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**ТЕХНИКА ФАҶЛАРИ**

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§) Наконец, мы создаем модель внутреннего аватара, используя интерфейсы виртуальной реальности (VR) и дополненной реальности (AR).

**Ключевые слова:** виртуальная реальность для образования, виртуальная реальность (VR) и дополненная реальность (AR), пассивная и активная учебная деятельность, 3D примитивы.

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## TA'LIMDA O'QITISHNI RIVOJLANTIRISHNING VIRTUAL REALLIK ORQALI YONDASHUVDA 3D PRIMITIVLAR

### АННОТАЦИЯ

So'nggi bir necha o'n yilliklardan beri virtual haqiqat (VR) va kengaytirilgan haqiqat (AR) interfeyslari jismoniy va virtual dunyoni birlashtirish va ikkalasining afzalliklaridan foydalanish orqali o'qitish va bilimlarni oshirish imkoniyatlarini namoyish etdi. Bunday texnologiyalarning afzalliklari hali ham o'rganilayotgan bir paytda, texnologiya manzarasi yuzma-yuz va onlayn o'qitish imkoniyatlarini, shu jumladan mavhum tushunchalarni tushunishda va real muhit va vaziyatlarda o'qishni qo'shishda yordam beradi. Kontentni namoyish qilishning konservativ usullari (o'matilgan video, audio, skriptlar) shaxsiylashtirish va o'zaro ta'sirga ega emas. O'quvchilarni yanada qiziqarli qilish uchun MOOC dan keying avlod ilg'or o'quv uslublarini joriy etish zarur. Va nihoyat, virtual haqiqat (VR) va kengaytirilgan haqiqat (AR) interfeyslaridan foydalanishda xususiy holati uchun biz ichki avatar modelini yaratamiz.

**Калит сўзлар:** Virtual reallik ta'lim uchun, Virtual reallik (VR) va kengaytirilgan reallik (AR), passiv va faol o'quv faoliyati, 3D, 3D primitivlar.

**Introduction.** In recent years, emergence and growth of Massive Open Online Course (MOOC) has revolutionized the conventional model of knowledge delivery in formal education. MOOC can be taken up by thousands of students from anywhere in the world with access to internet [1]. There is a massive participation of learners from around the world which is evident from the fact that popular MOOC provider, Coursera has attracted more than 7 million students; edX has over 2million registrants while the Udacity crossed 1.5 million students, As of Jan 2020, the platform has more than 50 million students and 57,000 instructors teaching courses in over 65 languages. There have been over 295 million course enrollments. Students and instructors come from 190+ countries and 2/3 of students are located outside of the U.S., Khan Academy has attracted more than 70 million students as of 2014 [2].

Universarium-free online education is a relatively young but well-established and popular resource. Can participate in courses and open lectures in management, pedagogy, cultural studies, microeconomics and many other disciplines. (<https://universarium.org/>)

Lektorium-educational project. Demonstrated in two directions: with free online courses and video recordings of lectures. Thematic coverage - includes a wide range of questions from different areas of science (<https://www.lektorium.tv/>)

PostScience-is a comprehensive educational project that offers not only lectures and courses, but also a large amount of useful scientific materials that all other interested people who clearly need specialists in various fields will need. ([https:// postnauka.ru](https://postnauka.ru))

4brain.ru-is an online resource that offers free training to develop memory and attention, logical and creative thinking, public speaking, and other similar skills. The main feature of this project is that it does not provide knowledge in a particular subject, but helps to develop the necessary, useful skills

for learning globally, in which it offers not only courses, but also games, tests, books. (<https://4brain.ru/>)

Coursea-is currently a relatively large-scale and well-established project for the deployment and transition of online resources. It brings together more than 140 leading universities, including Yale, Stanford, John Hopkins and Edinburgh. Coursea also has a number of Russian language courses, as well as foreign courses that allow you to watch Russian subtitles while watching. In total, the portal has more than 1,300 courses in seven languages. Listen to well-known teachers, do homework, and discuss learning projects with other listeners. Most aspirants can get a certificate upon graduation. (<https://www.Coursera.org>)

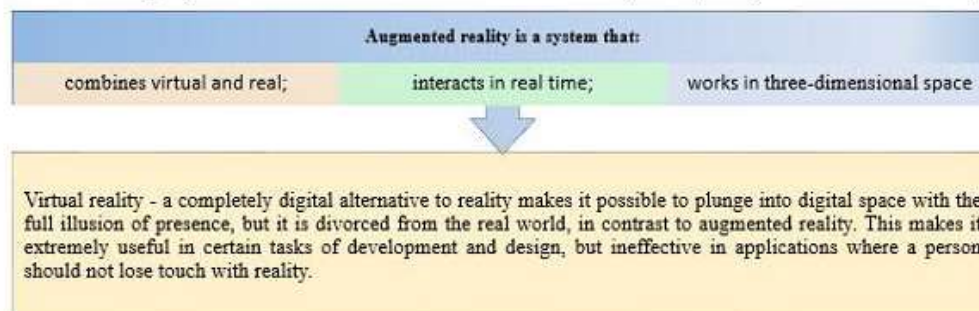
Khan Academy -offers its subscribers small video tutorials that are unique - they are not lectures, but specially designed stimulus videos that ask specific questions: Now, from Warholl's art, he explains in detail what the flu is, how the virus usually enters, and how it develops. The convenience is that all videos are stored on separate channels on YouTube, which means you can add them to bookmarks and share them with friends. (<https://www.khanacademy.org>)

