USE OF INNOVATIVE TECHNOLOGIES IN TEACHING NATURAL SCIENCES

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Abstract:
The article emphasizes that the use of modern technologies is an important factor in improving the quality and efficiency of natural sciences. The article presents opinions on the free use of multimedia-based activities in improving educational efficiency, consolidating knowledge, and forming practical skills and competencies. The application of methods for using innovative technologies in teaching natural sciences, their advantages, and examples are covered in the section of topics based on the methods.

Keywords: Innovation, technology, multimedia, animation, digital educational resource, audio, communication, graphics, video, competence

ИСПОЛЬЗОВАНИЕ ИННОВАЦИОННЫХ ТЕХНОЛОГИЙ В ПРЕПОДАВАНИИ ЕСТЕСТВЕННЫХ НАУК

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Аннотация:
В статье подчеркивается, что использование современных технологий является важным фактором повышения качества и эффективности естественных наук. Были высказаны отзывы о свободном использовании мультимедийного обучения для повышения эффективности обучения, закрепления знаний, развития практических навыков и компетенций. Применение методов использования инновационных технологий в преподавании естественных наук, их преимущества и примеры рассматриваются в разделе тем, основанных на методах.

Ключевые слова: инновации, технологии, мультимедиа, анимация, цифровой образовательный ресурс, аудио, коммуникация, графика, видео, компетентность

Introduction

Many reforms in the education system of our republic are helping to eliminate shortcomings in ensuring communication and continuity between types of education in the field of personnel training. The "Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030", approved by the Decree of the President of the Republic of Uzbekistan No. PF-5847 dated October 8, 2019, sets out specific tasks to introduce digital technologies and modern teaching methods into higher education processes, widely involve young people in scientific activities, combat corruption, increase the share of students studying in engineering and technical education, introduce a credit-module system, and increase the share of practical training in specialized disciplines aimed at improving practical skills in curricula. Today, state policy on personnel training has been characterized by a lack of full consideration of the socio-economic characteristics, needs and demands of regions, and a lack of in-depth study of supply and demand in the labor market, resulting in imbalances in the distribution of personnel across regions.

This is due to the fact that in some regions the need for pedagogical personnel has not been met for years. It is known from the experience of countries with high intellectual potential that if the continuity and connection between science, education and production is firmly established, it will be possible to train qualified personnel in this direction, ensure their employment, and implement structural changes in the country's economy. All links of education should be organized in such a way that it not only provides young people with deep and well-founded knowledge, but also teaches them to have a broad mind.

The need for independent learning in the student during the learning process, the large volume of materials being studied, the variability of the processes being considered, and the introduction of the latest methods in teaching elementary school natural science are the requirements of the present day.

The main essence of innovative pedagogical technologies in education is to interest students in teaching and achieve complete mastery of their knowledge. For this, it is extremely important for the teacher to correctly select teaching methods in natural science lessons in accordance with the topic. If the appropriate method is chosen incorrectly, the joint work of the teacher and the student will be ineffective. Therefore, the selection of teaching methods should be carried out on the basis of certain principles. The use of innovative technologies in teaching natural sciences is very important and effective. This helps students to master science in an interesting, understandable and practical way. Below are some innovative technologies used in teaching natural sciences and their advantages:

The use of innovations in educational processes opens up great opportunities for us. By using innovations in the educational process, we provide students with theoretical knowledge, as well as the opportunity to apply them practically. They not only learn them, but also learn to introduce something new through what they have learned, and learn to add to what we teach them in an additional way.

The main purpose of using innovative technologies in the educational process:
- achieving commonality between teacher and student;
- attracting students to science;
- changing the attitude towards education;
- acquiring the ability to apply the acquired knowledge in social situations;
- harmonizing ICT and didactic materials with the subject, etc.

Our state is also implementing major changes today. Students are being provided with a wide range of opportunities to creatively teach lessons through various interactive methods, pedagogical technologies, and didactic games, using various innovations in school education, and through these tools, topics are easily conveyed to students.

1. Interactive whiteboards and projectors:
• Advantages:
• Visually enriches the lesson.
• Attracts the attention of students.
• Allows for interactive exercises and assignments.
• Data can be edited and changed in real time.
• Examples: Virtually demonstrating experiments, drawing graphs and diagrams, and conducting interactive quizzes.

2. Computers and laptops:
• Advantages:
• Ability to use Internet resources (search for information, read scientific articles, watch video tutorials).
• Understanding complex processes through simulations and modeling programs.
• Analyzing data and creating graphs.
• Performing online tests and assignments.
• Examples: Studying cell structure in 3D format in biology class, modeling reactions in chemistry class, simulating laws of motion in physics class.

3. Virtual and Augmented Reality (VR/AR):

• Advantages:
• Take students into virtual laboratories and replicate real-world experiments.
• Study complex structures (e.g., the human body) in 3D.
• Visualize abstract concepts.
• Create an engaging and immersive learning environment.
• Examples: Take a virtual tour of the solar system in an astronomy class, explore the DNA molecule in 3D in a biology class, and virtually observe a volcanic eruption in a geology class.

