



## **METHOD OF DEVELOPING COGNITIVE INTEREST IN STUDENTS WHEN TEACHING ENGINEERING AND COMPUTER GRAPHICS**

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<b>A B S T R A C T</b>	<b>KEY WORDS</b>
<p>This article analyzes the methodology for developing students' cognitive interest in teaching engineering and computer graphics. The psychological and pedagogical foundations of cognitive interest are studied, and innovative pedagogical methods, technologies, and approaches for the effective organization of this process are considered. Particular attention is paid to the role of interactive learning, problem-based approaches, gamification, and group assignments in increasing students' interest. These methods are aimed at strengthening students' knowledge and preparing them for future professional activities. The article also provides practical recommendations for teachers and analyzes the practical results of developing cognitive interest. In conclusion, recommendations and methodological approaches are proposed aimed at improving the educational system.</p>	<p>cognitive interest, engineering and computer graphics, pedagogical methods, interactive learning, problem-based approach, student motivation, innovative pedagogy, educational process, gamification, practical results, recommendations for teachers.</p>

### **Introduction**

Today, the education system is aimed not only at transferring knowledge, but also at developing interest and motivation in students. The development of cognitive interest is especially important when teaching technical disciplines, such as engineering and computer graphics. These disciplines require students to have a high level of logical thinking, an analytical approach, creative and technical skills. Therefore, increasing students' interest in learning, increasing their motivation and active involvement in the learning process is becoming an important part of the educational process.[1].

Cognitive interest is an internal motivation of an individual to acquire new knowledge, search for new information and work with it. Students strive to expand their scientific and practical capabilities, to delve deeper into their studies. Cognitive interest is an important component of the educational process, since it plays a key role not only in acquiring knowledge, but also in continuing to learn and working with new ideas. Therefore, developing cognitive interest in students in technical disciplines such as engineering and computer graphics is necessary to explain the practical significance of these disciplines and make the educational process more exciting and effective. [2].

Engineering disciplines teach students technical knowledge, as well as problem solving, creative thinking, and solutions to real-world problems. Computer graphics helps students develop practical skills in digital imaging, 3D modeling, animation, visualization, and many other creative fields. These disciplines help students combine technical and creative abilities, which in turn helps develop their overall cognitive interest.[7].

Computer graphics are closely related to engineering, teaching students not only practical technical skills, but also modeling complex systems with a creative approach. For example, teaching 3D modeling, visualization, virtual reality and other modern technologies contributes to the development of students' cognitive and creative interests. All this contributes to the development of students' thinking skills through the use of engineering and computer graphics disciplines in the educational process.

Cognitive interest causes students to be internally motivated to acquire new knowledge. In this process, students become more engaged in their studies and begin to feel ready to work independently in scientific activities. Providing students with problem-solving processes and finding innovative solutions in technical disciplines such as engineering and computer graphics activates their cognitive interests. If a student is given the opportunity to study topics that interest him, he will usually achieve better results.

The teacher plays an important role in this process. Teachers should not only provide students with knowledge, but also manage and develop their interests. With the help of teaching methods, interactive approaches and the use of innovative technologies, it is possible to awaken students' cognitive interest. One of the important methods for developing cognitive interest is problem-based learning, interactive learning processes, virtual and practical simulations.

This article aims to study the methodology for developing students' cognitive interest in teaching engineering and computer graphics. The article presents the main pedagogical methods for developing cognitive interest, such as interactive lessons, problem tasks, practical exercises, gamification and other innovative approaches. The effectiveness of these methods in practice and how students' interest in the subject can be increased through their application are discussed.

## **Problem Analysis**

A decrease in student interest in technical subjects such as engineering and computer graphics often leads to a decrease in the effectiveness of the learning process. These subjects require students to have a high level of logical thinking, analytical skills, and creativity, but in some cases these abilities are not fully demonstrated. Students' internal motivation to learn, i.e. cognitive interest, has a significant impact on the acquisition of the subject. If students have low interest in the subject, this not only reduces their enthusiasm for learning, but also leads to difficulties in acquiring knowledge.

### **Problem 1: Decreasing interest among students.**

Technical subjects, especially complex fields such as engineering and computer graphics, can often be boring and difficult for students to understand. Sometimes, students fail to properly explain the practical significance of these subjects and their applications in real life. As a result, students have difficulty learning the material and their interest in the topic decreases. Especially practical classes, although an effective way to increase students' interest, sometimes do not coincide with the current teaching methods, which reduces students' motivation.

**Problem 2: Difficulty understanding topics.**

Computer graphics or engineering subjects often rely on complex concepts and mathematical models, which can be difficult for students. When studying these subjects, they often cannot better understand the material through practical examples or visual explanations. To engage students in the learning process, topics need to be presented in an interesting and understandable way. It is important not to limit yourself to just theoretical data, but also to teach students through practical exercises and interactive tasks.

