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Virtual Reality in Education (On the Example of Applications)

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Abstract: Virtual reality is an interactive three-dimensional artificial world, immersion in which creates the illusion of reality for the user. It not only affects the human senses, but also itself reacts to its movements and actions. Initially, a new discovery in the world of information technology was used exclusively for entertainment purposes: virtual reality glasses and helmets were created, allowing you to plunge into your favorite game with a head and feel like the main character. However, over time, virtual reality began to conquer other areas of human life: medicine, architecture, cinema, art, education, etc. This article describes how virtual reality can be incorporated into the educational process and how it can affect students' mastery of the material, identifies the pros and cons of using this technology when learning, and also examines modern VR devices and educational programs.

Keywords: VR-technologies, educational process, visibility, involvement, high cost of equipment, distance education, self-education

The creation of virtual reality is a big step in the development of information technology. However, no one will argue that any discovery in the IT world always somehow affects other spheres of human activity [1]. In particular, it has a huge impact on education, which is not surprising: it is impossible to prepare a person for life in a rapidly developing world if he has never encountered modern technologies during his entire time at school and higher education. Moreover, the use of new technologies will definitely attract more attention to the learning process and will allow you to more clearly familiarize yourself with the lesson material. Now virtual reality is not being actively introduced into the field of education. Firstly, the cost of high-quality equipment is quite high, so not every school or any other educational institution can afford to buy a virtual reality device. Secondly, it is not yet clear to everyone how to naturally introduce this technology into the learning process and what enormous benefits it will bring. Despite all these difficulties, virtual reality will definitely become part of the educational process in educational institutions. After all, once presentations and interactive testing were not actively used in schools and universities, and now it is impossible to imagine classes without these components [2]. The purpose of the study. It is necessary to outline ways of introducing virtual reality into education, to indicate how this may affect the learning process, as well as to consider popular virtual reality devices and educational programs.

Materials and methods of research Virtual technologies perfectly cooperate with the transfer of empirical material. It is quite possible to dilute the usual lecture explanation of the material with a 5-7 minute immersion in the virtual world. The lecture does not lose its function as a structure-forming element, but the lesson becomes more modernized. In addition, students are more involved in the learning process, the material becomes more visual and understandable with the right approach [3]. VR technologies allow using a distance learning approach. Even if a student and a teacher are separated by kilometers, they will be able to meet in a virtual classroom. This will eliminate the boundaries and difficulties that arise when learning through videoconferencing [4]. If a student cannot attend classes for some reason, virtual technologies will be able to allow him to attend a lesson remotely. The opportunity to observe what is happening in the classroom, right from your seat, to see other students present in person and remotely, to communicate with the teacher will be easily provided. To do this, you will need a camera to shoot video in 360-degree format and the ability to broadcast video in real time [5]. The introduction of virtual reality into the educational process has a huge number of advantages, namely:

