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НАМАНГАН МУҲАНДИСЛИК-ТЕХНОЛОГИЯ ИНСТИТУТИ ИЛМИЙ-ТЕХНИКА ЖУРНАЛИ

НАУЧНО-ТЕХНИЧЕСКИЙ ЖУРНАЛ НАМАНГАНСКОГО ИНЖЕНЕРНО-ТЕХНОЛОГИЧЕСКОГО ИНСТИТУТА

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organizations (for example, creative groups of listeners and students, the Situation Modelling and Business Games Training Centre, design laboratory work). These models will make it possible to create the basis for interaction between national and global educational structures, as well as their dynamic integration into the realization of «cross-cutting» digital educational technologies oriented to the training of personnel of the digital economy and information society. Further development of this area of research is directed at the formation of systemic and visual thinking of the learners and learners, creation and effective maintenance of digital educational content, intellectualization and leading re-engineering of educational technologies, ensuring the competitiveness and competence of graduates. It is also an absolute necessity to form an adequate response of modern education system to challenges and threats like, for example, coronavirus pandemic, which doomed the education system «to collapse» into online learning with a certain loss of quality, system and continuity.

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BASED ON THE OBTAINED VIRTUAL REALITY ENVIRONMENT IN THE EDUCATION SYSTEM

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Abstract:
Objective. *Virtual reality systems are evolving in the fields of manufacturing, medicine, construction, sports, military, travel, television and education. The computer algorithms of a unique digital platform have been developed to demonstrate, exchange experience and knowledge.*

Algorithms for 3D visualization were also developed for creating geometric models, Mesh type PR (reducing the size of polygons) and Simplify poly (simplifying the number of polygons), which affect 3D objects in the virtual programming system without losing quality.

Methods. *The experiment was carried out A modern virtual 3D university manager should be able to:*

• Design and geometric models of 3D objects for virtual environments, in particular exterior, interior and characters, and their computer algorithms have been developed.

• Algorithms have been developed for Mesh type PR (reduction of polygon polygons) and Simplify poly (simplification of the number of polygons), which affect 3D objects in the virtual software system without losing quality.

• The created 3D models are shaped to accept materials, textures, polygons and sizes, file formats by a virtual software system platform (Collada and Skp, Dae)

• In addition to information about the books, presentations and video files were displayed on the virtual stands. Stand-boots with a user-friendly interface have been created to present information.

• study of computer modeling methods and algorithms, application of virtual reality algorithms in education and on this basis to design a three-dimensional model of TUIT building (main educational buildings computer rooms and laboratories, dormitories, gyms, kitchens) and modern integrated learning environment (LMS)).

• Establish an inter-platform database to collect data and connect to applications.

• Practical application of three-dimensional environment placement of web applications and database integration technologies with modern 3D technologies.

• Develop a mobile application and web portal for Virtual 3D University's three-dimensional virtual environment.

• prompt response to inquiries and prompt results;

• Be comfortable and understandable to both the beginner user and the experienced user.

Results *As a result of testing and implementation of this virtual 3D software system in the Agency for Information and Mass Communications under the Presidential Administration of the Republic of Uzbekistan, the following results were recorded, including:*

- Design and geometric models of 3D objects for virtual environments, in particular exterior, interior and characters, and their computer algorithms have been developed.

- Algorithms for Mesh type PR (reduction of polygon polygons) and Simplify poly (simplification of the number of polygons) are developed in the virtual programming system, which affects 3D objects without losing quality.

- The created 3D models are shaped to accept materials, textures, polygons and sizes, file formats by a virtual software system platform (Collada and Skp, Dae).

- In addition to information about books, presentations and video files were displayed on virtual stands. Stand-boots with a user-friendly interface have been created to present information

Conclusion. *The educational programs helped to shift the official language theme from classroom to computer classroom, which made the learning process fun and enjoyable for students and facilitated the teacher to complete the assessment. The use of virtual reality technologies can increase students' interest and attention, while the immersive and interactive environment encourages students to become active students. "Tell me and I will forget; Show me and I may remember; Involve me and I will understand*

Keywords: 3D virtual worlds, polygonal simplification algorithms, Poly reduction algorithms, virtual 3D object (artifact, internal and external texture), vAcademia, virtual reality for education.

Introduction. Today, virtual reality (VB) is widely used in various fields. A virtual being is an artificially generated information environment that focuses on replacing the environment with information that is generated on the basis of various technical means in the usual way. The creation of information visualization tools aimed at developing virtual reality tools for educational purposes can have a pedagogical effect that cannot be achieved with other technical means.

The establishment of virtual universities abroad is recognized as a modern innovative pedagogical technology. The number of supporters of virtual education is growing. In countries such as the United States, the United Kingdom, Germany, Korea, and Japan, where the system is in place, it is several million a year. The reason for this is that distance learning interactive virtual learning is both convenient and inexpensive for users, and most importantly, allows users to acquire knowledge at a time that suits them, rather than learning in the traditional way in educational institutions. This interactive-virtual learning is very convenient and effective. Nowadays, it creates great opportunities to improve the quality of education by creating new methods and techniques. Undoubtedly, this increases the cognitive activity of learners by requiring the teacher to work on themselves in teaching and research activities. Makes the learning process brighter and more fun.