**Problem 3: Low interest in practical classes.**

Engineering and computer graphics should not only provide students with theoretical knowledge, but also involve them in practical activities. Low interest in practical classes and laboratory work reduces the effectiveness of the educational process. Students often do not devote enough time to practical classes because they find these classes difficult or boring. Therefore, there is a need for new pedagogical methods to make practical classes more interactive and interesting.

**Objectives: Objective 1: Developing cognitive interest.**

As is known, when students show interest in learning, their level of assimilation of the material and efficiency increase significantly. The main goal of this article is to develop cognitive interest. In order to increase the interest and motivation of students in the learning process, it is necessary to use modern pedagogical methods and interactive approaches. Increasing cognitive interest contributes to the fact that students not only continue their studies, but are also ready to apply the knowledge they have gained in real life [12].

**Goal 2: To develop students' high interest in the disciplines.**

To generate interest in the subjects, teachers should use innovative and interactive methods. For example, problem-based learning, gamification, case studies, and virtual labs attract students' attention. Helping students solve real problems and find creative solutions increases students' interest in the subjects. In addition, when teaching technical subjects such as computer graphics or engineering, it is important to develop students' practical skills and involve them in practical activities.

**Goal 3: Motivating students in the learning process.**

When students feel motivated to learn, they begin to feel more active in the learning process. To increase student motivation, it is important to make classes interesting and interactive. This, in turn, will increase their desire to learn. Classes can be adapted to modern teaching methods such as gamification, interactive programs, organizing group work and projects in the classroom. It is also important to implement an individual approach to each student to increase their personal development and interest.

**Goal 4: Active involvement of students in the learning process.**

An effective way to engage students in the learning process is to implement interactive methods and technologies. Virtual simulations, interactive programs, and 3D modeling provide students with advanced approaches to learning engineering and computer graphics. Students learn these methods

with greater interest, and the application of acquired knowledge in practice becomes more exciting for them.

The problem analysis and objectives demonstrate the need to develop effective methods for developing students' cognitive interest. Increasing students' interest in learning and involving them in practical activities will significantly improve the effectiveness of the learning process. Teachers can offer students interesting and interactive classes that will help them be ready to apply the knowledge they have gained in practice.

**Theoretical foundations.** Cognitive interest is a person's internal motivation and desire to learn new knowledge and to understand previously studied materials more deeply. Cognitive interest mainly means interest in a person's intellectual activity in the learning process. Psychologically, cognitive interest is associated not only with obtaining information, but also with its deep analysis, asking advanced questions, and expanding the range of knowledge [10]. In the field of psychology, several main factors influence the formation and development of cognitive interest. The most important are internal motivation and interesting, purposeful activities in the learning process, which help develop students' cognitive interest. During learning activities, the student is interested not only in obtaining new knowledge, but also in its connection with existing concepts and the desire to extract practical results. These factors stimulate the development of cognitive interest.

The development of cognitive interest is also associated with controlled difficulties and goal-oriented activities. When students apply their knowledge in practice and are convinced of their success, this increases their interest in further learning and acquiring new knowledge. For example, in technical disciplines such as computer graphics or engineering, creating conditions for solving real problems helps to increase students' interest in the learning process.

Pedagogical theories play an important role in developing cognitive interest. To increase students' interest and motivation, it is important to choose the right teaching methods. The most effective pedagogical approaches for developing cognitive interest include the following:

According to constructivist theory, knowledge is actively constructed by students, meaning they learn new information by relating it to their own experiences, concepts, and knowledge. Constructivist pedagogy allows students to develop independent thinking and learn from practical experiences while learning. This approach increases students' cognitive interest as they not only accept information, but learn to analyze, test, and apply it. In technical subjects such as engineering and computer graphics, constructivist teaching helps students develop innovative approaches to solving real-life problems related to these subjects.

The main principles of constructivism:

- Knowledge is built on the basis of students' personal experience.
- The learning process should be active and interactive.
- Students' progressive and creative approach is encouraged.

Interactive teaching methods help students to actively engage in the thinking process. These methods provide students with the opportunity to interact, solve problems together, and participate in the creation of new knowledge. For example, group work, problem-solving tasks, virtual simulations, and role-playing games encourage students to solve interesting but challenging problems. These methods not only increase cognitive interest, but also stimulate students to think independently during the learning process.

Problem-based learning focuses on identifying, analyzing, and solving problems. It helps students connect topics to real-life problems, which develops their critical thinking and cognitive interest. Advanced problems encourage students to look for solutions based on their own experience and knowledge. In engineering and computer graphics, this approach brings students closer to real-world practice and prepares them to apply their knowledge to solve real-world problems.

