

Virtual Reality In Training Impact On Students Of Educational Programs In Augmented Reality

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DOI: 10.47750/pnr.2023.14.S02.02

Abstract

Currently, the article is relevant, because virtual reality and augmented reality are our future. This is the latest direction in the use of computers. The article reveals the relationship of a person with the computer world he created, that is, the relationship of the real with the virtual. Technologies, peripheral devices of virtual and augmented reality and their application in various fields are considered. Currently, there is an increasing interest in modern technologies in education, and for a quality learning process, the use of virtual reality technology is considered purposeful.

Already in Azerbaijan, in the field of education, as a pilot project, a "3D" classroom was created, where lessons were held in 6-9 grades in biology, zoology and human beings. With the help of virtual technology - "3D" glasses and a special board, students studied the structure, organs and various information about humans, animals and plants [12].

Should this activity be expanded? Create educational programs in augmented reality? How will classes conducted in the virtual world affect pupils and students?

The article discusses these issues and reveals the significance and prospects for using modern augmented reality technologies for teaching in the school curriculum.

Keywords: augmented virtual reality, virtual reality, "markerless" technology, "marker" technology.

Introduction

A person always strives to imitate with maximum accuracy the reality surrounding him/her in which he lives, to convey his/her feelings, various sounds and images. For example, this is how virtual games were created. Virtual reality depicted in virtual computer games is perceived by many of us as entertainment. But in fact, this is an erroneous statement. After all, if you understand that in virtual reality (VR), if this is a reality, artificially recreated with the help of technical means that affect the human senses (vision, hearing, smell, touch, etc.), then the objects of virtual reality behave close to the behavior of similar objects of material reality. Currently, virtual reality is used in education, medicine, architecture, aviation, military equipment, etc. [5].

Virtual augmented reality technology is our present and future, which allows us to solve many unsolved issues, save people's lives, save expensive equipment, fix problems that have arisen, having gained the necessary knowledge and skills to carry out complex operations in the most inaccessible places on the planet, in outer space, and learn professions associated with dangerous working conditions, with an increased risk to a person, that is, be prepared for extreme life situations.

Using computer technology, you can create a world in the world [1,2,5]

The purpose of the article: to reveal the development of VR application development in education, where students can acquire knowledge and share this information with others. Show the significance and prospects of using modern augmented reality technologies for teaching in the school curriculum.

Virtual and augmented reality

Virtual reality, therefore, is a human-created three-dimensional environment using computer technology, where images differ depending on the application of virtual reality: augmented (AR) or mixed (MR). This is a world where real objects interact with objects of the virtual world [1], in other words, it is an “artificial real or fantasy environment” felt by a person through a computer using video and sounds.

Augmented reality is the interaction of a person and a computer. It combines two independent spaces: the world around us, that is the real objects, and the world recreated on a computer i.e., virtual [1].

By accepting our reality and changing it by superimposing programmed virtual objects on top of the video signal from the camera, a new virtual environment is formed, which, through the use of special markers, becomes interactive.

Augmented reality technology is software where special mathematical algorithms connect the camera, tags and computer into a single interactive system. The camera in the surrounding space, using mathematical algorithms, recognizes and determines the mark and combines it with the virtual model. Thus, the virtual object repeats any movement of the real mark. The “eyes” of this system are the camera, and the “hands” are the markers, that is, the real world recognized by the camera is “transferred” into the virtual environment, superimposing one layer of reality on another and creating an augmented reality world. That is, to put it simply, the position of the real mark is determined from the image taken with the camera.

The recognition process takes place in the following steps.

1. Pictures are taken from the camera.
2. Spots are recognized on each frame using a program to search for a given pattern – the mark frame.
3. The image inside the frame is determined.
4. A virtual 3D model is built in the two-dimensional coordinate system of the camera image.
5. Attached to the label and as a result the movement of the label in real space also moves the virtual 3D model, which exactly follows the label.

Augmented Reality Technologies

There are "markerless", "marker" and "spatial" augmented reality technologies. Each technology has its own advantages and disadvantages [6].

1. "Markerless" technology. The advantage of this technology is that the real-world object markers are the objects themselves, since the landscape captured by the camera is divided into a virtual "grid" and reference points are found using a software algorithm. This is how the exact locations of the virtual model are determined.

2. Marker technology. The advantage of this technology is that it works without failures and therefore is more reliable than the "markerless" technology. Since the recognition of marks or markers by the camera is simple, and the binding to the place of the virtual model is more rigid.

3. "Spatial" technology. This technology uses data built into a mobile phone, such as – GPS / GLONASS, gyroscope and compass. Thus, with the help of spatial coordinates, the location of the virtual object is determined, and the activation of the program occurs only after the coordinates embedded in the program and the coordinates of the user match. The components necessary for working with augmented reality technology are the following: – computer, that is, a graphic station;

- display;
- a camera to get a "cast" of the real world;
- labels, or markers;
- software that superimposes virtual objects on a "cast" of the real world.