Three-dimensional Virtual Worlds provide both opportunities and challenges for education, and many topics in this area need further research[1,2]. Despite the repeated positive conclusions, 3D VWs have not become widely used, and researchers often report that their studies have experimental nature. The most common problems with applying 3D VWs in the everyday teaching are steep learning curve and demand for computational and network resources [3]. As stated in recent surveys, the use of these technologies as learning environments is a new emerging trend and still under development [4]. While the computers and networks are constantly improving, the 3D VWs also require significant improvement to make them more convenient for educators and to deal with the steep learning curve. These facts motivate further research in the area.

Such a hybrid experience can be captured using the virtual recording feature of vAcademia. Several techniques are used by educators for getting content out of traditional classes, such as video recording of face-to-face lectures and recording of web conferences.

Fig. 1 Lecture capturing process in Real world

These methods allow creating cheap educational content for asynchronous learning. 3D VWs are also used for generating such content, but learning activities are usually recorded as 'flat' 2D video, which eliminates many advantages of 3D VWs, such as sense of presence. [4]

This interactive-virtual learning is very convenient and effective. Nowadays, it creates great opportunities to improve the quality of education by creating new methods and techniques. Undoubtedly, this increases the cognitive activity of learners by requiring the teacher to work on themselves in teaching and research activities. Makes the learning process brighter and more fun. Today, there are a number of systems for evaluating virtual education in foreign countries (vAcademia.com, VirBela.org, etc.).

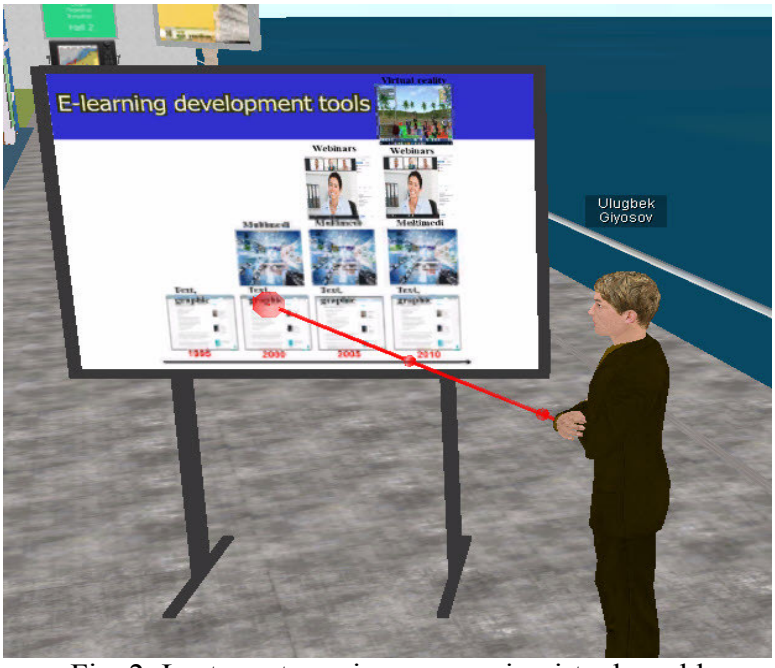

Fig. 2 Lecture streaming process in virtual world

Methods. The following methodology will be used to ensure the operation of the virtual 3D education infrastructure:

Service Offered: Students at the university made virtual buildings with virtual classrooms for e-learning activities. The authors have already carried out lessons and projects with students in these classrooms. These teachers were not familiar with the virtual world, so they needed to learn about it and how to create, register, and use an avatar prior to the official workshop (which was a great success). During a test run, some of the teachers experienced technical problems with their computers, microphones, etc. The instructor met the teachers in a virtual classroom that contained red chairs, tables, a podium, and a poster attached to a whiteboard. She presented five creative teaching techniques and discussed them in detail with the group.

1. Study and Architectural planning of custom virtual 3D education:

After the participants were introduced to each other and seated in the virtual classroom, the instructor began the workshop. First, they emphasized the importance of creative teaching for engaging and motivating students to pursue academic studies, especially in the areas of education system

2. Analysis, study and design of virtual 3D solution:

Students can participate in virtual world activities with their teacher. They can take virtual tours of museums, different countries, etc. For young student, a teacher can project the virtual

world on a large screen for the entire class to use and enjoy. In Second Life, students are able to experience sunrise, midday, sunset, and midnight. Also they can learn to design and build items like houses, cars, and airplanes using primitives (prims). The workshop instructor showed the teachers a virtual eco car (built by a team asked to design an energy efficient and environmentally friendly car) and airplane (designed to use wind, a renewable source of energy). The instructor gave the participants simple instructions for preparing primitives too.

3. Integration of IoT and OpenGL with VLE:

As universities continue to increase their online presence, they are challenged to re-evaluate their ways of teaching to best utilize the new opportunities that digital technologies offer. While these technologies present a variety of methods for online collaboration, virtual worlds offer the added ability to interact within a realistic graphical environment, situating learners together in the same space and time. These features give participants a highly social and immersive environment within which they can represent their role-play characters through avatars. Integrated as part of a university course, the inherent social characteristics of these spaces create opportunities for interactions that can increase students' motivation to learn. Beginning with a discussion of the pedagogical foundations of virtual learning environments (VLE's), this paper describes the instructional situations that these environments are best suited to teach.

