

APPLICATION OF THE SINGAPORE METHOD OF PROBLEM-BASED LEARNING (PBL) IN THE FIELD OF ECOLOGY AND BIOTECHNOLOGY

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Abstract

This article presents methods of problem learning in biology, where students based on their current knowledge of the problem, learn the information necessary to solve the problem, as well as strategies used to solve the problem.

Keywords: problem-based learning, achievements of Singapore specialists, teacher support, new material.

Relevance of the topic. Modern approaches in the process of preparing competitive graduates, and in the future specialists, acquire new methods and solutions, expand their horizons beyond the boundaries of traditional pedagogical dogmas.

One of such relevant solutions in recent years in a number of top universities in the world is problem-based learning. When exploring the capabilities of this method, the most striking example was shown by the achievements of Singaporean specialists, which interested us as a promising way to independently study sections.

Of particular interest in this method is the possibility of deep immersion in a problem in real mode, with the formulation of a life situation, as well as the search for non-traditional, and most importantly, independent ways of solving students.

The problems in such problems are genuine, which is most important when training specialists in the field of biology and ecology, where there are enough modern and unresolved problems.

The problematic teaching method is most in demand, since currently traditional approaches to teaching form a certain passivity among students.

British researchers attribute this phenomenon to the fact that students are in the position of ready-made consumers of knowledge and the effort made is only related to the reproduction of knowledge in the context of assessment tests [1].

Accordingly, traditional approaches to training do not have the desired result in the process of creating the final product - a competitive specialist in an intensively developing world.

Practical significance. In this regard, the innovative new method of problem-based learning (PBL) has declared itself as effective in working with students in the process of acquiring basic skills, which has declared itself to be the most relevant when teaching in biology, biotechnology and ecology.

The aim of the study in our work was to create an experimental product or PBL tool, followed by the use by teachers in the educational system to solve specific problems in the field of modern biology.

The main tasks of the work:

1. Creation of an experimental group
2. Definition of the problem
3. Search for solutions
4. Generating ideas
5. Introduction to the learning process
6. Synthesis and use in experimental classes

The main tool of PBL is the FILA table (Facts, Ideas, Learning issues, Action plan), which is designed to develop students' thinking (table 1).

Table 1-Main stages of the FILA table

F	Facts	These are the facts that will be extracted from this problem.
I	Idea	Writing of possible causes, ideas, solutions of precisely those facts that have been identified and recorded in the column "Facts". They should also be described without any judgment.
L	Learning Issues	-must be voiced in the form of a question - must, when answering, help build knowledge to solve the problem
A	Action Plan	Arises from gaps in the "Facts" column or from fuzzy information in a problem that needs clarification. Also includes research resources

Research results and discussion.

To apply the method of problem-based teaching by teachers - biologists, the role of an instructor (teacher) is primarily determined.

The instructor identifies a fairly well-known problem in the field of biology, which is deliberately complex, obscure, but intriguing enough.

Thanks to intriguing uncertainty, students begin to analyze the situation and conduct research on it, come to various reasonable decisions and conclusions.

An important component of the problem should be that its content must necessarily be related to the content of the course. In addition, although the problem should not be familiar to students, it should have practical value in order to be applied in the professional future in the potential future.

When choosing a problem that is suitable for a particular specialty and matches the content of the course, additional requirements must also be considered.

First, the problematic task should help students acquire new professional skills that they can apply in solving practical problems.

Secondly, when compiling a problem situation, it is necessary to state the problem in the form of a narrative that includes details of the history of the assignment. However, history should not provide too much information that students would be able to find on their own through logical reflection and analysis. Thirdly, it is necessary to form students in teams with different levels of basic knowledge, degree of preparation and practical skills. It is important to take into account the ultimate goal and methods of achievement, more successful dynamics, team results.

The stage of involving students in teams can be achieved by identifying the strengths and weaknesses of team members on their own. This will help in the future when performing various roles in the process of solving problems.

Fourth, the instructor needs to provide training support to accelerate the perception of the new course content, as well as the problem-solving process.

For example, in biology classes under the section "ecology" and "biotechnology", we made the following problems:

In the spring, Arman and his friends went to rest in the mountains. They decided to climb to the top of the mountain and enjoy nature. As they went out into the mountains, their breathing worsened and they began to feel bad. Armand noticed that mountain goats were grazing in flocks on the top of the mountain. How is it that mountain goats are also mammals, just like us? how can they live freely in a mountainous area, but we can't?

After studying the problem, students compiled a table (table 2).

Table 2 - Results of the environmental task

Facts	Idea	Learning Issues	Action Plan
They got sick	Hurt	In some cases it becomes a bad thing?	Internet resources
On top	Maybe they were hungry	What is the composition of the air at the top?	Books on ecology
Mountain goats grazed	Adaptation	How the breath can adapt. system	Environmental resources
They live in packs	Their respiratory system is different	Composition of blood of animals	Anatomy

Alina and her mother decided to close the pickles in the jar. My mother brought all the ingredients cleanly washed and sterilized put and closed. A week later, the banks became cloudy and the lid swelled. Alina wanted to try cucumbers, but her mother *did not allow her and said that she forgot to put aspirin in cans. Alina was wondering why you can't eat these cucumbers and why put aspirin tablets in jars?*



Studying problems, students learn a new topic on their own and also take at least some experience from this problem, and use this skill in the future in life.

The following points are important in determining the role of students in problem-based learning: forming students into small teams to study the problem situation presented, students identifying gaps in their own knowledge and skills by students, determining the type of information necessary to resolve or manage the problem situation. At the next stage, a specific method is developed that summarizes the steps taken by students to solve a problem situation [2].

Conclusions.

Thus, in the process of problem-based learning (Problem-Based Learning) of students, the support of the teacher should be throughout the process, from the moment the problem is presented and until the team presents its solution.

The key point at this stage of training is the support of the instructor as an assistant, trainer, mentor, guiding students to a deeper understanding of the new material.

References

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