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USE OF VIRTUAL ENVIRONMENT AND 3D MULTIMEDIA ELECTRONIC TEXTBOOKS IN HIGHER EDUCATION

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Annotation. The purpose of this article is to provide an overview of the educational possibilities of the virtual world and metaverses in education, with particular attention to their pedagogical possibilities.

Keywords: Virtual world, 3D technology, modern education, geographical objects, deformation, cinematography, special effects

As our education system continues to become disconnected from reality, students' need for rich experiences that lead to real academic achievement is increasing. As a tool that connects students with the real world through communication technology, the possibilities of the virtual world are multifaceted, and in the process of learning, they feel together with the real world. Virtual worlds allow students not only to practice, but also to think creatively, learn and conduct scientific research. At the same time, it also provides opportunities for many different learning styles through real-world learning opportunities. Virtual worlds are changing the way information is accessed and perceived, as well as the way information is transmitted and consumed. While experiences in the context of higher education have explored the potential of virtual worlds in education, there is a need to popularize experiences that can be key to future innovation in educational institutions.

In recent years, special attention has been paid to the use of modern 3D technologies, especially multimedia-based technologies, in the education system. The rapid development of information and communication technologies has not only had a small effect on the education system, but has also become the main means of its organization. For example, Cloud Computing, Mobile Learning, Tablet Computing, Open Content Learning, Analytic Learning, Virtual and Remote Laboratories.

The 21st century educational system is directly connected with the 3D world and multimedia technologies. In the last decade, the Internet network has achieved a very high efficiency, but the rapid development of multimedia technologies and 3D technologies and their integration with the Internet are enriching its possibilities even more.

One of the necessary conditions for improving the content of education is to increase the opportunities for students to acquire independent knowledge, to create appropriate conditions for the formation and development of electronic information resources of education.

The basis of the modern education system is a quality and high-tech environment. Its creation and development are technically complex, but such an environment serves to improve the educational system, to introduce information and communication technologies into the educational process. The use of multimedia technologies and computer graphics in the educational process makes it possible to conduct the teaching process in an interactive form. 3D technologies are currently one of the most developing and young fields, and are considered as the most convenient technologies for creating modern, design projects in our daily life.

Despite the many advantages of three-dimensional images, there are also disadvantages that should be taken into account when developing graphic projects. The following are examples of the disadvantages of 3D graphics:

1. High requirements for the hardware part of the computer: its RAM, processor speed, etc.;
2. A lot of time is spent on creating all the models of the scene, which become the field of view of the camera;
3. Compared to two-dimensional graphics, the complexity and freedom of creating images is less. Freely control the proportions of objects, non-observance of the rules of proportion, based on 2D graphics tools, drawing the object in pencil or on paper or on the screen. In 3D format, this is possible only in powerful packages, and even then, additional efforts and creativity are required;
4. The need to constantly monitor the interaction of objects in the scene, including when creating 3D animation. Because 3D graphics objects are variable, they are easily adapted to each other, and unnecessary relationships between them should be controlled;
5. A simple example: an animated character model can be thrown in mid-air instead of being thrown in a chair. Therefore, it is necessary to observe the rules of deformation of objects.

Compared to flat images, three-dimensional has a number of advantages which are being found by scientists: 3D modeling refers to the process of developing a 3D model (or a frame model in the form of a three-dimensional object) using specialized software. A three-dimensional model is created using many points connected by lines and curved surfaces. The areas in which three-dimensional modeling is used are constantly expanding. It is as follows: games, that is, modeling of realistic characters; creation of individual models of medical human body organs; development of models of engineering vehicles, new devices and structures; cinematography covers various areas such as special effects and the creation of fictional characters. Also, 3D-modeling is used enough in the field of advertising.