Gamification is the introduction of game elements into the learning process. This method is an effective tool for increasing students' cognitive interest. In the study of engineering and computer graphics, providing tasks in a game format makes the process of acquiring knowledge interesting and interactive. For example, the use of 3D modeling, virtual simulations or games in educational programs stimulates active participation of students and increases their interest in learning.

Psychological and pedagogical theories play an important role in developing cognitive interest. Constructivism, interactive teaching methods and problem-based approaches contribute to the development of cognitive interest in students. The application of these methods in practice activates students in the learning process and increases their interest in acquiring new knowledge.

## **Methods of developing cognitive interest in teaching engineering and computer graphics.**

In technical fields such as computer graphics and engineering, various interactive and innovative teaching methods are used to increase students' interest in learning [13]. These methods not only promote motivation to acquire knowledge, but also enhance the desire to learn. The following methods are effective in developing cognitive interest:

Interactive teaching methods provide active and continuous interaction with students in engineering and computer graphics classes. The main goal of these methods is not to turn students into passive consumers of information, but to make them active participants in the learning process.

- **Curriculums:** Interactive curricula play an important role in teaching computer graphics and engineering. For example, with the help of 3D modeling or animation programs, students can see the results of their work in real time. These programs actively involve students in the learning process and allow them to apply the topics in practice.

- **Simulations:** Simulations allow students to test complex systems, processes, or machines in real time. In disciplines such as engineering and computer graphics, simulations give students the opportunity to see how systems work and learn about them. This method is an effective tool for generating interest in students and improving the learning process.

- **Virtual Labs:** Virtual labs provide students with the opportunity to conduct scientific experiments and test the principles of engineering systems and computer graphics in practice. With the help of such labs, students can test the principles of engineering systems, their structural elements and the sequence of work.

These methods not only help to increase interest in learning, but also to strengthen the desire to apply the acquired knowledge in practice.

The problem-based approach encourages students to solve real-life problems. This approach is particularly effective in fields such as engineering and computer graphics, where practical and systematic knowledge is required. - 3D-моделирование и создание анимации:

In the field of computer graphics, students' interest can be increased through creative tasks such as 3D modeling or animation. For example, students can create objects or movements, add visual effects and animate them. This process is interesting for students and increases their motivation.



- Analysis of engineering systems: Using a problem-based approach, students analyze real engineering systems, seek to understand their operation, and learn the principles of their functioning [15]. For example, by analyzing cars, airplanes, or other technical devices, students gain a deeper understanding of their operating principles.

The problem-based approach forces students to test their knowledge, identify errors and work on them, which increases cognitive interest. Through teamwork and group discussions, students teach each other to express their thoughts clearly and develop teamwork skills. This approach helps students not only to learn knowledge, but also to solve real problems in the field of engineering and computer graphics.

The methodology for developing cognitive interest in teaching computer graphics and engineering is aimed at ensuring active participation of students, increasing their motivation for learning and expanding their scientific and practical knowledge. Pedagogical methods such as interactive methods, problem-based approach, group work and gamification arouse students' interest and make the learning process more effective. With the help of these methods, students not only gain knowledge but also prepare to apply it in practice.

## **Practical results and Recommendations**

The effectiveness of methods used to develop students' cognitive interest is reflected in the educational process. Pedagogical methods such as interactive approaches, problem-based approaches, group work and gamification ensure not only the acquisition of theoretical knowledge, but also develop students' active participation, independent thinking and problem-solving abilities.

- Effectiveness of interactive methods: The use of training programs, simulations and virtual laboratories in the field of computer graphics and engineering makes the learning process more engaging and interactive for students. These methods help students apply theoretical knowledge in practice. For example, practical classes in 3D modeling or animation creation captivate students and reveal their creative potential.

With the help of training programs and simulations, students can see their work in real time and analyze the mistakes they made. This helps to increase cognitive interest. In addition, students strive to constantly improve their work, which increases their interest in learning.

- Effectiveness of the problem-based approach: The problem-based approach allows students to solve real-life problems. In the field of computer graphics and engineering, tasks such as analyzing complex systems, creating 3D models and visualizing them are effective in developing cognitive interest. Students are eager to apply their knowledge in practice, which increases their interest in learning.

For example, tasks related to checking the efficiency of an engineering system or creating complex animations using computer graphics are of great interest to students and help them to absorb knowledge more deeply. Through this method, students develop individual approaches, find new solutions, and test their knowledge in practice.