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• high degree of visibility: this technology will allow you to demonstrate in detail any phenomena and objects;
• engagement: in addition to detailed consideration of the artificial model, students have the opportunity to be involved in interaction with virtual reality and its components;
• practice: getting theoretical knowledge is very important, but conducting an operation or a complex experience inside a virtual reality without fear for your life will give useful practical skills that will definitely be useful in the future;
• focusing: if a student is inside a virtual reality, another world ceases to exist for him and no external stimuli will be able to distract him from the learning process, which will positively affect the assimilation of the material;
• distance learning: virtual technology allows you to make the process of distance learning as pleasant and convenient as possible for the teacher and students.
Despite all the advantages that virtual reality gives in teaching, there are some difficulties associated with the introduction of this technology into the educational process:
• cost: buying high-quality equipment for the whole school or for any other educational institution requires huge costs;
• functionality: unfortunately, so far many virtual reality educational applications are not so high-quality, but they are designed to be implemented everywhere in the classroom, it takes time for at least a partial transition to VR technologies instead of the more familiar approaches in teaching.
Buying equipment for an entire school costs a lot, but an individual family can purchase a virtual reality device if desired. By downloading educational applications that can be easily found in online maga- zines (for example, Steam, Oculus Store, App Store, Google Play Market), the owner of the coveted equipment will be able to engage in self-education. After we have figured out how the use of virtual reality for educational purposes can positively affect the assimilation of material, we can turn to the most popular virtual reality devices and discuss their functionality. The Samsung Gear VR virtual Reality glasses are powered by a Samsung smartphone. The microUSB interface allows you to connect the phone to the helmet body with lenses. Obviously, the image quality will depend on which smartphone is connected to the helmet. You can control the process using the built-in buttons or joysticks and touchpads, which, unfortunately, need to be purchased. Controllers may also be needed in order for some applications to become available. The main disadvantage that can be identified with this device is the strong heating of the phone when using virtual reality glasses. In any case, for a superficial acquaintance with the technology of the virtual world, Samsung Gear VR glasses are quite suitable. The following virtual reality glasses act as analogues: Carl Zeiss VR One, Avegant Glyph, Archos VR Headset, Deepoon E2. All of them also have their advantages and disadvantages, but we will not focus our attention on each of them in detail.
На примере некоторых образовательных программ предлагаю выяснить, какие возможности могут предоставить приложения виртуальной реальности [4]:
1. Google Earth VR allows you to see countries and cities, visit the main attractions and wonders of the world and even travel into space;
2. 3D Organon VR Anatomy makes it possible to study human anatomy and fully explore the human body;
3. My Way VR offers a journey across continents, countries and cities; 4. Apollo 11 VR demonstrates the first human flight to the moon, while you can either act as a passive observer, or take flight control into your own hands;
5. The VR Museum of Fine Art offers to walk through the virtual museum and see all the famous sculptures and paintings;
6. Titanic VR allows you to take on the role of associate Professor of archaeology Ethan Lynch and explore the bottom of the North Atlantic;
7. InMind 2 VR allows you to take part in the process of growing up of one teenager, shaping his future and causing various emotions and key moments of life;
8. Labster makes it possible to conduct scientific experiments inside a virtual laboratory;

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9. MEL Chemistry VR is a structured collection of interactive chemistry lessons. Despite the fact that the applications considered are considered the best and there are other educational programs, it can be concluded that there is a small amount of training material. This can be explained by the fact that educational institutions do not actively implement VR technologies in the classroom [5]. The owners of the coveted equipment are more interested in entertainment content, and hence the small demand for educational applications. The results of the study and their discussion Virtual reality can easily help to make classes more interesting and the material clearer: for this, it is enough to dilute ordinary lecture lessons with small dives into the virtual world. Students will be involved in the learning process, will be able to try out complex operations and experiments in practice, examine in detail the structure of the human body, walk around the virtual museum and much more. The main difficulty that educational institutions face when considering the idea of using VR technologies in the classroom is the cost of equipment. Now distance education is not so widespread, because if the students themselves are not interested in getting an education, the teacher really needs to try to attract the attention of students. With the introduction of virtual reality technologies, the learning process would be pleasant for both the student and the teacher. Mixed learning, in which part of the class is present full–time, and the other - remotely, would allow students who do not have the opportunity to attend the lesson full-time, still see everything that happens in the classroom from the first person using VR technologies. Even now, you can find high-quality equipment for immersion in virtual worlds on the market, and all kinds of online services allow you to purchase various applications and games for entertainment and educational purposes.

Conclusions. There is an active development of high-quality virtual reality devices and educational applications, but educational institutions have not yet begun to introduce VR technologies everywhere in the classroom, which is primarily due to the high cost of equipment. That is why, so far, the active use of this technology in the classroom seems to be something fantastic. However, after overcoming the financial barrier, schools will be able to begin the gradual introduction of VR technologies, while generating demand for high-quality training programs.

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