INTERACTIVE VIRTUAL 3D REALITY AND ARGUMENTS IN THE BENEFIT OF ITS APPLICATION IN EDUCATION

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ABSTRACT

The article gives a brief description of the history of the formation of interactive 3D virtual reality systems and their diverse use abroad both in various business companies and in educational institutions. A statistical analysis of the target audience. A description of the features of such systems is given.

Keywords: 3D virtual reality systems, electronic learning tools, multimedia technologies, interactive electronic learning tools.

INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

Interactive virtual 3D reality technology was born on the basis of the computer games industry. The basis for these games is the concept of "game engine." The term "game engines" appeared in 1990, although attempts were made to standardize the program code of the game kernel back in the 1980s.

Later, an approach based on specialized engines was applied to the development of all popular computer games, first for specialized game consoles, and then for IBM-compatible computers with various operating systems, such as Linux, MacOS, Microsoft Windows.

The format of this article does not allow a full excursion into the history of the development of computer games. However, it should be noted that many years of software development to support the creation of games on various hardware bases and computers running various operating systems and specialized game and television consoles, tablet computers, mobile phones and others have accumulated significant financial resources and intellectual potential of the world's leading programmers. Ultimately, this led to the creation of an entire industry, the business volume of which is almost three times higher than the GDP of Latvia, and more than the GDP of countries such as Croatia, Serbia, Lithuania.

It should be noted that almost half of Russians between the ages of 18 and 30 are constantly playing computer games and, of course, the target audience of the national higher school and the education sector as a whole is no exception to these statistics. Taking into account the fact that 81% of Russians between the ages of 18 and 30 go to the Internet every day, we can confidently assume that among students in higher education there is a significant proportion of representatives who are used to the infrastructure and principles of functioning of computer games.

Attempts to bring these developments to the learning process have been made repeatedly, mainly it was about children of primary and secondary school age. However, they did not try to introduce elements of the computer-gaming infrastructure for older students mainly because

of the difference in behavioral models when they participated in the learning process and in the process of a computer game.

The locomotive of a breakthrough in this area was the corporate business of America and England. LindenLab was the first company in 2003 to build on the basis of the game engine something capable of solving tasks other than computer games, but in a similar space. LindenLab was the first company in 2003 to build on the basis of the game engine something capable of solving tasks other than computer games, but in a similar space.

This is a kind of virtual environment created on the basis of developments in computer games, with painted streets, houses, rooms and elements of nature, including trees, grass, etc. Each participant logs in from his personal computer and receives an "avatar" - his own virtual display in this world. He can correct this "avatar", changing the appearance, elements of clothing, forming a traditional look for his environment. "Avatar" under the control of a personal computer can move through this virtual space and interact with it. He can communicate with other participants both in text form and through audio and video communications. Also, the participant can interact with additional elements, such as a pointer, a chair, a table, a screen, a printer, etc. He can raise his hand, stand up, sit down, go up and sit down at his desk, i.e. he can do everything that is usually done in educational institutions. And, of course, other participants present in this virtual space can interact with all these objects. For example, one "avatar", using a pointer, can highlight some content on the screen and all other participants present in this place of the virtual space will be able to see this selection. Further, if another "avatar" asks a question on this selection, then all other participants will also hear the question. In other words, in fact, this technology allows you to "get together" and interact with people who are hundreds and thousands of kilometers apart from each other as if they are in the same room.

Returning to the SecondLife project, it should be noted that this is not a specialized learning environment, although Harvard and Oxford universities have successfully used this system for these purposes. IBM and Oracle use SecondLife to train remote employees and conduct meetings. A similar virtual environment was created by the Open-source community based on the developments of SecondLife and LMS (LearningManagementSystem) Moodle. The new environment is called Sloodle. This environment was created specifically for training and, perhaps, it is it (given the status of Open-Source) that should be considered as the basis for creating similar projects in Uzbekistan. specialized elements and functions, for example, the laser pointer mentioned above, a printer for transmitting documents, the "Lecturer" mode for muting students, blocked areas of the premises that prohibit the unauthorized lecturer from leaving the board, blocking the entrance to the virtual audience after the beginning of the lecture, forced disconnection of the participant in case of his inappropriate behavior.