The 3D environment is a natural environment for students. Most of the games they play during their prime use this technology and are known as Massively Multiplayer Online Role Playing Games (MMORPG). These are video games in which a large number of players interact with each other in a virtual game world, not to be confused with Multi User Virtual Environments (MUVEs), which are online multiplayer virtual environments sometimes called virtual worlds. MUVE enables students to participate in interactive learning experiences at various levels. This allows students to learn together at the same time and in the same place, as a result of which they can communicate with each other, exchange creative ideas and learn how to conduct scientific research. They use 3D technologies such as software that allows users to have a unique learning experience, and immersive systems in large spaces where students can communicate with other participants synchronously and asynchronously [2].

In general, virtual worlds are also known as metaverses, a concept derived from science fiction. Virtual worlds - space modeling, three-dimensional representation of geographical objects and cities, as well as digital modeling of the real environment. Second Life (SL) is a 3D environment that allows users to interact through images. Their main features are that they are easy to use, they provide a range of collaborative objects, and they have attractive 3D features. Overall, their novel and highly immersive feel has made virtual worlds interesting scenarios for testing innovative learning technologies, and successful virtual world participants can feel deeply present in this world. A mirror world attempts to display (or mirror) real-world structures in 2D or 3D. GIS systems are often a two-dimensional window, Google Earth is an example of a 3D window world.

SL helps students develop immediate and socially meaningful learning processes and define their digital identities. The learning process is essentially a communicative process that takes place in a social environment. Therefore, Web 2.0 tools, including SL, have such potential in terms of facilitating the learning process. Interactive learning requires social activities that foster identity, awareness, relationships, connections, and interactions among students [3].

Virtual worlds can be used to create highly effective learning spaces. Because they are general and context-free, they can cover all disciplines. The social aspects of the virtual world are extremely important for education. They devote themselves to creating role-playing games and scenarios that allow students to temporarily take on responsibilities without having to deal with the real world.

Metaversions and three-dimensional worlds in education: characteristics and achievements

- providing a unique environment for learning and knowledge sharing;
- expanding understanding of scientific and social experience;
- create greater opportunities for group interaction and support activities, and allow meta-reflection to achieve learning outcomes;
- improve cooperation and communication skills,
- enabling students to easily transfer learning from a learning context to a real-life context.
- encourage students to gain practical experience;
- development of students' ability to create networks and communities of practice;
- development of problem solving and negotiation skills;
- helping students to be goal-oriented, expect results and work to achieve them;
- forming the ability to learn independently;
- supporting creativity, research and personality development through open learning methods;
- developing the ability and experience to understand others;
- offering unique opportunities for self-expression [1].

Simulations and virtual worlds engage students in higher-level cognitive thinking, such as interpretation, analysis, discovery, evaluation, and primarily problem-solving, while performing small experiments using virtual 3D worlds.

In the training, the following tasks are planned for the creation of 3D virtual environment and multimedia electronic textbooks:

clarify on the basis of the direct consideration of didactogenic productivity of pedagogical and psychological requirements, such as the incorporation of educational materials with different levels of complexity, having a high level of visuality, and reflecting a set of variable tasks in the structure and content of 3D multimedia electronic textbooks;

creating a 3D multimedia electronic textbook on computer science based on the Unity program and the principles of software development such as modularity, completeness, demonstrability, branching, controllability, flexibility, etc. clarifying the technological scenario by strictly defining its identity with the algorithm;

improvement of the creation of 3D multimedia electronic textbooks on the basis of the Unity program by developing a mechanism for continuous correction of the multimedia component in the processes of finding sources, optimizing quality, determining the structural structure, designing hypertext, creating an intellectual core, creating the content of the educational system, visualization stages;

the quality criteria for evaluating the efficiency of using 3D multimedia electronic textbooks should be improved on the basis of the maximum consideration of the adequacy of the level of access to repeated feedback, compliance with educational standards, the possibility of complete reduction of educational materials, the organization of educational activities and the forms of diagnosis of educational results.

