



Teaching the Topic of Numerical Sequences Using Interactive Methods

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Abstract: This article discusses the second model of the widely used "Let's Read Together" method in the educational process, namely the "Understand" model, as well as the "Prize" mathematical game. The significance of these methods in the student learning process is analyzed. These methods are applied to the topic of "Numerical Sequences," one of the fundamental topics in mathematical analysis. The article also provides solutions to problems such as students' lack of active participation in lessons and their incomplete understanding of mathematical concepts.

Introduction

Today, the education system is in a constant process of change and improvement, becoming increasingly effective through modern pedagogical approaches, innovative technologies, and interactive methods. Therefore, the importance of education and its development is one of the key factors determining the future of any society.

The primary task of pedagogical technologies in education is to place the learner at the center of the learning process. This means moving students away from merely memorizing and mechanically repeating educational material, instead developing their independent and creative thinking abilities and making them active participants in the lesson. Only then can students freely express their thoughts, understand the practical significance of topics, and justify their perspectives on applying knowledge in real-life situations.

Literature Review

[3] The article discusses the use of personalized learning technologies in mathematics lessons.

[4] The article highlights how a historical approach to studying academic subjects can bring the learning process closer to scientific knowledge. It also emphasizes that when teachers introduce mathematical concepts, discussing their history and development (particularly the contributions of great ancestors) can increase students' interest in the subject and foster love for the motherland.

[5] The article analyzes the use of didactic games in teaching mathematics. It notes that the effectiveness of lessons depends on the teacher's creativity. Students should be able to consolidate their knowledge and apply it in real-life situations.

[6] The article emphasizes the importance of independent learning in strengthening students' knowledge in the modern era of advanced science and technology. It highlights the need to build

students' confidence, teach them to acquire knowledge independently, and work on self-improvement.

[7] The article provides a brief overview of work-related textual problems, their types, and steps to solve them. It also discusses key principles and considerations for solving such problems, offering examples to help students and independent learners master textual problems with ease.

[8] The article presents theoretical and logical foundations for developing students' creative thinking, emphasizing the importance of these foundations in solving exponential equations and inequalities. It provides typical examples and guidelines for solving such problems.

[9] The article discusses the importance of mastering fundamental knowledge and avoiding errors in solving inequalities. It provides examples of solving fractional-rational, irrational, logarithmic, and trigonometric inequalities using algorithmic methods.

[10-14] The article analyzes the effectiveness of interactive technologies as a means of improving the quality of the educational process. It highlights the widespread adoption of interactive methods in education, which require humanization, democratization, and liberalization of the learning process. Interactive methods aim to achieve high results with minimal time and physical effort, requiring skill and agility in teaching theoretical knowledge, developing practical skills, shaping moral qualities, and assessing student performance.

Main Section

The use of interactive methods in modern education serves to deepen students' understanding of mathematical concepts and develop their independent thinking skills. Particularly in teaching mathematical analysis, the use of interactive methods enhances student engagement, encourages exploration, and helps students learn the subject through practical skills. Since mathematical analysis often involves complex concepts, traditional teaching methods may pose difficulties for some students. Therefore, incorporating interactive methods into lessons creates opportunities for students to actively participate in discussions, learn from one another through teamwork, and apply theoretical knowledge in practice. One such method is the "Understand" model of the "Let's Read Together" approach, which we will examine using the example of the "Numerical Sequences" topic.

Application: The topic is divided into smaller sections by the teacher and assigned as independent reading tasks to talented students. Mathematical terms used in the topic are distributed among students with lower proficiency levels.

For example, if we divide the "Numerical Sequences" topic into smaller sections:

1. Student 1: Concept of numerical sequences
2. Student 2: Convergence of numerical sequences
3. Student 3: Properties of convergent sequences
4. Student 4: Cauchy's theorem

Students independently study these tasks and, during lecture sessions, explain them to their peers without direct teacher involvement (the teacher acts as a mentor, guiding the process and ensuring a correct scientific and methodological approach).

