



## Mathematical Models and Their Classification the Use of Problem-Solving Technologies in Teaching the Subject

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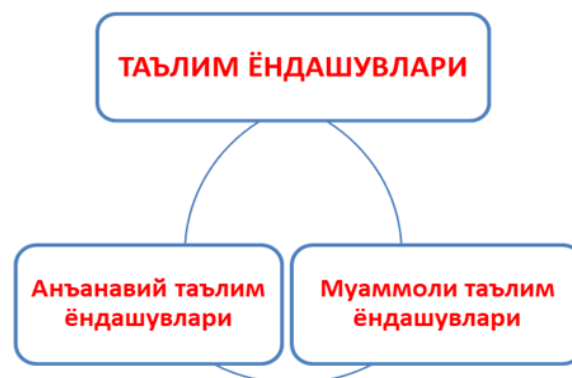
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**Abstract:** This article describes the positive results of the achievements in the topic "Mathematical models and their classification" from problem-solving technologies and interactive educational methods, which are part of the science of mathematical modeling.

**Keywords:** Mathematical modeling, kwhl method, Know, Want, How, Learn, 5w1h method, Bloom's cube method, SWOT analysis.

In the process of teaching the subject of mathematical modeling, there are several interactive teaching methods, and it is effective to use any teaching method on the topic. Therefore, we will achieve good results if we use the interactive educational method of the following topic, improving the interactive educational methods. So, we will compare some interactive educational methods and discuss their purpose and implementation.

Improve the system of continuous education in Uzbekistan educational process as an important direction of the ongoing reform technology has gained acceptance. It's the efficiency of the process active use by teachers of modern educational technologies in educational practice [1-30], as well as knowledge of modern technologies used in educational practice in developed foreign countries, was provided on the basis of the following conditions. The solution of the pedagogical problem is achieved by designing the content and means of the activity of the teacher and the student. In modern conditions, the manufacturability of the educational process is a new approach to its design, that is, education requires the need to illuminate the process according to its technological structure.



**Problem-based learning** is the cognitive activity of students and increases creative independence.

The essence of problem-based education is to create problem situations (organization achieves) and solve them in collaboration with the student and the teacher. In this, the independent work of

students (thinking, solving problems, and as much as possible) and the activity of the teacher should be as guiding as possible. Problem - (Greek. problem - problem) - complex that requires a solution question, issue.

Problem-based learning technology has been formed since ancient times is coming Including Problematic Questions and Answers in Ancient Greece, Ancient

Problematic debates have been widely used in India and China.

American psychologist, philosopher, and educator based on problem-based learning

The ideas of John Dewey lie. In 1894, he taught in the city of Chicago that the basis of education was not the curriculum, but the experience of games and work.

founded the school.

The main goal of problem-based education is to fully understand the problem to achieve and teach to solve it. Problem teaching is sufficient to order to be - it should be an integral part of the whole educational process.

### **Types of problematic educational technologies**

- ✓ Person-oriented educational technology
- ✓ Cooperative teaching educational technology
- ✓ Heuristic (research) educational technology
- ✓ A project education technology
- ✓ Educational technology that develops critical thinking.

For the purpose of the experiment, we used the method mentioned above with the participation of the 3rd year group 373 and 374 of the Faculty of Medical Prevention, Medical Biology, and Folk Medicine of the Bukhara State Medical Institute.

One of the urgent problems of our time is a person as a subject the idea of continuous development, lifelong learning, education It implies that students should conduct their educational activities not only to understand the world and develop human abilities, but also to change the world for the better.

Change the world for the better - creativity concept is a dependent process. Creativity is an activity in which a person working capacity, high level of thinking, ability to see the problem, qualities such as research work, intuition, quickness of mental reaction appears.

It is the ability of each person in the educational process development, problematic education in encouraging him to be creative

Today's world education is highly effective in the application of technology emphasizes.

So, in order to ensure the relevance of today's education:

1. The use of methods for the formation of life skills;
2. Determine and evaluate the formation of life skills the development of directed methods is becoming increasingly important.

As a result, the following general skills and attitudes emerge, is achieved to be:

- ✓ Ability to work in a team
- ✓ Listening to others
- ✓ Ability to make decisions
- ✓ Ability to solve problems
- ✓ To cooperate
- ✓ Ability to solve problems

- ✓ Ability to critically analyze information
- ✓ To determine one's own educational direction
- ✓ Ability to demonstrate knowledge

For the purpose of the experiment, we conducted the above-mentioned method with the participation of groups 373 and 374 of the Faculty of Medical Prevention, Medical Biology, and Folk Medicine of the Bukhara State Medical Institute. Initially, test lessons were conducted for the students of the 3rd-grade group 373 using the "Problem Education" method, and for the students of the 3rd grade group 374 using the traditional teaching method.

