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Содержание

INTERACTIVE METHODS IN TEACHING MATHEMATICS: CASE-STUDY METHOD

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Abstract: *the following article deals with the new pedagogical technologies that are the product of goal-oriented forms, methods and tools of education, particularly, in Mathematics education. Observations show that in most cases, the teacher works alone during the lesson, and students stay as observers. In this work, the teaching method Case study connects the teaching of Mathematics with life, develops students' thinking skills, increases the effectiveness of teaching with the examples of which are given and related on this subject.*
Keywords: *pedagogical technology, Case study method, types of cases, State Educational Standards.*

ИНТЕРАКТИВНЫЕ МЕТОДЫ В ОБУЧЕНИИ МАТЕМАТИКЕ: МЕТОД КЕЙС-СТАДИ

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Аннотация: *в статье рассматриваются новые педагогические технологии, являющиеся продуктом целевых форм, методов и средств обучения, в частности, в математическом образовании. Наблюдения показывают, что в большинстве случаев учитель во время урока работает один, а ученики остаются наблюдателями. В этой работе метод обучения Case study связывает преподавание математики с жизнью, развивает у студентов навыки мышления, повышает эффективность обучения с помощью примеров, которые приводятся и связаны с этим предметом.*
Ключевые слова: *педагогическая технология, метод кейсов, типы кейсов, государственные образовательные стандарты.*

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Large-scale reforms require the development of Mathematics education and science in the country; government decisions to improve the content of Mathematics education, connecting the subject with life, increasing the effectiveness of teaching, educating; and upbringing comprehensively developed generation for a rapidly developing society. At the same time, the introduction and application of new pedagogical technologies in the process of teaching Mathematics is directly related to the requirements of the time.

New pedagogical technologies are the product of goal-oriented forms, methods and tools of education, in particular, Mathematics education. Observations show that in most cases, the teacher works alone during the lesson, and students remain observers. This kind of education does not increase the intellectual thinking of students, does not increase their activity, and does not extinguish their creative activity in the educational process. In addition, lessons based on advanced pedagogical technology help students to integrate their

knowledge, develop students' thinking skills, and teach them to think independently and creatively [1-14]. After all, the upbringing of a harmoniously developed generation is an important sign of the cultural and educational development of society, the spiritual maturity of the nation. In this work, we will try to explain the essence of the method Case study on the example of the science of Mathematical analysis.

The word "Case" is derived from the English word ("case" - a real situation, event, "study" -learn, analyze) to carry out teaching based on the study, analysis of specific situations.

The essence of the Case stage method is that participants are invited to think about a real life situation, which describes not only a practical problem, but also the learning material that must be mastered in the process of solving the problem. Analysis of the situation in this way also has a strong influence on the student's pre-experience of future professional activity, which is the basis for the emergence of interest and motivation to study.

Let's analyze at the mathematical types of case studies, which are becoming more and more popular today. They are divided into: Practical cases; Teaching cases; Scientific research cases.

Theme: Checking function with the help of derivatives

Aim of the case: Theoretical and practical issues of teaching the subject "Mathematical Analysis" are based on the theme **"Testing functions with the help of derivatives"** to develop the development of e-learning modules and the development of conclusions and recommendations for improving teaching.

Learning Outcomes:

- To provide students with knowledge about checking functions using the derivatives.
- To develop students' ability to check functions using the derivatives.
- Organizing training sessions using information and communication technologies.

To successfully complete this case, students must first have the following knowledge and skills:

Students should know: Information about functions, their limit and derivatives.

Students should fulfill: to study the topic independently; identify the nature of the problem; promotes ideas;to learn to make independent decisions by critically reviewing data; to have own point of view and draw logical conclusions; to work independently with educational information; compare, analyze and summarize data.

Students should acquire: communicative skills; presentation skills; collaborative skills; problem-solving skills.

The object of the Case: 1st year students of Bachelor degree.

Case questions:

- To know the definition of derivative;
- To know geometric and mechanic definition of derivative;
- Memorize the table of derivatives of simple functions;
- To know function differentiation;
- Ability to find high-order product and differential;
- Spent time to complete the work (minutes).

Table 1. Case tasks (Version I)

	1	**Case task:** Geometric and mechanical meanings of the derivative
	2	**Case task:** $f(x) = 8x^3 - x^4$ Find the increasing and decreasing range of the function.
	3	**Case task:** $(1+x)^{\alpha} \geq 1 + \alpha x \ (x \geq -1, \ \alpha > 1)$ Prove the inequality.
	4	**Case task:** $y = \frac{x^4}{4} - 2x^3 + \frac{11}{2} \cdot x^2 - 6x + 3$ Check the function to the extremum.

Table 2. Case tasks (Version II)

	1	**Case task:** Main theorems of differential calculation.
	2	**Case task:** $y = \arcsin\lvert x \rvert$ Check the function completely and draw the graph.
	3	**Case task:** $y = \sqrt{x^2 - 1} - x$ find the asymptotes of the function graph.
	4	**Case task:** $\lim\limits_{x \to 0} \left(\frac{\sin x}{x} \right)^{\frac{1}{x^2}}$ Calculate with the Lopital rule.

We recall that in the papers [15-23] using some properties of the continuous functions, important properties of the Fredholm determinant are investigated.

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