Development Of Students' Logical Competence Through The Improvement Of Software And Information Support In The Context Of Digitalization

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ABSTRACT

This article examines the problems of developing students' logical competence using logical problems from the vector chapter of geometry. Logical problems and the didactic requirements for them, as well as the features of solving logical problems using digital educational technologies, are analyzed. The importance of teaching students analytical and systematic thinking through logical problems in modern education is highlighted.

Keywords: digital education, logical competence, vectors, logical problems, didactic requirements, digitalization, interactive learning, modern technologies

It is well known that the current higher education system is based on state educational standards that emphasize a competency-based approach. The development of logical competence in students plays a crucial role in preparing them for modern professional activities. Forming logical competence in every student enables them to think correctly during their future professional activities, to express their thoughts clearly and logically, and to develop their reasoning skills. This, in turn, contributes to their intellectual development. Logical competence is relevant not only in various academic disciplines but also in everyday life, and it is developed through the process of mastering different subjects.

Logical competence refers to the quality that includes the ability to solve complex problems, make well-founded decisions, and develop critical thinking skills – all of which are essential in today's world.

It is an indicator of learning outcomes that encompasses the skills and abilities necessary to perform any intellectual task, beginning from the early stages of a student's educational activity.

Logical competence consists of the following components:

Communication skills, which include:

the ability to understand the content of a question posed by an interlocutor and to provide a relevant and timely response;

the ability to accept the perspective of the interlocutor;

the ability to conduct a constructive dialogue;

the ability to formulate and justify one's own approach.

Information processing skills, which include:

the ability to understand the overall logic of a presentation;

the ability to identify the main idea and understand logical connections;

the ability to analyze information from various sources.

Cognitive organization skills, which include:

the ability to formulate problems;

the ability to identify and select the necessary steps to solve them.

All of these elements form the foundation of a student's general preparedness in the initial stages of education. These abilities are essential not only for learning but also for successfully acquiring new knowledge efficiently and effectively in a context where the content of professional activities and information flow are rapidly increasing.

Therefore, a targeted approach to teaching aimed at developing high-level logical competence is considered a modern educational strategy. It requires the formation of several general and professional competencies in students, particularly for the effective teaching of mathematics and related subjects.

The general competencies that should be developed in students include:

logical thinking culture,

communication culture,

the ability to understand and analyze problems encountered in personal activity,

the ability to evaluate the essence and importance of information in the development of the modern information society, analyze it, and extract relevant data.

Professional competencies include:

the ability to critically reconsider accumulated experience,

the ability to collect information from contemporary scientific research,

the ability to process and interpret this information,

the ability to form conclusions regarding the relevance of accumulated research data to their professional activities.

As can be seen from the above, logical competence is the general preparedness of a future specialist to continuously improve their knowledge independently. It is the ability to quickly and effectively master new knowledge that supports professional growth in a rapidly evolving work environment. Analyses show that the most effective way to develop the competencies listed above is through direct integration into the educational process.

Today, innovations and digitalization processes in education require a rethinking of the content and methodology of education. Students' analytical thinking and independent problem-solving skills, that is, logical competence, are of great importance in their professional and scientific activities. It is precisely in teaching the chapter "Vectors" of geometry that students can be trained in logical analysis and increase their interest by integrating modern technologies.

Today, the digital environment of education involves not only the use of technology, but also the development of students' thinking skills in the process of imparting knowledge. The chapter "Vectors" of geometry is of particular importance in the formation of students' logical competence. The issues taught in the chapter "Vectors" are focused on mathematical modeling, graphical analysis, and problem solving, and teach students to think logically.

Logical problems are those that require the student to think analytically, draw logical conclusions, and solve problems systematically. Logical problems related to the topic of vectors can take the following forms:

- Geometric vector modeling;
- Representing physical processes using vectors;
- Solving real-life problems using vectors.

To ensure the effectiveness of logical problems, the requirements for them should be as follows:

1. Clarity and clarity.
2. Logical coherence.
3. Differentiation.
4. Practical orientation.
5. Compatibility with innovative technologies.

Logical problems related to vectors can be divided into the following types:

1. Geometric problems.
2. Practical problems.
3. Complex problems.

The following steps are recommended for solving logical problems:

1. Understanding the purpose of the problem.
2. Collecting initial data.
3. Graphical and mathematical modeling.
4. Calculation and analysis.
5. Drawing conclusions.

Logical competence refers to the development of students' abilities to analyze problems, draw logical conclusions, and make decisions during the educational process. Digital tools, such as platforms such as GeoGebra, Desmos, and Wolfram Alpha, create an interactive learning environment for students and facilitate their mastery of the subject. With the help of these tools, students will be able to determine the graphical and algebraic properties of vectors.

The following methods can be used to effectively teach the chapter on vectors:

- Explanation stage: The teacher explains the topic with visual materials.
- Practical exercises: Students are taught to work independently through interactive programs.
- Problem-based learning: Students are given real-life problems and vectors are used to solve them.
- Group activities: Students analyze problems together in small groups.

Using modern technologies in teaching the vector chapter of geometry not only facilitates the mastery of the subject, but also develops students' logical analysis and decision-making skills. Therefore, it is necessary to enrich the content of lessons with digital tools.

Teaching the chapter "Vectors" of geometry in a digital environment plays an important role in developing students' logical competence. Using modern technologies, it is possible to increase the effectiveness of the lesson, encourage students to understand the topic more deeply, and also equip them with practical skills.

Digital technologies offer the following advantages in developing students' logical thinking:

- Interactivity.
- Visualization.
- Flexibility.
- Self-assessment.

By solving logical problems related to the vector chapter of geometry, students' logical competence can be effectively developed. In this case, the compliance of the problems with didactic requirements and their compatibility with modern technologies are of great importance. The digitization process serves to increase students' interest in teaching logical problems and improve educational efficiency.

References

1. Khasanov, T. (2018). Vectors and methods for solving geometric problems based on them. Tashkent: Science and Technology.
2. Ramesh, A., & Kumar, S. (2021). Digital Learning and Geometrical Concepts: Practical Applications of Vectors. Springer.
3. GeoGebra.org. (n.d.). Interactive tools for mathematics education. Retrieved from https://www.geogebra.org.
4. Khatamov, O. (2023). Methods for developing logical competence in teaching students in a digital environment. Mathematics and Pedagogy, 15(2), 54–63.
5. Akhmedov, K., & Yusupov, N. (2019). Vectors and their applications in physics. Journal of Higher Mathematics, 12(4), 42–51.
6. Wolfram Alpha. (n.d.). Computational Knowledge Engine for Vectors. Retrieved from https://www.wolframalpha.com.
7. Pedagogy Today. (2022). Modern Approaches in Mathematical Education: A Focus on Logical Thinking. New York: Academic Press.
8. Ismoilov E.O. Tools aimed at developing students' professional competence on the basis of an integrative approach // European Journal of Humanities and Educational Advancements (EJHEA) (ISSN 2660-5589) (Journal impact

factor 7.223). – Spain, volume 3, № 4,
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