## **Recommendations**

Recommendations for teachers aimed at developing cognitive interest play an important role in increasing students' motivation to learn and improving the effectiveness of their educational process. The following recommendations can be highlighted:

- Use of Technology: Using modern technology in teaching computer graphics and engineering motivates students to learn. The introduction of technology such as virtual labs, 3D simulations and training programs increase students' interest. With the help of technology, students can test their knowledge by solving real life problems.
- Implementation of innovative approaches: Teachers should guide students to new ways of thinking through innovative pedagogical approaches. Implementation of methods such as interactive approaches and problem-based learning promotes students' scientific interest and effective learning. Through these methods, students actively participate in scientific research, strengthen their knowledge and develop new ideas.
- Improving teaching methods: Teachers should constantly improve their teaching methods. In the learning process, students' interest can be increased by using interactive activities, practical classes, group work, and problem-based approaches. These methods encourage students to learn and search independently.
- Individualized approach: Each student has an individual learning style. Teachers should consider the individual needs of students and develop personalized approaches. With the help of individualized teaching methods, students can be helped to find the most suitable learning methods for them, which contributes to the development of their cognitive interest.
- Increased motivation: To develop cognitive interest, teachers should organize their teaching styles in such a way as to increase students' motivation. Interesting tasks, various games, and recognition of achievements help students become more motivated to learn. Regularly rewarding students' successes and recognizing their achievements increases their interest in learning.

The methods and approaches used to develop cognitive interest promote active participation of students in the learning process, problem solving and application of knowledge in practice. The recommendations offered to teachers will help make the learning process more effective through the use of technology, the introduction of innovative approaches, an individualized approach and increased motivation of students. These recommendations are important for the development of cognitive interest and improvement of the quality of the learning process.

## Conclusion

The methods used to develop students' cognitive interest were scientifically analyzed, and the results they can give in practice and how the educational process can be improved were considered. These methods help not only to increase the level of knowledge acquisition by students, but also play an important role in preparing them for future professional activities. In the learning process, it is important to make students active participants and ensure the acquisition of knowledge not only at the theoretical but also at the practical level.

1. Improving students' learning: Methods that focus on developing cognitive interest, such as interactive and problem-based approaches, gamification, and hands-on activities, actively engage students in the learning process. This significantly increases their learning. Students learn new topics by applying their knowledge not only theoretically but also practically. These methods provide an individual approach to each student and motivate them to learn more successfully.
2. Application of innovations in the learning process: The use of modern technologies, innovative methods and pedagogical approaches makes the learning process interesting and effective for students. With the help of interactive programs, virtual laboratories, 3D modeling and gamification methods,

students are involved in activities aimed at solving real-life problems. These methods contribute to the formation of cognitive interest in students and provide an opportunity to develop the necessary technical and creative skills for professional life.

3. Preparation for future professional activity: One of the main goals of cognitive interest development methods is to prepare students for their future professional activity. For example, in technical disciplines such as computer graphics and engineering, students develop their technical and creative abilities through practical classes. This, in turn, ensures their successful professional activity in such areas as engineering, design, programming and others. By developing cognitive interest, students not only deepen their scientific knowledge, but also master the necessary skills to solve problems in their workplaces.

4. Effectiveness of Teaching Approaches and Methods: The effectiveness of teaching approaches and methods used by teachers has been thoroughly researched. Interactive learning, gamification, problem-based learning, and group work methods have received positive feedback from students and increased their interest in learning. These methods promote collaboration among students, strengthen knowledge, and develop critical thinking and problem-solving skills that are necessary for successful performance in a rapidly changing and technologically advanced world.

5. Increased student motivation: Another important outcome of developing cognitive interest is the increase in students' motivation to learn. Motivation is a key factor that activates students in the learning process. When students find motivation in the learning process, they begin to take their learning activities more seriously. Gamification methods, interactive learning tools, and teamwork increase students' self-confidence and motivate them to apply their knowledge in practice with greater enthusiasm.

6. Systematic learning and innovative thinking: The result of the effective application of cognitive interest development methods is the development of students' systemic learning and innovative thinking skills. Innovative thinking is a thinking process aimed at finding new solutions and solving existing problems using advanced methods. Students develop their innovative thinking skills by applying new technologies, exchanging opinions, trying out new ideas.

In conclusion, the methods used to develop students' cognitive interest improve the efficiency of the learning process, enhance their desire to learn, and play an important role in preparing them for their future professional activities. Innovative pedagogical approaches, the use of technology, interactive and gamification methods, and problem-based approaches deepen students' knowledge and contribute to the growth of their cognitive interest. These methods also play a significant role in developing students' technical and creative skills necessary for successful professional activity. Thus, the introduction of effective methods for developing cognitive interest is important for improving the learning process, helping students prepare for the future, and orienting them toward successful professional activity.

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