For instance:

If the sequence $\{S_n\}$ approaches S as $n \rightarrow \infty$,

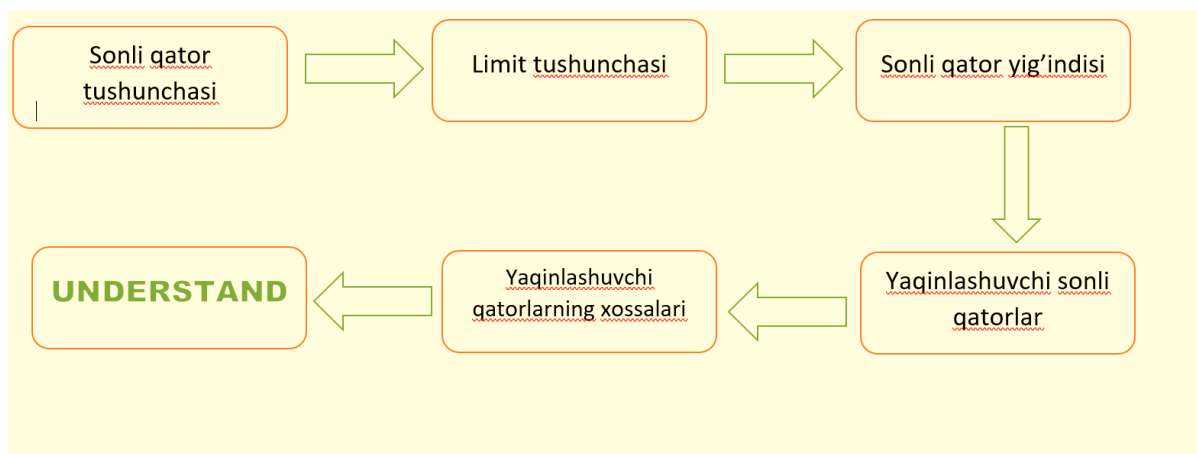
$$a_1 + a_2 + a_3 + \dots + a_n + \dots \quad (1)$$

the series is said to be convergent, and its sum is defined as:

$$\lim_{n \rightarrow \infty} S_n = S, \quad S = \sum_{n=1}^{\infty} a_n$$

If the sequence $\{S_n\}$ does not have a finite limit (the limit does not exist or is infinite), the series (1) is said to be divergent.¹

The lecture pauses at this point, and another student briefly explains the concept of a limit and its existence. Once all students have memorized the concept of a limit, the lecture resumes from where it was paused. At the end of the lecture, students are provided with handout materials in the following format:



Students answer the given questions and proceed along the path. All participants who provide correct and complete answers to all questions reach the "UNDERSTAND" mark and receive an excellent grade. Depending on the scope of the topic, the number of questions in the handout can be increased or decreased.

Advantages of the Method: This method enhances students' active participation in the learning process and develops their ability to learn independently. It broadens opportunities for developing critical thinking. By searching for, assimilating, and conveying information, students gain deeper knowledge. Since each mathematical term is explained, the level of understanding increases. This method also allows for identifying gaps in students' understanding of specific parts of the topic and addressing them effectively.

To reinforce the knowledge gained during the lecture through practical examples, we will discuss the "Gift" method.

The "Gift" Method: In this method, participants are given several practical tasks or examples related to the topic. The results of these tasks are linked to various gifts or rewards.

For example:

1. Students solve problems or complete exercises related to the topic.
2. Based on their performance, they receive points or rewards (e.g., small prizes, certificates, or recognition).
3. This approach motivates students to engage actively with the material and apply their knowledge in solving problems.

The "Gift" method not only reinforces learning but also makes the process enjoyable and rewarding, encouraging students to put in their best effort.

By combining the "Understand" model with the "Gift" method, educators can create a dynamic and engaging learning environment that promotes deep understanding, active participation, and practical application of mathematical concepts.



Participants are rewarded with gifts corresponding to the tasks they complete. This approach helps move away from traditional teaching methods, increases student activity during lessons, boosts morale, and provides an opportunity to motivate active participants.

In conclusion, utilizing the information presented in this article for teaching the topic of "Numerical Sequences" in mathematical analysis ensures active student participation in the learning process, fosters the ability to independently acquire knowledge, and makes lessons more effective, productive, and engaging. Observations show that in traditional lessons, information is solely delivered by the teacher, and students are limited to passive observation. By employing these methods, such issues can be effectively addressed.

These innovative approaches not only enhance understanding and engagement but also create a more interactive and dynamic learning environment, ultimately leading to better educational outcomes[3-14].

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