

# METHODS OF USING INNOVATIVE DIGITAL EDUCATIONAL TECHNOLOGIES IN COMPUTER LESSONS

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## Abstract

In this article, the role of innovative technologies in improving the quality of knowledge in the field of informatics is considered, various innovative technologies, such as interactive platforms and online courses, virtual and augmented reality, mobile applications for learning lessons, and their impact on productivity are highlighted.

**Keywords:** innovative technologies, information and communication technologies, digitization, interactive methods, online educational platforms, virtual reality, mobile applications, cloud technologies.

## Introduction

Informatics plays a key role in modern education, as it serves as a basis for understanding and using digital technologies. Today, computers and the Internet have become an integral part of our lives and reflect the modern requirements of the labor market. Therefore, students are required to acquire skills and knowledge in informatics in order to become successful and competitive personnel in the modern world. In addition, informatics forms a number of valuable skills and qualities in students. First, it develops analytical thinking, the ability to systematize and analyze information, as well as to solve complex problems using logical and algorithmic thinking. Second, computer science develops technical literacy and the ability to work with computers and software. Third, it helps develop communication skills, as many tasks in computer science require collaboration and information sharing. Informatics is important in modern education, because it not only provides the basis for the use of technology, but also forms the basic skills necessary for students to successfully adapt to a rapidly changing world.

## Literature Analysis

Traditional computer science teaching can face a number of challenges that make learning difficult and limit student learning. Some of these problems are: outdated teaching methods and methods; monotony and lack of interactivity; lack of individualization of teaching; lack of practical experience.

Traditional computer science teaching can limit learning and prevent students from improving their skills. Therefore, there is a need to use innovative approaches and technologies that can contribute to more effective and interactive teaching of computer science.



Innovative technologies play an important role in improving the teaching of computer science. They create new opportunities for active and interactive learning and allow the learning experience to be tailored to each student's needs and learning style. Below are some of the roles that innovative technologies play in computer science education.

1. Improving access to information and resources. Innovative technologies such as the Internet and digital libraries provide wide access to modern information and resources. This allows students to enrich their knowledge of computer science, search for additional materials and develop their interests .
2. Interactive training. Interactive educational platforms and programs allow students to actively interact with the material and apply the acquired knowledge in practice. They can complete practical tasks, solve problems, conduct experiments and get immediate feedback on their actions. It helps to understand and remember information more deeply .
3. Individualization of training. Innovative technologies make it possible to adapt teaching to the individual needs and level of knowledge of students. You can provide students with personalized content tailored to their level and offer additional materials or assignments for extra practice. This helps each student learn at his own pace and achieve better results.
4. Development of skills for working with modern technologies. Innovative technologies include modern tools and programs widely used in the field of informatics. The use of these technologies as part of education helps to form skills for working with them, which not only increases the quality of education, but also prepares students to work in the modern digital world.

Innovative technologies have great potential to improve the educational process. They significantly improve teaching and learning, making it more interactive, convenient and effective. Here are some examples of the possibilities of innovative technologies in education:

1. Online Education : Online education platforms such as Moodle, Coursera, edX and Khan Academy provide students with access to a variety of courses and materials across a range of subjects and skills. This allows students to study subjects at their own pace, at their own time, and independently from anywhere in the world.
2. Virtual Reality (VR) and Augmented Reality (AR): VR and AR technologies allow creating an immersive and interactive learning environment. They can be used, for example, to visualize complex concepts, create virtual laboratories or create 3D models for studying scientific objects
3. Access to mobile applications and devices : With the help of mobile applications and devices, students can access learning materials and resources anytime and anywhere. They can use mobile applications to study independently, manage assignments, and communicate with teachers and classmates.
4. Flexible educational systems: The use of algorithms and artificial intelligence allows to create educational platforms that can adapt to the individual needs and abilities of the student. This helps to optimize the learning process and achieve maximum results for each student .
5. Collaborative learning and the cloud : Collaborative learning, including group projects and collaboration, is becoming more accessible through the cloud. Students can easily share information, documents, and ideas while working on projects with classmates from different locations [2] .



Innovative technologies in education can create a more interactive and personalized learning environment, help students acquire practical skills and apply their knowledge in practice. They can also increase access to education for people in remote areas and expand learning opportunities outside the classroom.

### **Research methodology**

Interactive educational platforms and online courses are one of the most popular and effective innovative technologies in education. They offer students new opportunities to learn and acquire knowledge. Offers a systematic and organized approach to education. They usually include courses in various subjects created by experienced teachers and experts in their fields. These platforms allow you to use a variety of materials such as video lectures, interactive assignments, tests and forums to communicate with other students and teachers. Students can learn the material at their own pace, review challenging topics, and ask questions.

Online courses such as MOOCs (Massive Open Online Courses) provide free access to educational materials from leading universities and organizations. These courses usually have a rigid structure and a modular approach, allowing students to learn the material step by step. Courses can be designed for both beginners and advanced students. They provide an opportunity to independently study the material and receive feedback from teachers and other students.