Virtual reality technologies lift the veil of human capabilities, influence the industry and thus improve the quality of our lives. Virtual reality technologies have an impact on the development of certain industries, areas of research and development, affect various aspects of society.

Application of virtual reality technology

Putting into practice new ideas and approaches, creating simulators and simulators virtual reality solves problems in the military industry, astronautics, medicine and other areas. Using virtual reality technologies in teaching professions associated with dangerous working conditions, with an increased risk to human health, or at high cost, you can get the necessary skills and knowledge through training. At the same time, in virtual augmented reality, you need to be prepared for extreme cases of life.

Application of virtual reality technology in the military industry.

The US military uses virtual and augmented reality technologies to train military personnel and to train newcomers and form primary skills, as well as to maintain the qualifications of experienced specialists.

In 2012, the United States officially approved a program for the use of VR and AR equipment for training military pilots, driver mechanics, sailors, doctors and ordinary soldiers. [7]

With the help of simulation of hostilities, practicing first aid in extreme conditions personnel in conditions as close to real as possible acquires the necessary skills. Simulators for developing equipment maintenance skills – for training pilots, allow you to control it without sending the aircraft into the air, learn by making mistakes in augmented reality. Simulators for the training of ground forces for basic training of recruits – stationary shooting simulators for practicing shooting skills from different types of weapons (virtual shooting ranges), simulators for parachuting, as well as many other virtual devices and equipment can reduce the cost of maintaining and repairing military equipment, save the health and life of military personnel, reducing the risk of errors in real situations.

For example, the Marine Tactical virtual environment Decision Kit, for the passage of the military simulation of combat operations exactly repeats the combat zone; tactical augmented reality system Tactical Augmented Reality, created in the USA – highlights targets, displays the location of the fighter on the map, shows the distance to the target, displays hints; a helmet designed for sailors – gunners – GunnAR, also developed by the research and development department of the US Navy – helps to aim, adjust the aiming, display data on the amount of ammunition in the clip and in stock, broadcast commander's orders; exoskeleton – simulating injuries, allowing you to feel a semblance of discomfort and pain, etc.

Application of virtual reality technology in medicine [11].

In medicine, virtual reality technologies are used to prepare and conduct operations. To do this, with the help of computer and magnetic resonance imaging, three-dimensional data are obtained, and patient models are created, and operations are performed in virtual reality. Thus, doctors prepare for all kinds of problems by taking into account all the risks and fatalities. For example, the “Hands of God” technology system created in 2013 by Italian scientists, designed to be implemented on spacecraft, is used by doctors to train interns and control operations.

Simulators, virtual reality simulators increase the confidence of patients after a stroke and injuries in their abilities, also contribute to the processes of accelerating the recovery of the body and relieve pain. Helmets or virtual reality glasses can partially or completely restore limb mobility in people with problems.

Currently, methods and procedures are being tested using virtual reality technologies to reduce pain, damage to the nervous system and mental disorders, as well as to combat phobias and post-war syndrome, to check visual acuity, to help the blind and impaired movement orientation, poorly walking, for diagnosing diseases and simulating various conditions and diseases, for aesthetic medicine, etc.

Thanks to virtual reality technologies, it is possible to better understand the feelings of patients, their pain, and reactions in various situations, to see possible changes in appearance, also patients suffering from a phobia, feeling virtual disturbing moments, or touching objects of their fear, can get rid of their ailments.

Application of virtual reality technology in astronautics

Currently, virtual reality is also used in astronautics. To become a qualified astronaut, the NASA Space Agency partnered with Epic Games to build a simulator of working on the International Space Station, with which candidates undergo a two-year intensive training. As a result, candidates get used to the technical environment of the ISS and transport ships, providing emergency medical assistance to each other in conditions close to weightlessness. In this way, future astronauts improve their skills in a convincing simulation.

Created by Italian scientists in 2013, the Hands of God technology using glasses allows you to track the movements, guide and correct the astronaut's hands, pointing out and correcting the astronauts' mistakes and manipulations along the way. The

system is now effectively used by specialists from the earth's flight control station to provide assistance in emergency situations – in surgical operations, in case of failure of complex electronics, for welding in outer space.

Applications of virtual reality technology in education [2].

In order to become a qualified specialist in any field, it is advisable to start training for the chosen craft from an early age. After all, the dream of every parent in the future is to see in their child a worthy citizen, a true patriot, an intelligent, enlightened person. Undoubtedly, for this one upbringing received in the family is not enough, and therefore, the child needs to arouse interest in learning and knowledge, create an environment where he would strive for this himself, and not under duress. As we notice, almost all children, even adults, are very interested in virtual games. Therefore, it would be better to use this interest of children and youth in the direction of learning and create virtual learning programs for schools and universities.

The first steps in this direction have already been taken. The work of Selivanov V. V. and Selivanova L. N. of the Smolensk State University "Virtual Reality as a Method and Means of Education" reveals the positive and negative effects of virtual augmented reality in education. The paper presents experimental training programs in virtual reality as a special information environment, in three dimensions, where there is animation and image changes in real time and the experience of the effect of presence and their influence on the thinking and psychological states of the individual is traced [3].