Abroad, such systems are presented by the commercial project Web. Alive, which is positioned specifically for training purposes, but in the corporate business sector. For example, the AvayaLearning training campus was built on the basis of the project.

At the moment, dozens of educational institutions from America, Europe, Asia, Australia are already using a virtual 3D environment for educational purposes. Such 3D virtual worlds based on game computer engines impress students and allow them to feel comfortable for the 18–25 generation, who are familiar with similar environments based on their hobby for computer games.

For example, the real experience of implementing such systems in Russia made it possible to open a separate 3D modeling faculty at the university, which immediately found its listeners.

So, why was this technology able to find its place in the learning process around the world?

The most effective and promising areas and applications of 3D technology in the Republic of Uzbekistan at the current moment are architecture, medicine and education.

Applications of 3D technology in construction.
In recent years, the Republic of Uzbekistan will introduce work on the development of housing and communal services and improvement of villages in accordance with the "Well done the village"program. The main advantages of using 3D technology in construction are:

Saving. When using 3D technology, there is a decrease in human labor, construction time and material consumption.

Environmental friendliness. The amount of harmful waste from construction in this case is minimized.

Quality. The program embedded in the 3D printer reduces the number of miscalculations, and also eliminates the human factor.

Opportunities. Using 3D printing, you can bring to life any geometric solution.
In the area of education, the President's decree was adopted on measures to further develop the higher education system. "

According to the document, a comprehensive measures program for 2017-2021 is planned to strengthen the infrastructure of research institutions and the development of innovative activities. To this end, the government implements more than 40 events in 6 areas of development of the field of science and innovation.

The mass distribution of 3D printing in the field of science has not yet been observed, but soon it will become a reality and will show its literally limitless potential. Using this technology, they are already creating copies of archaeological exhibitors, and complex geometric forms, and even medical prostheses.3D printing opens up promising prospects for science, which will help to make more than one revolutionary invention and discovery.

Using 3D technology, teachers and teachers get a powerful tool to accelerate the understanding of complex concepts and principles by students. Three-dimensional modeling makes it possible to systematize large amounts of information and translate them into a more convenient and visual form.

Students more willingly and with genuine interest master knowledge in a new specialty, because a person is curious by nature. The use of new technologies increases the motivation for learning. 3D printing is available for people of all ages:

- junior and high school students get acquainted with technology, learning the basics in the game mode;
- high school students and students receive the basics of modern professions in high-tech industries, realize their creative potential, and develop engineering thinking.

The products obtained during three-dimensional printing can be felt, evaluated, worked on errors, understood what was done correctly, and what part of the project needs to be adjusted. Design students, designers, architects and engineers in practice see the prototypes of their developments, can conduct their tests. Historians and archaeologists create objects and artifacts, reconstruct historical events and places using 3D printing.

In medicine, using a 3D printer, you can create layouts for training. You can only imagine how much easier it was to create prostheses for people in need, before you needed to have several hundred thousand dollars to order a prosthesis. Thanks to 3D printing, you can create an ideal prosthesis for a patient for $ 50 in a few days. With the help of printers, today specialists create exact copies of human organs, in the future it will become possible to manufacture real organs for implantation to patients, this will help save thousands of lives. In the meantime, with the help of voluminous layouts, specialists can hone their skills before conducting serious operations.

More than 55% of Uzbek schoolchildren and students have modern high-tech "gadgets": computers, tablets, mobile phones with round-the-clock Internet access. Could the education system be left out? - The answer is obvious. In the educational process, multimedia equipment and telecommunication technologies are now widely used. At the same time, the high speed of technology development and, accordingly, the short life cycle of equipment pose new challenges for education in the struggle to attract and retain students' attention to the learning process. 3D technology is a modern trend in educational technologies that meets all the requirements and has great potential.