Based on these tasks, it is planned to achieve the following practical results:

- The structure, content, pedagogical requirements for the creation of 3D multimedia electronic textbooks, assessment criteria will be improved within the framework of professional competences that must be formed in students;
- a multimedia electronic textbook will be created for higher education institutions using the Unity program based on the science of computer support;
- in higher education institutions, the modules of the structural structure of the 3D multimedia electronic textbook on Computer Science are improved by means of a motivational algorithm;
- The efficiency of use is determined based on the consistency, coherence and succession of the information and news presented in the 3D multimedia electronic textbook.

To ensure that education is as effective as possible, it is necessary to implement the following:
- ensuring that learning objectives are aligned with metaverses, 3D virtual worlds and assessment;
- providing the opportunity to think through dialogue and discussion;
- placement of control aspects in an immersive environment for students to work independently and to check their knowledge;
- development of realistic scenarios that allow shooting from exercises to real life;
- aligning assessment with learning activities to be effective.
- introduction of a feedback system to educational activities for effective learning;
- proper use of the generation of stereo devices in the educational process.

There was not enough demand for the first generation of stereo equipment for a number of reasons. First, almost all of the developments were wrapped in a small shell, and they did not even try to contact the manufacturers of the related components (video card, monitor). Secondly, the technologies were not developed enough, and the technical characteristics of the devices were, to put it mildly, not high. Thirdly, the prices of the devices were too high due to the previous two reasons, and given that there were almost too few moons commensurate with the devices, it led the first generation to a dead end. Attempts to produce gadgets that create the illusion of various stereo effects in a diffused state can be extended to the second generation. The third attempt to bring three-dimensional visualization technology to the mass market is associated with the name of Nvidia and its 3D Vision technology. It is too early to speak of its success, but few doubt the fact that the era of mass stereoscopic devices has arrived.

NVidia's 3D Vision technology is a complex solution that includes software, special devices (active shutter glasses), NVidia video cards (no less powerful than the GeForce 8 series) and monitors compatible with the technology. As a result of 3D Vision work, an image is formed on the monitor screen, which is perceived as volumetric by polarized glasses. This significantly increases the accuracy of the image with the help of our binocular vision, brings it closer to the natural image.

Wide format (16:9 aspect ratio) monitor Acer GD245HQ is one of the first representatives of 3D monitors with 3D Vision technology. This 23.6-inch monitor is designed to be used as a home gaming platform and multimedia media center. As an important detail, Acer GD245HQ's unusual design is precisely the combination of multi-colored (black and orange) plastic and stripes, different from the parallel-perpendicular paradigm.

The technical characteristics of Acer GD245HQ correspond to the modern standards of home monitors for games and multimedia: the matrix capacity is 1920x1080 points, the resolution is declared at 8000:1, the response time is 2 milliseconds. The monitor has 3 video outputs: DVI, HDMI and VGA, built into the power unit. The design of the Acer GD245HQ allows the user to move the screen away from the center white. Like all monitors capable of 3D Vision technologies, Acer GD245HQ can refresh the image with a frequency of 120 Hertz, that is, the standard 60 Hertz is changed in stereo mode.

The stereo mode on the Acer GD245HQ looks beautiful and convincing, adding a touch of realism to the test windows. The monitor menu is Russianized, so the user will have no problems with the Acer GD245HQ.

ASUS is respected in the computer market. Naturally, he could not avoid the trend and released his own model, ASUS VG236H, which can carry 3D Vision technology. This is a 23-inch monitor with a classic design, designed for home use. ASUS VG236H has a matrix aspect ratio of 16:9, and a screen resolution of 1920x1080 pixels. The monitor features Trace Free II technology for fast image refresh, which allows ASUS VG236H 120 Hz at 2 milliseconds with a GtG refresh rate. The screen resolution of the monitor is announced as 100000:1. An important feature of the ASUS VG236H is a dual-channel DVI input, which allows the monitor to display stereoscopic videos. The monitor also has HDMI and YpbPr video outputs.

Testing showed that the ASUS VG236H has no problems with the image, both in standard mode and in stereo mode. For more convenience, the monitor screen can be rotated 150 degrees around the axis and tilted by an additional 15 degrees.