The main goal of problem-based learning is to fully understand the problem.

achieve and teach her to solve. Problem-based learning is enough to be - it must be an integral part of the entire educational process.

We threw the creativity of the students toward the problem without a full explanation of the topic. Thus, we motivated students to think about this topic and express what they know. The primary problem, considered as a particular problem, is the model and the definition of modeling. Thinking about this, most of the students tried to express their thoughts and speak differently from other students. During the lesson, we exchanged at least one thought with each of the students.

In the process of exchanging ideas, we built the students' confidence by motivating them to give a more detailed presentation, telling them that their opinion is correct, even if they do not deviate from the method of solving problems.

When we asked students to give some examples of a model as a type or collaborative learning problem, they solved the problem with their examples.

A map is a graphical model of an area or starry sky.

The map follows the principle of similarity: it remembers the appearance of continents, lakes, forests, rivers and constellations, the ratio of the location of objects, the ratio of distances between objects, the angular distance between stars, the ratio of their light distribution, etc.

A mannequin is a model that reflects the appearance of a person. The mannequin will have the same proportions of appearance, skin color and hair as a person.

There are also models of cars, ships, military equipment, architectural structures, etc. Lots of sports games (football, basketball, golf, billiards, tennis, chess...), flying on spaceships (space simulators), planes and helicopters, cars Racing games, stick games, fighting games, computer diving simulators have been developed. These simulators are sometimes referred to as imitators. The results of our lesson, which was held in the experimental group according to the plan, ended according to the plan.

#### Students of the group 373

The number of the students	5-marked	4-marked	3-marked	2-marked
12 people	4	4	3	1

#### Students of the group 374

The number of the students	5-marked	4-marked	3-marked
10 people	6	6	1

**Result:** Students from the subject "Mathematical models and their classification" are divided into 2 groups, using the interactive educational methods "Problem-Solving" method and the "traditional education" method. In the experiments, each performed activity is independently analyzed and errors are analyzed scientifically, understanding the shortcomings. As a result, the superiority of the

"Problem-Solving" method over the traditional method was achieved, with the preliminary processing of plans for the activities being implemented, with an efficiency per student of 25.64%.

We found that groups 373 and 374 are the result of adding useful material from the problem reading method described above.

#### **Indicators of students 373 groups.**

4 student 5 mark 12- 100%

4 student 4-mark 1- x

3 students 3-marked.

1 student 2-mark \_\_\_\_\_

$$8,33\% * 4 = 33,32\% \quad 12x = 100\%$$

$$8,33\% * 4 = 33,32\% \quad X = 100/12$$

$$8,33\% * 3 = 24,99\% \quad X = 8,33\% * 12 = 99,96\%$$

$$8,33\% * 1 = 8,33\%$$

**Method result: 66.64% positive rate was observed with 99.96% recovery.**

#### **Indicators of students of 374 groups.**

6 student 5 mark 13- 100%

5 student 4-mark 1- x

2 student 3-mark

$$7,69\% * 6 = 46,14\%$$

$$13x = 100$$

$$7,69\% * 5 = 38,45\%$$

$$X = 100/13 = 7,69$$

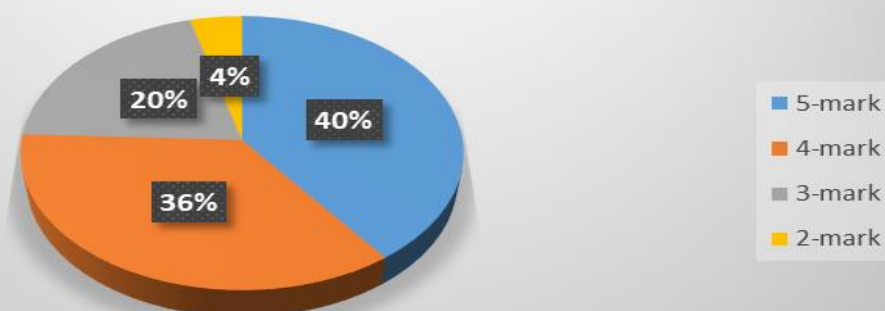
$$7,69\% * 2 = 15,30\%$$

$$X = 7,69\% * 13 = 100\%$$

**The result of the method: 84,59% with 100% success is considered a positive indicator.**

**Conclusion:** In the process of learning the science of mathematical modeling, interactive learning methods using the "problematic learning" method and the "traditional learning" method in the process of teaching the subject are shown. In summary, as a result of teaching 2 groups using the "traditional education" method and the "problematic education method", 66.64% of the students of the 373rd group and 84,59% of the students of the 374th group had a positive result.

### Graphical model of scores obtained by groups 373 and 374 using the "Problem matching" method



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