Advantages of interactive learning platforms and online courses include:

- Flexibility and Convenience : Students can study the material at their own time and anywhere they have access to the internet.
- Personalization of learning : platforms and courses can be adapted to each student's level and needs, offering a personalized learning experience.
- Interactivity and practical application : Many platforms offer interactive activities that allow students to apply their knowledge in practice.
- Global opportunities: Students can study, exchange experiences and expand their knowledge with people from different countries and cultures.
- Continuous availability of materials: materials can be stored and available for re-study at any time.

In general, interactive learning platforms and online courses have great potential for improving the learning process and increasing access to knowledge in computer science and other disciplines.

Virtual Reality (VR) and Augmented Reality (AR) are two technological trends that offer the user new ways to interact with the world around them.

Virtual reality allows the user to enter a digital environment created using special equipment such as virtual reality glasses. With the help of VR technologies, the user can be transported to a virtual space, where he can experience the feeling of being in another place or interact with virtual objects and characters.

Augmented reality, in turn, allows the user to interact with the surrounding world, filling it with digital objects and information. AR technologies usually use smartphones, tablets or special AR glasses. When using AR, the user can see additional graphic elements or information overlaid on the real environment.



Both VR and AR have great potential for the future. They are changing the way we perceive and interact with the world, opening up new possibilities in entertainment, work, learning and many other areas of life.

Mobile learning apps are becoming increasingly popular because they offer flexible and convenient learning anytime, anywhere [1].

Some of the benefits of mobile learning apps are:

1. Flexibility and convenience. Mobile apps allow users to learn and learn new skills at a time and place that suits them.
2. Interactivity. Many mobile learning apps offer interactive activities, quizzes, games and other ways to make the learning process more interesting for users.
3. Personalized education. Mobile applications can adapt to the needs of each user.
4. Mobile apps allow you to use different media formats to better understand and remember the material.
5. Communication with the teacher or student team. Mobile applications allow you to communicate with teachers or other students through forums, chats or online meetings.
6. Encourage motivation and self-education. Mobile apps provide rewards, achievements, and tracking of users' learning, helping them stay motivated and self-disciplined.

Mobile learning apps can be useful in language learning, professional development, math and science, history, art, and many other areas. They offer new opportunities for personalized and interactive learning.

### **Analysis and results**

We will consider the main advantages of using innovative technologies in teaching computer science.

One of the main advantages of using innovative technologies in teaching computer science is the ability to interest and motivate students.

1. Interesting. The use of new technologies such as virtual reality, augmented reality, game elements and interactive applications make the process of learning computer science more interesting for students.
2. Motivation. The use of innovative technologies allows to stimulate students motivation to study computer science. This is related to the ability to choose topics that interest them, use practical examples, and create life projects.
3. Interactivity and cooperation. Innovative technologies make it possible to create interactive tasks, quizzes and group projects, which encourage students to actively participate in the learning process.
4. Adaptation to personal needs. Innovative technologies allow teachers to adapt materials and tasks to the individual needs and level of each student.
5. Development of critical thinking and problem thinking. Innovative technologies require students not only to acquire knowledge and skills, but also to think, analyze, and solve problems.

Innovative technologies in computer education can significantly increase the excitement and enthusiasm of students, which in turn will serve to more successfully master the educational material and develop their skills in this field.



Another advantage of using innovative technologies in teaching computer science is the ability to individualize learning and adapt it to different needs of students [2].

1. Personalization of education. The use of innovative technologies allows teachers to create individual curricula and programs for each student. This includes adjusting the level of difficulty of tasks, using different teaching methods, providing additional materials depending on the individual ability and level of knowledge of each student.
2. Flexibility and convenience. Innovative technologies allow students to learn at their own pace and at their own time. They can use online platforms, record and view lectures, complete assignments and receive online feedback. This is especially useful for students who have limited access to educational institutions or who are busy with other duties.
3. Adaptation to different learning styles. Each student has their own preferences and learning style. Innovative technologies make it possible to adapt materials and teaching methods to different styles and preferences of students. Technology can provide a variety of materials and assignment options to meet the needs of each student.
4. Feedback and progress monitoring. Innovative technologies allow teachers to better monitor the progress of each student and provide timely feedback. They can use online tools to track assignments, analyze test results, and summarize student progress. This helps teachers know in which areas students need more help and which aspects of computer science need more attention.

Innovative technologies in the teaching of computer science allow for the creation of more flexible and individualized curricula, taking into account the different needs and learning styles of students. This serves to make education in informatics more effective and qualitative [3].

Developing skills to work with modern technologies and tools is an important aspect in today's world, where technology is constantly evolving and changing. This will allow you to perform tasks effectively, be competitive in the labor market and constantly improve your profession.