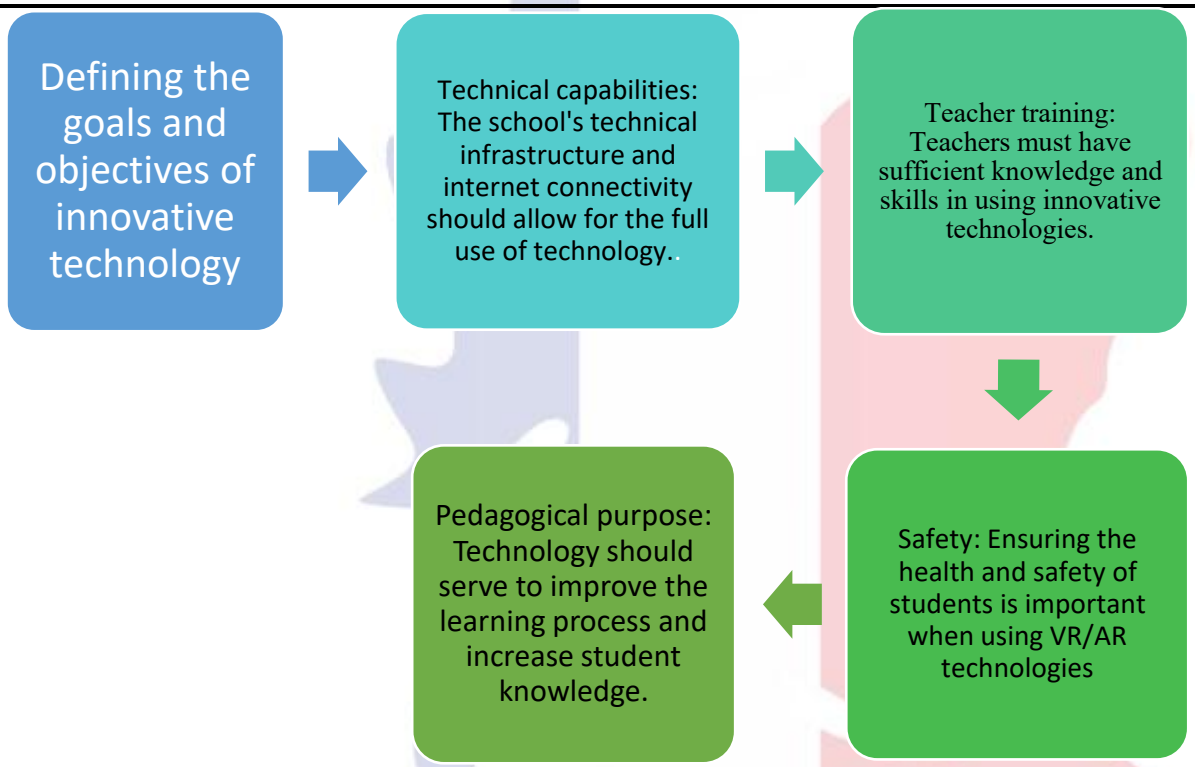
4. Mobile applications:

• Advantages:
• Access to educational materials anytime, anywhere.
• Short and interactive lessons.
• Checking mastery through quizzes, tests and games.
• Getting acquainted with news and information about science.
• Examples: "Anatomy 3D Atlas" for biology, "Periodic Table" for chemistry, "Physics Toolbox Sensor Suite" for physics

5. Drones:

• Advantages:
• Study of the natural environment (ecology, geography).
• Data collection from a high point (cartography, geodesy).
• Monitoring and surveillance work.
• Examples: Measuring air temperature and humidity using drones to study climate change, monitoring vegetation cover.

Things to consider when using innovative technologies:



The methods of using innovative technologies in science lessons are very diverse and vary depending on the type of science, subject and age of students. Below are the most commonly used and effective methods.

These methods make science lessons interesting, effective and modern. The teacher should use his pedagogical skills to choose methods that match the interests and needs of students. It is also important to use technologies purposefully and make them an integral part of the learning process.

Conclusion:

The use of innovative technologies in teaching natural sciences makes the learning process more interesting, effective and practical. This helps students to deeply master the subject and become successful in the future. The important thing is to choose the right technologies and use them purposefully.

The use of innovative technologies opens up great opportunities, but achieving success requires careful planning, caution and constant learning. By focusing on the above aspects, you can maximize the positive impact of innovations and minimize their negative consequences. If a teacher is inquisitive, creative, and knows his subject well, and teaches students through this subject based on innovative ideas based on today's demands, this will make that teacher gain the attention of students and parents. Based on the ideas mentioned above, by instilling a lot of information in students in all lessons, it is possible to increase their interest in learning and their profession. For this, of course, it is necessary to instill more

concepts about modern science-related techniques and technologies in students. The more skilled the teacher is, the more proud he will be of his students' achievements in the future.

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