ASUS Splendid Video Intelligence, a color rendering optimization system built into the unique functions of ASUS VG236H, may be useful to users of this monitor.

Korea's LG Corporation decided to partner with Nvidia and produced its first monitor with 3D Vision technology LG W2363D. This is the latest 23-inch multimedia monitor.

LG W2363D has 1920x1080 pixels with an aspect ratio of 16:9.

The screen resolution is advertised as 70000:1, with a response time of 3 milliseconds. The built-in G MODE system of additional working conditions means that the LG W2363D works clearly as a multimedia gaming monitor for the home.

It includes 4 points: acceleration of Thru Mode response time, optimization of image dimensions in 16:9 format ARC, automatic recalculation of episode lighting in stereo mode AutoBright and optimization and improvement of musical continuity SRS Tru-surround HD.

Japanese leading TV manufacturers Sony and Panasonic have entered into serious competition with Korean companies LG and Samsung. For this purpose, they sponsored the world football championship and the 2010 Olympics. Sony shows that 3D TVs make up 40% of the company's profits. In 2010, the price of such TVs was predicted to be 200 US dollars more expensive than ordinary LCD panels.

All this suggests that the move by manufacturers to develop large-scale television sets will lead to a very rapid price drop.

During testing, the FuHzion VX2268wm had absolutely no problems with imaging. Several questions may arise regarding its menu design. Its settings menu is not completely intuitive. In general, it can be said that the ViewSonicFuHzion VX2268wm is a quality monitor that supports 3D Vision technology and is considered the most affordable for its time on the market.

It can hardly be doubted that the era of mass stereoscopic imaging had begun. People have always wanted to bring the image on the computer monitor closer to reality by making their dreams come true step by step. Today's virtual world is almost indistinguishable from the world we see through the glass, the future of 3D technologies allows us to achieve even more impressive results.

The results of the analysis showed that the 3D multimedia electronic textbook occupies a special place among the new pedagogical technologies, it is fundamentally different from the traditional (usual) textbook with the following features:

- the closest methodical support tool to the teacher;
- availability of theoretical and practical information related to each chapter and topic of science, organization of laboratory training on the basis of virtual existence, and the possibility of showing it through audio visual aids;
- manifestation of various information in action;
- availability of practical programs related to science;
- availability of science-related test questions, tasks, rest periods;
- data compactness;
- the possibility of providing a lot of information in a short time;
- students feel themselves in a virtual existence;
- increase the efficiency of students' learning, etc.

In short, metaverses, 3D multimedia e-textbooks and virtual worlds are increasingly used in teaching. In particular, creating immersive, authentic, and multimedia learning experiences enables distance learning to be structured in interesting ways and is quickly becoming a core part of the entire learning space. Despite the growing interest of practitioners and researchers in the learning and knowledge sharing capabilities of these unique learning environments, current virtual world technologies present a number of opportunities that need further development. Higher education institutions need to see the potential of these technologies and integrate them into their daily teaching and learning practices.

REFERENCES:

1. Adaptation Camacho M., Esteve V., Gisbert M. (2011). Delve into the deep: Learning potential in metaverses and 3D worlds (eLearning Papers).
2. Silverman D. 3D Primer for Game Developers: An Overview of 3D Modeling in Games /David Silverman. http://gamedevelopment. tutsplus.com/articles/3d-primer-forgame-developers-an-overview-of-3d-modeling-in-games-gamedev-5704.
3. 3dsMax. Трехмерное моделирование и анимация на примерах В. Т. Тозик 2008 5. 3ds Max 2012 СергейТимофеев 2011
4. Antonacci D.M., Modaress N. (2008). Envisioning the educational possibilities of user-creat-ed virtual worlds. AACE Journal, 16(2), 115-126.
5. TuChih-Hsiung, Blocher Michael and Roberts Gayle (2008) “Constructs for Web 2.0 learning environments: a theatrical metaphor” Educational Media International, Vol45, №4, pp. 253-269.