The results of the study were as follows: training programs in VR improve answers on tests on relevant topics by 40–50% for poorly performing students, and for excellent and talented students by 2 or more times (100%). The following conclusions were obtained.

1. Training programs created in VR form specific cognitive motivations, interests in learning and creating positive, harmonious mental states.
2. They have a wide opportunity to perform actions with objects, the effect of presence, the interactivity of the situation, the implementation of visualization of abstract models, etc.
3. VR, used in education, acts as a method, means and technology of learning.

But at the same time, the negative aspects of the use of VR in education are also manifested: a) virtual learning programs do not completely replace teaching in educational institutions.
b) it is more expedient to use them when studying the most complex topics of various subjects
d) use for training professional skills in various activities.

Even despite certain shortcomings, the following conclusions can be drawn: a virtual training program is necessary. This program should be comprehensively assembled from school subjects. With this program, students will be able to get information about each subject in a virtual augmented environment.

In specially created virtual classrooms equipped with computers and glasses, they will be able to study the surface and deep layers of the Earth, its natural resources, fossils, the location of the ocean and continents, seas and rivers, deserts and jungles, countries, about different plants, animals, their habitat, evolution, about microscopic living organisms, about the mother and its structure, movement and rules of transformation, about substances and their compositions and structures, about the elements of their properties and transformation, and much more.

This program is safe because without risk to the life and health of students, you can carry out any chemical reactions, trace compounds, elements and changes in structural relationships, visit space, deep in the ocean, underground, study dangerous animals and plants, visit different countries, even participate in historical battles and battles without leaving the classroom.

But at the same time, one should not forget about the negative impact of virtual reality on a person. Despite the fact that during the experiments conducted by V. V. Selivanov and L. N. Selivanova, this fact was not indicated – “Is it possible to use VR in pedagogy, in particular, in didactics? Up to now we do not exactly know all the systematic developments in this area. The publications that exist are of a review, theoretical nature, in which, a priori, the possibility of using VR technologies in education is recognized as an advise” [3].

Let's look at the differences regarding the altered states of consciousness and the state of the basis of VR. A.E. Voiskunsky showed that being in VR, unlike ASC (caused by hypnosis, chemicals, etc.), does not cause inadequacy of thinking, does not reduce the degree of reflection, is not characterized by the presence of a feeling of duality, “alienation of one's own Self”, “exit from the body”, “separation of body and soul”, does not lead to the loss of arbitrariness and purposefulness of activity, does not provide a feeling of fictitious acquisition of an interlocutor, a sense of the presence of an “other”, “higher mind”, “cosmic informational will”. These and other features of VR testify to its advantages of being able to be used in education, skills training, and other areas, starting from primary school age [4].

But despite the above statements, it is possible to point out certain points referring to various sources [4, 8, 9, 10]:

- no need to get carried away and no need to create a world with a “full immersion effect” in virtual reality. The child is still small, and he may lose his sense of reality. He may have symptoms – dizziness, nausea, headache, which are caused by stress hormones produced by the body. Since the virtual experience is very different from the real one, and creating textbooks, you need to take this into account.
- computerized learning is a virtual reality, the basis of which is the achievement of "over-stimulation" of the human senses. But at the same time, it is necessary to take into account the methods of interaction between the teacher and the student. That is, creating virtual classes, we need to combine traditional teaching methods with modern ones:
- explore the way of interaction between the teacher and the student and their actions. – take into account the content of education – explore the way to learn the material.

Conclusion

Is it possible to use virtual reality in the learning process? Is there currently a need to study virtual reality technologies? Given the increased interest in modern technologies for a quality learning process, these questions can be answered unambiguously positively. But at the same time, not forgetting about its negative influences and considering them.

Virtual augmented reality in education is our future. Indeed, participating in childhood and adolescence, a person in a virtual augmented world in wars or in hostilities, having directly virtually come into contact with poverty and disease, becoming a virtual spectator of the consequences of the use of a nuclear bomb, the Chernobyl accident, he will certainly have feelings of mercy, a desire to help, protect, most the main thing is to fight for peace. Seen earthquakes, floods, fires, cataclysms will lead to the idea of how to effectively create more sustainable structures, structures, buildings. He also learns, without fear, without risk to health and life, to put various experiments and reactions and learn from his mistakes. Also get a lot of information, visit different countries, descend like Jules Verne's heroes into the bowels of the Earth, into the depths of the ocean, fly into space, travel around the world not in 80 days, but in 80 seconds.

The future generation can take part in the first and second world wars not by hearsay and not from textbooks, but with their own eyes they can see all the horror that occurs during the conduct of hostilities.

Using virtual reality to create a curriculum, we can teach our children from an early age to mercy, to analysis, to the desire to create and create, the pursuit of knowledge, readiness for extreme cases, and prevention of fatal outcomes.

The virtual augmented reality curriculum is our future, but a future where you need to live a real and full life, gain knowledge, and create, without completely immersing yourself in it.

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