USING CASE-STUDY TECHNOLOGY IN ORGANIZING PRACTICAL CLASSES IN DIFFERENTIAL EQUATIONS

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Annotation:*This article examines the use of Case-Study technology in organizing practical classes in Differential Equations. It highlights the importance of connecting theoretical knowledge with practical application, fostering students' independent thinking, decision-making, and problem-solving skills. The methodology involves selecting scientifically justified topics, creating problem situations, and using various educational materials such as texts, multimedia, and interactive tasks. The Case-Study approach enhances students' communicative competence, engagement, and ability to analyze and present collected information effectively. The results demonstrate that this technology significantly improves the quality and effectiveness of practical mathematics classes in higher education.*

Keywords: *Case-Study, Differential Equations, Practical Classes, Higher Education, Problem-Based Learning, Pedagogical Technology, Student Engagement, Communicative Competence*

Introduction. In higher education institutions, along with delivering lecture classes in disciplines belonging to the field of mathematics, practical classes also play an important role. Practical classes mainly involve solving examples and problems, which helps to connect the theoretical knowledge presented in lecture sessions with practice and ensures the development of students' skills related to the topic [1; p.66].

Therefore, it is necessary to introduce new approaches to organizing practical classes in mathematical disciplines in higher education institutions.

One of the most important requirements for organizing practical classes in mathematics is that the topic selected for each session must be scientifically justified. In other words, the objectives of the lesson should determine the scope of the topic

while taking into account the students’ capabilities, define its level of complexity, connect it with the theoretical knowledge obtained and previously studied topics, determine the sequence of tasks and independent assignments given to students, identify the necessary equipment for the lesson, enrich the process with additional visual aids, and create problem situations through the use of modern teaching technologies.

For this reason, the application of advanced pedagogical technologies in the process of teaching mathematics is required. This is because modern and non-standard (interactive) teaching forms are one of the ways to improve the organization of educational activities aimed at effectively addressing educational and developmental tasks and enhancing students’ cognitive activity [2; p.71].

One of the advanced teaching technologies aimed at increasing the effectiveness of teaching mathematical disciplines is the Case-Study technology. This technology is considered effective because it creates problem situations for students and encourages them to work independently and make independent decisions [3; p.34].

Therefore, when organizing practical classes in mathematical disciplines, particularly in the “Differential Equations” section, using Case-Study technology, it is necessary to create a creative task and formulate a problem situation for its analysis. In completing this task, students collect the necessary information related to the topic outside the practical class time from relevant educational literature, mass media, and Internet sources. This allows students to imagine the situation and identify a set of problems.

In this process, the educational materials provided can be presented in different forms such as printed materials, video, audio, and multimedia resources.

When assigning tasks for the implementation of Case-Study technology with the help of these educational materials, it is necessary to pay attention to the following aspects:

-the research problem should be relevant and significant;

-it should not have a clearly defined or straightforward solution;

-it should correspond to the topic of the lesson;

-there should not be sufficient information for direct analysis and solution;

-the presented information should contain contradictory or debatable elements.

At the same time, attention should be paid to the following aspects: defining the purpose of developing the Case, for example, fostering communicative competence. To achieve this, the scenario should involve the interpersonal interactions of participants, describing the details of their communication and following a known and recognizable scenario. Problematic questions and tasks should be developed that allow students to master various types of communication (requests, tone, intonation, speech etiquette, phraseological units, etc.); instructions should be prepared for creating the work for didactic purposes and for its proper use; each new detail should be analyzed, and the information collected for the task should be processed; an initial version of the presentation of the collected and studied material should be prepared.

At this stage, the placement of the material and the form of presenting the work should be determined (presentation, video, business game, wall newspaper, etc.). The professor or instructor manages the activity in the classroom, for example, by giving keywords, forming small groups, initiating discussions, maintaining a spirit of entrepreneurship in the audience, and assessing students’ contributions in analyzing the situation.

Based on the recommendations described above, when organizing practical classes in the “Differential Equations” section using Case-Study technology, the following results can be achieved (see Table 1).

Results Achieved in Organizing Practical Classes in Differential Equations Using Case-Study Technology

Table 1.

№	Learning	Education process
1.	Receives new information	Creates an original work
2.	Studies methods of collecting information	Acquires education and achieves personal goals
3.	Learns methods of analysis	Develops communicative competence
4.	Learns to work with text	Improves decision-making skills
5.	Integrates theoretical and practical knowledge	Forms the ability to solve problems in unfamiliar situations

Conclusion: The use of Case-Study technology in practical classes for Differential Equations effectively enhances students’ learning experience. It promotes the integration of theoretical and practical knowledge, strengthens problem-solving, decision-making, and communication skills, and increases student engagement. The methodology provides a structured approach to designing interactive and creative tasks, enabling students to collect, analyze, and present information independently. Overall, this approach contributes to higher quality and more effective mathematics education in higher education institutions.

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