One of the methods of forming skills for working with modern technologies and tools is independent study. There are many online courses, training materials, and tutorials that you can use to learn new tools and technologies. Cooperation with colleagues, exchange of experience also serves to form the skills of working with modern technology and tools.

Developing the skills to use modern technologies and tools takes time and effort, but it is essential for professional growth and success in today's world. Constantly learning and using new tools will help you stay a sought-after expert and stay on top of the latest tech trends.

One of the limitations and problems of the use of innovative technologies in the teaching of computer science is the demand for special qualifications of teachers. In order to effectively use innovative technologies, teachers should be familiar with these technologies and have sufficient qualifications. Constraints may include limited resources and technology availability. Not all educational institutions can provide the necessary computers, software and the Internet to use innovative technologies in teaching. This can limit teachers' ability to use modern tools and technologies in the educational process [5].

One of the main limitations in the use of innovative technologies in the teaching of computer science is the need to use technical equipment and software.

To effectively use innovative technologies, teachers and students need computers, laptops, tablets or other devices to complete assignments and work with technology. You also need



high-speed Internet access to download and share information, access online resources, and collaborate on projects.

In addition, to use innovative technologies, you need the appropriate software. For example, virtual and augmented reality require specialized software and applications, while programming and development may require integrated development environments, language packs, and other developer tools.

It is also important to have a plan to support and prepare teachers and students to work with technical equipment and software. Education, training, and workshops help teachers master new technologies and teach students how to effectively use existing hardware and software.

One of the possible problems associated with the use of innovative technologies in the teaching of computer science is the instability of the technical infrastructure [6].

In order to overcome problems related to the stability of the technical infrastructure, it is important to provide disaster recovery plans, perform regular maintenance and upgrades of hardware and software, and have qualified specialists who can solve problems quickly and efficiently. Alternative solutions can also be sought, such as using backup communication channels, testing and debugging the system initially, and installing additional security measures to protect data and the network.

### **Conclusion**

In conclusion, it can be noted that the role of innovative technologies in improving the quality of computer science education cannot be overestimated. They ensure interactivity and active participation of students in the educational process, increase access to information, facilitate the exchange of knowledge and experience, and help teachers to be up-to-date and competent in their field.

The use of innovative technologies allows to create more effective and interesting lessons that contribute to better learning and development of computer skills. With their help, students can put their knowledge into practice, create their own programs, and directly see the results of their work.

At the same time, the use of innovative technologies in the teaching of computer science makes it possible to use a large amount of information and materials, which makes it possible to study deeper and more advanced topics. This, in turn, helps students develop critical thinking, problem solving, and creative skills.

In addition, innovative technologies allow creating an environment of cooperation and exchange of ideas between students and teachers. It helps stimulate creative thinking, develops communication skills and allows students to learn from each other.

Thus, innovative technologies play an important role in improving the quality of teaching computer science by ensuring the interactivity and active participation of students, increasing the possibilities of using information, sharing experience and knowledge, maintaining the relevance and competence of teachers. The introduction and use of these technologies in the educational process is a necessary step for the successful teaching of computer science and the readiness of students for the rapidly changing world of information technologies.





Prospects for further development and use of innovative technologies in computer education are very wide. Each year, technology continues to evolve and offer new opportunities that greatly enhance the learning experience and improve student outcomes.

One of the prospects is the use of artificial intelligence in computer science education. Artificial intelligence helps analyze and optimize the learning process, provides personalized materials and recommendations for each student, and creates unique learning scenarios based on the needs and abilities of each student.

Another perspective is the development of online education and distance learning. Thanks to video conferencing technologies, online course platforms and other tools, students can receive quality education from anywhere in the world and teachers can teach effectively and efficiently virtually.

Of course, the introduction and use of innovative technologies in education also creates some problems, such as availability and teacher training. However, with the right training and support, these technologies have tremendous potential to improve the quality of computer science education and help students develop the skills they will need in the future.

It is important to prepare teachers to use innovative technologies in education. Teachers play a key role in the successful integration and application of these technologies in the educational process, and their training and skills significantly affect the quality of education .

First, training teachers to use innovative technologies allows them to master new tools and programs that make lessons more interactive and interesting. This allows teachers to effectively use technology in teaching and achieve their goals.

Second, training teachers to use innovative technologies will help them develop skills in designing and creating quality lessons with the help of these technologies. This includes the ability to select and evaluate relevant and high-quality resources, create interactive tasks and exercises, and adapt material for different types of learning.

In addition, teaching teachers to use innovative technologies serves to develop their competencies in the field of educational technologies. This includes understanding the principles of effective use of technology in teaching, building skills to effectively provide feedback and support to students, and building skills to evaluate and adapt technology to the diverse needs of students.

Teacher training is the key to successful use of innovative technologies in education. It allows teachers to master new tools and programs, develop skills in designing quality lessons, develop competencies in educational technologies, and stay abreast of the latest developments. This, in turn, serves to effectively use technology in the educational process and increases the quality of education in computer science.

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