3D technologies in education make it possible to diversify lessons and lectures, make the educational process effective and visually voluminous. The use of 3D content in the classroom makes it possible to visually explain the school curriculum to students, promotes "immersion" in the subject of the subject studied during the lesson, and allows you to move from the whole structure to its individual elements, from complex to simple and vice versa. Interactive educational content for secondary school education consists of a combination of tests, 3D-video, modeling, virtual laboratories, interactive tasks, games, as well as texts, images and hyperlinks. Benefits of using 3D technology:

- Equips teachers with high-quality teaching materials, thus saving time on explaining complex concepts.
- Visualizing the “complex” topics of the school curriculum helps students better understand the material being studied.
- The inclusion of 3D (three-dimensional models) of processes and objects in traditional methods of training introduces innovation into the “routine” learning process, increases the motivation for learning.
- Facilitates the systematization of knowledge.
- Promotes the assimilation of more information, which positively affects the results of tests and exams.

3D users have the opportunity to study in detail both the external and internal characteristics of stereoscopic models, in addition, it is possible to travel through the nervous or digestive systems, separate the muscles in layers or penetrate into the cell, remove the outer shells for a detailed study of the insides of the object, and also set own labels on separate parts for a deeper understanding of the object. Interactivity is an important teaching method, since biological objects are very difficult to visualize.

Interactive 3D virtual reality systems have the following features, some of which are not typical of other distance learning technologies:

– participants in the educational process can be anywhere in the world;
– the teacher can demonstrate multimedia teaching materials from his computer, including streaming sound and video broadcast from a microphone or video camera;
– there is an opportunity to focus on a particular subject;
– the software allows you to control the presence of students in the learning process and their condition. For example, it is possible to control the student's attention on the subject of instruction, and if the student is distracted, then draw his attention again;
– the teacher can manage the interactive interaction between students by controlling the audio channel and the ability to selectively connect or, if required, disconnect individual participants in the educational process;
– there is the possibility of presenting content on multiple screens, and the student can independently choose which type of content is more convenient for him to use;
– it is possible to transfer content to students;
– it is also possible to connect external participants to the audio channel through classic telephone systems;
– the teacher is able to communicate both with a group of students and with an individual student personally.

The most important point that distinguishes this type of training system from other types of training is the factor of visualization of the presence of all participants - both the teacher and students. All the same as in ordinary life, are present in the audience, can sit, walk, talk, go to a neighboring audience, etc., but all this is virtual. It does not matter where the participants are located geographically, the main thing is that the telecommunication channels ensure the proper quality of communication.

It should be noted that the technology of interactive 3D virtual reality does not imply the provision of administrative functions, organization of feedback, etc. These functions are implemented by LMS (LearningManagementSystem) systems, in cooperation with which the discussed technologies can be used.

Comparing this environment with other "classical" distance learning systems, we can distinguish several functions inherent only to these virtual systems.

The first is the effect of collective presence. When there are several "avatars" in the room, it is still felt more personally than the presence of these people at webinars in classical training systems such as Webex, Scopia, Uconnect, etc.

Secondly, there are several simultaneous content channels. Usually in the classical webinar system there is only one channel, for example, a lecturer's presentation. In a virtual environment there can be several sources of different content, and the student can choose the preferred one, such as a teacher's video camera, presentation, various supporting documents, etc.
The virtual 3D learning system also provides additional features:

– Connection of external participants to the conference via the public telephone network;
– the creation of a training campus from a group of virtual audiences connected together by one topic;
– effect of the effect of distance between participants.

Of course, the presence of these functions cannot be decisive when choosing between “classical” education and training based on interactive 3D virtual reality technology. However, without a doubt, this technology in terms of efficiency is somewhere between the full-time type of training and the "classical" distance learning system, blurring the line between the full-time presence and the remote "full-time" presence.

Thus, based on the positive experience of using interactive virtual 3D reality technologies for studying abroad, we can say that these technologies have much higher potential than the methods of personal training used in the traditional educational process or classic webinars. From the point of view of the informational saturation of the educational process, the formation of individual educational paths, the provision of feedback (interactivity in the learning process, assessment of learning outcomes, etc.), the use of interactive virtual 3D reality technology for learning certainly deserves close attention and more detailed consideration.

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