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ON THE COOPERATION BETWEEN TEACHER AND STUDENT WITH ARTIFICIAL INTELLIGENCE IN CREATING INFOGRAPHICS ON THE TOPIC "VECTOR AND SCALAR QUANTITIES"

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Abstract

The article describes the experience of joint work between a teacher and a student using artificial intelligence technologies to create educational infographics in physics. As an example, the topic “Vector and Scalar Quantities” is considered. A comparative analysis of infographics on this topic created by a student and by artificial intelligence is presented. The advantages of cooperation between teacher, student, and artificial intelligence are shown. Specific recommendations are given.

Keywords:

education, physics, vector quantity, scalar quantity, infographic, artificial intelligence, teacher, student, cooperation, efficiency, process, quality.

Vector and scalar quantities are one of the basic topics in the physics course, forming in students a fundamental understanding of physical concepts and laws. All physical quantities are divided into two groups: scalar and vector. A scalar quantity is completely determined by its numerical value (magnitude). Examples include: time, area, mass, work. Operations on scalar quantities are carried out according to the rules of algebra and differential calculus. A vector quantity is completely determined by its numerical value (magnitude) and direction. Examples include: velocity, acceleration, force. Operations on vector quantities are carried out according to the rules of vector calculus. However, mastering this topic requires not only theoretical knowledge but also a clear visual representation of the differences between vector and scalar quantities, their graphical representation, and real-life examples. Teachers strive to diversify the ways of presenting topics, in particular— through cooperation with students to increase the effectiveness of its assimilation. Such forms of cooperation include: drawing up a lesson plan and a reference card by students under the guidance of a teacher (1,2), selecting and solving non-standard physics problems with subsequent analysis (3-5), and creating infographics (6-10). Surveys show that most students enjoy creating infographics.

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Infographics are educational materials for visually presenting information to make it easier to understand and remember. They can activate students' cognitive activity, making the learning process more effective and visual. Experience shows that the greatest effect is achieved when creating infographics in cooperation between teacher, student, and artificial intelligence. This allows for effective visualization of the topic and makes learning more interactive. The teacher is required to: formulate educational goals, select theoretical material, set criteria for the infographic, verify the accuracy of data proposed by artificial intelligence. The student is required to: study the theoretical material, propose the structure of the infographic, use artificial intelligence when creating images, diagrams, and tables, adjust the result, analyze the infographic, and draw conclusions. Artificial intelligence helps: find real-life examples, visualize them, and offer ready-made infographic templates.

Figure 1 shows an infographic on the topic “Scalar and Vector Quantities” created by a second-year student, while Figure 2 shows an infographic created by artificial intelligence. In the first case, a structured diagram is shown, with subcategories highlighted for vector and scalar quantities (direction, numerical value), symbols of physical quantities are given, and the image of a student at a desk adds an emotional and visual accent. Bright contrasts and saturated colors are used. In Figure 2, there is a clear division into two columns—scalar and vector quantities—with a list of examples in each column accompanied by appropriate icons. The information is presented compactly, clearly, and simply. However, there is no explanation of what exactly distinguishes scalar from vector quantities.

Analysis of these figures allows the following recommendations to be made:
- Use artificial intelligence to create detailed, structured infographics, simplifying and adapting them for student perception.

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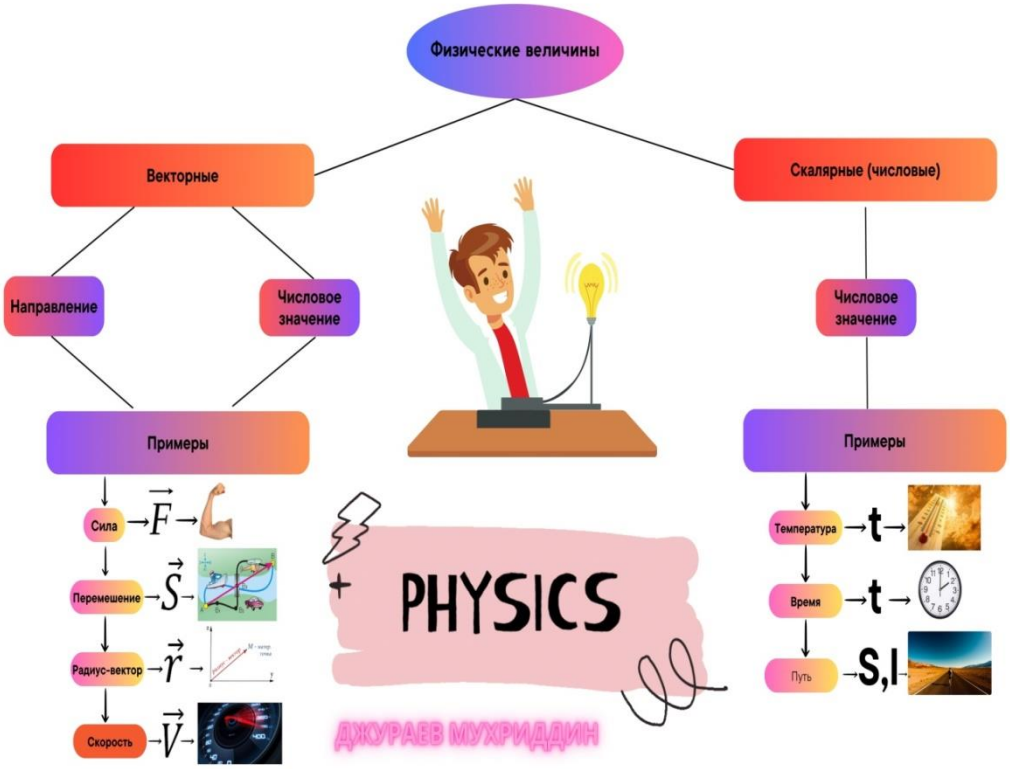

Fig. 1, Fig. 2

- The student proposes their own visual solutions, focusing on the main idea; artificial intelligence complements or structures them; the teacher helps the student, guides them, and balances simplicity and depth.

Conclusion

Cooperation between teacher and student with artificial intelligence in creating infographics on the topic “Vector and Scalar Quantities” improves the quality of material assimilation and develops students' skills in working with artificial intelligence. This contributes to the introduction of innovative technologies into the educational process while maintaining the teacher’s primary role as an expert and mentor.

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