the "dryness", unemotional presentation of the material, is overcome.

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Гнезділова Вікторія, Микитин Тетяна. Кейс-метод як одна з інноваційних освітніх технологій та використання його на уроках біології. *Журнал Прикарпатського університету імені Василя Стефаника*, 10 (1) (2023), 114–125.

Система української освіти сьогодні перебуває на етапі важливих масштабних перетворень. Від учнів сучасної школи вимагають, як основного результату освіти, оволодіння набором універсальних навчальних дій, що дозволяють ставити і вирішувати найважливіші життєві завдання, з якими вони можуть зіткнутися безпосередньо у дорослому житті. Так, наприклад, щодо різних розділів біології,

учні повинні розуміти: чому їх навчає предмет, навіщо їм необхідна біологія, як пов'язані досліджувані поняття із завданнями практики та повсякденним життям.

В зв'язку з цим передбачається новий підхід до конструювання змісту освіти, а також до використання сучасних освітніх технологій навчання. Як відомо, однією з таких ефективних технологій є життєво-ситуативне навчання з використанням кейс-методу. Порівняно недавно розпочалося активне використання кейс-технології в освіті і зараз цей підхід став однією з найефективніших технологій навчання. Даний метод підтверджує дидактичну значущість та актуальність застосування кейс-технології в процесі навчання біології як ефективного засобу підвищення біологічних знань учнів. Вчителі виділяють ряд переваг кейс-методу, порівняно з традиційними методами навчання: практична спрямованість, інтерактивний формат, розвиток учнів soft skills. Вчені розробили декілька класифікацій кейсів. Але, не дивлячись на різноманіття кейсів, вони всі мають типову структуру, яка включає: сюжетну частину, методичну частину та інформаційну частину.

У статті розглянуто особливості кейс-методу та можливості застосування його на уроках біології. А також запропоновано зразки кейсів з курсу «Анатомія людини».

Ключові слова: кейс-метод, освітня технологія, критерії оцінювання, структура кейсу, біологія.