The 3D Virtual offers an environment that allows shifting the traditional educational process (book/textbook) to the new way of learning that is interactive and more visual Virtual reality offers an attractive and effective way of learning where students can learn through experimentation and interactions in the virtual world.

Results. In Uzbekistan, 3D virtual education technologies are not using in the education system. This sector is still beta testing. Therefore, the creation of a Virtual Reality for Education, visualization of knowledge, design of virtual reality systems, smart lessons, e-learning. for teachers and researchers is an important task for Uzbekistan.

The Uzbek group of researchers has theoretical and practical experience in using 3D virtual education services in education, as well as skills in developing software for information systems, creating 3D virtual education and its services. This experience is reflected in the scientific and methodological works of the project participants, as well as in their certificates for the software product. The aim at providing Uzbekistan with an educational platform based on virtual reality. There are two aspects in your project : a scientific and technical one related to virtual reality and one centered on educational issues.

An analysis of the advantages that stem from the usage of Virtual Worlds in education. A thorough analysis of the virtual world platform characteristics. A study on the necessity to interconnect LMSs with Virtual Worlds through VRML.

Based on this experience and knowledge, the Uzbek group of researchers plans to build a private 3D virtual education and supplement it with services for teachers and researchers. It is planned that To the design of the automatons, the software uses tolls in 3D, as the Blender and the VRML (Virtual Reality Modeling Language) and to the publishing of a page on the internet it is integrated the Program Language PHP (Hypertext Pre Processor). These objects are such as immersive reconstructed buildings, trees, indoor and outdoor buildings environments, whose height and location are known, or roads that are adjust to the VRML educational materials. The project carried out in TUIT test environments that is maintained for next generation GI application researcher purpose. While create the platform we can use Unity game developer for WebGL. This 3D virtual education will bring together researchers and teachers from various universities in different regions. 3D virtual education infrastructure for teachers and researchers is planned to be built on the Uzbek side. To create such infrastructure, the necessary hardware is available and software will be used. To work together, the Indian side

will be given access to the space. A virtual platform will also be created for discussions on the project implementation and consultations.

Discussion. The leaders in the global market of "3D for education" technologies are American companies IBM, Microsoft HoloLens, Google, Samsung. Currently, teachers and researchers mostly use virtual education services from Google and Microsoft. Moreover, Google provides many free services for teachers: Codeingame.com, vAcademia.com, virbela.com,fun-mooc.fr and others. At first sight, the scientific challenges regarding virtual reality that have to be addressed in our project. Moreover there already exist virtual reality platforms . They certainly suffer from limitations but without a deep study of the limits of these existing systems. There exists an online course on the french MOOC platform: FUN (https://www.fun-mooc.fr/) (in french alas) on virtual reality and innovative teaching practices. There also working in this area Haptics and virtual reality laboratory in Korea. Haptics covers diverse range of topics, including the understanding of human sensorimotor ability, mechanics and electronics principles required to build haptic interfaces, and computational algorithms for modeling and rendering haptic environments.(http://haptics.khu.ac.kr/)Microsoft Xbox packed provides many application for game study field education, medicine and architecture.

Watch full talk to see Labster's virtual laboratories.bit.ly/vr-labs. Labster's virtual laboratories are proven to significantly increase learning impact over traditional methods

Applications for VR and AR in Education.

Open Simulator, Second Life, Active Worlds, Project Wonderland and Open Cobalt are some Virtual World platforms that can be applied in any educational procedure. In the following paragraphs we examine their main characteristics and perform a qualitative comparison. Open Simulator platform development originated as soon as Linden Labs Inc distributed their Second Life client software under GNU LGPL license, making it widely available to users and programmers. Some preliminary efforts resulted to a freely available, open source project named Open Simulator (OpenSim). An Open Simulator installation can host simulated virtual environments, much the same with Second Life due to the adoption of its messaging protocol. This characteristic makes OpenSim accessible through the most popular SL viewers. User registration and account creation are totally free.

Conclusion. Creation of virtual universities abroad is recognized as a modern innovative pedagogical technology. The number of supporters of virtual education is growing. The system is worth millions of dollars per year in universities in the US, UK, Germany, Korea, Japan, and other countries. This is because the distance learning in the traditional way of learning in educational institutions allows both users to obtain knowledge at a time when it is convenient and affordable for them. - There is almost no such system in virtual 3D university of Uzbekistan;

- There are practically no Uzbek courses available for the virtual 3D university. We will produce the following results:

- Operation is faster when it is installed in the national domain;
- Preparation of appropriate instructions for launching and operating the created virtual 3D University;
- Presentations, demonstrations of existing VR models

Development of specific models for tutors to use VR and 3D modelling in the built environment curriculum;

Initial perception of 3D and VR technologies by tutor;

- Tutors' requirements after the initial integration with 3D and VR technologies;

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