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Research Article

VIRTUAL REALITY IN HIGHER EDUCATION FEATURES

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ABSTRACT

At the beginning of the article, a brief overview of the technologies is given, basic definitions are given, and the technical part is described. The following discusses existing experience in using these technologies: applications, organizations and research. Recommendations are given for implementation in the higher education system of our country. In addition, the influence of virtual reality on human health was also studied, and a number of conclusions were drawn.

KEYWORDS

Virtual reality, Virtual Reality, Amended Reality, Mixed Reality, information.

INTRODUCTION

Learning using virtual reality allows you to visually conduct lectures and seminars, conduct trainings and show students all sides of a real object or process, which in general has a huge effect, improves the quality and speed of educational processes and reduces their cost. Virtual reality technologies make it possible to take full advantage of the fact that a person receives 80% of information from the outside world through vision, while a person remembers 20% of what they see, 40% of what they see and hear, and 70% of what they hear, what they see, hear and they do [1].

Currently, there are several variants of virtual reality systems:

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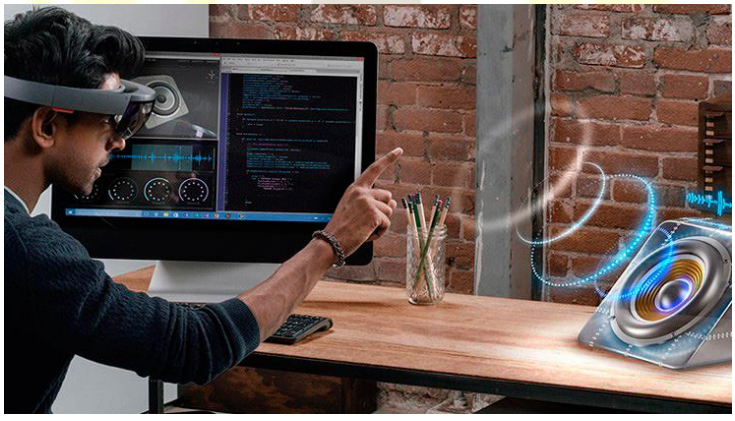
- conventional (classical) virtual reality (Virtual Reality – VR), where the user interacts with the virtual world that exists only inside the computer;
- Augmented or computer reality (Amended Reality – AR), where computer-generated information is superimposed over images of the real world ;
- Mixed Reality (MR), where the virtual world is connected to the real one and includes it.

Virtual technologies have appeared on the educational market quite recently and they have been developing rapidly. Developers are headed by many computer giants, the terminology in this area is still preserved. Publications and advertising brochures today most often mention three basic technologies — VR, AR and MR. VR headsets and headsets present the user with a computer-simulated world. This world, as a rule, is not connected with what surrounds the user during his work with the VR system. This technology is widely used in computer games. VR allows the user to fully immerse themselves in the computer world, and this is its main advantage [2].

Of particular importance is training using virtual reality technologies for teaching professions where the operation of real devices and mechanisms is associated with increased risk or is associated with high costs: an airplane pilot, a train driver, a dispatcher, as well as the process of learning to drive in driving schools, etc. Here, special attention should be paid to the quality of the visualization system, since the picture should be absolutely reliable. Virtual reality is also of great importance when teaching such a complex and unique specialty as an astronaut. To train astronauts, simulators with virtual reality simulators can be used, which are already planned to be implemented at the Russian Cosmonaut Training Center [3]. It can be superimposed on the image of a real object in a mixed virtual-real world (Fig. 1).



Picture 1. Imposition of information about sound waves onto a sound column using MR

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The rapid development of technology could not but affect the educational process. And although VR (virtual reality) technologies are no longer something new, they have been used in education relatively recently. In this article we want to analyze in detail one of the areas of VR application, namely VR in education. There are several reasons for the spread of virtual reality technologies in the field of education [4]:

- Reduction of the price of technical equipment. Over the past few years, prices for modern VR devices designed for home and professional use have significantly decreased, making them more affordable.
- Rapid growth in the number of software for VR. To date, there are already several thousand of the most diverse applications for VR and their number is increasing every day.
- The growth of investments in VR – more than $ 2.5 billion per year. This figure has been growing steadily since 2012 and, apparently, does not plan to significantly stop its growth in the near future.
- An increase in the number of large companies working in the field of VR. There are already more than 300 of them on the European market, and giants such as Oculus, HTC, Sony, Microsoft, Samsung and many others have been implementing their technologies in this area for a long time.
- Implementation of VR technologies in a number of areas: oil and gas industry, mechanical engineering, energy, metallurgy, telecommunications, advertising and much more. Virtual reality has long ceased to be just a game story and is actively being introduced into all spheres of human activity.
- Through the use of VR, students and students will have the opportunity to interact with various subjects, immerse themselves in the digital world, or take part in invaluable events in the history of mankind.

If we talk about the application in education, then for virtual reality it is the study of nature [5, 6], conducting laboratory work in physics [7], studying dinosaurs [8], traveling to planets [9], astronomy [10], and much more. For AR, this is the study of anatomy [11], chemistry [12, 13] and astronomy [14, 15].

There are a number of problems and each of them is based on the peculiarities of human perception of the surrounding reality. One of the most unpleasant effects that occur when using virtual reality glasses is motion sickness. The same applies to almost all aspects of human body behavior. In virtual reality glasses, we see an area right in front of us, and at the moment when a person looks at the horizon, the lens focuses in a specific way. Focusing separately also raises questions, because in helmets sharpness occurs where it is necessary to look according to how it was provided by the developers. In life, sharpness is where we look ourselves. There are several other important factors.

- The high cost of developing programs for VR. This process requires a lot of time, effort and investment.

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- Possible difficulties in adapting to virtual reality. Not all people perceive VR in the same way.
- So far, VR is being implemented at the experimental level. In order to make technology a full-fledged part of the educational process, it is necessary to work cardinally on training programs in schools and universities.

CONCLUSIONS

Despite the psychophysiological problems that arise in the process of using VR and AR technologies, the growth of investments in this area remains explosive. This is caused by a lot of reports from a number of scientists and marketers, whose opinion is respected in society.

Today, education is considered one of the most promising areas for the development and implementation of virtual reality technologies. The idea of using virtual reality for the purpose of learning is far from new, and VR technologies have long been used from virtual excursions to other lessons.

Thus, students will be able to immerse themselves in virtual reality and learn a lot of new things and try it virtually for themselves.

Outdated teaching methods such as information stands, slates and interactive whiteboards, layouts, plaques, etc., in our modern world are boring, uninteresting and beloved manuals. However, if teachers used virtual reality, then a student could see a detailed picture with complete information about the subject/time being studied, which in turn would allow him to study the topic in more detail and better. As a result, knowledge would be remembered better, and education would become more effective.

Students do not learn and do not remember everything that a teacher or teacher gives them during lessons, lectures or seminars. With the help of virtual reality, students will be able to learn using their senses, such as hearing, sight and touch. As a result, virtual reality is one of the most effective tools for teaching natural, humanitarian, social, technical, applied sciences in schools and universities, since it is an innovative way of learning. This method uses technological elements and adapts to different styles of teaching students. Students learn information much better and faster if they enter a 3D environment that makes everything more fun, exciting and enjoyable. Virtual reality allows you to explore, travel without leaving the classroom, attend what the student wants to learn without moving, have a great professional orientation and much more.

Thus, we can say that virtual reality technologies can be present in the educational process. Even if this technology is not so developed yet, and its technologies have not yet been finalized, but now it can be successfully used. The introduction of information technologies in the field of education allows us to qualitatively change the content, methods and forms of education, make it more interesting and effective.

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