There are various challenges that MOOC community is coming across. Few of them are accreditation and certification of students, increased dropout rate, quality assessment of learning, personalization and individual instruction support, student performance assessment, long-term administration and oversight, ethical and privacy issues for learner's data [3, 4, 5]. Out of all these challenges, the incredibly low rate of course completion (as low as 10 %) is one of the most troubling aspects [6]. Better engagement techniques are required for retaining a student from sign up to course completion.

**Using AR in education.** Augmented Reality refers to a concept in which real world is enhanced by blending it with virtual world [10]. The real-world static objects are dynamically morphed with context sensitive virtual information like video, audio, or a graphic overlay to improve user's experience [10, 11]. Augmented Reality is also transforming the learning environment by enhancing learner's real environment with virtual information, in various multimedia formats like graphics, video and audio etc. [12]. The overlaid information is hidden under the cues which when scanned with AR enabled devices bring static environment to life and provides better learning experience for students.

**Virtual Reality(VR) for education.** Virtual reality technology (VR) and interaction by 3D geometric model could bring an end to the passive learning which is followed in the traditional methodology of education. They also lead to beneficial communication between various participants in education process.[13]

Virtual reality systems included time and location and good quality of consist of computers,



users, hardware and software. They separated into two main categories: Immersive Virtual and Non immersive.

Fig.1. Description of AR system.

**Experiential learning.** As students are able to interact with the tasks presented to them, their experiences are personal in the learning process. Allowing them to construct their own learning experiences through abstract, active and reflective experience. Applications can also be developed to enable the application of concrete experiences in order to evaluate the extent of understanding of

users. Real-time interaction and real time feedback with each interaction enable students to create, reflect and apply their knowledge gained.[9]

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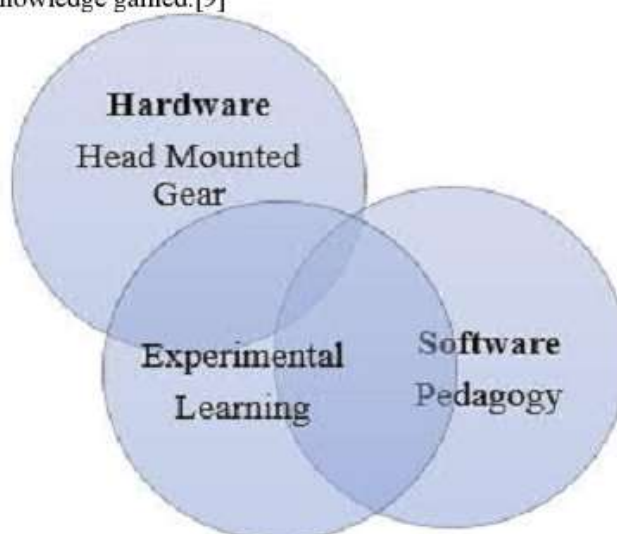


Fig.2. Using augmented and virtual reality to support the experiential learning process.

Virtual reality allows the student to go through experience over a wide period of time. This allows people with disabilities to participate in an experiment or learning environment and overcomes all language barriers. Thanks to text access, it provides equal opportunities for communication with students in other cultures, allowing the student to take on the role of man in different cultures. Potential advantages of using VR in education and training: visualization and reformation, an alternative method of presenting material; learning in conditions that are impossible or difficult to experience in real life; increased motivation; promotion of cooperation; adaptability, providing the opportunity for learning to adapt to the characteristics and needs of the student; and assessment and evaluation, offering great potential as a tool for evaluation due to the easy monitoring and recording of sessions in a virtual environment. [1]

Over the past 5 years, virtual reality technology (VR) has evolved from dubious to a wide area of application and implementation. And it was a priori to acknowledge the fact of their usefulness. Perhaps for this reason, many misconceptions about BP in general and, in particular, in the field of education were born. The main disadvantage of virtual caves is the high cost, which makes the use of this type of virtual reality immersion limited. On the other hand, the use of HMD can often cause some level of cyber disease. Virtual reality, augmented reality and their variations are computer interface methods that take into account three-dimensional space.

**Analysis and results. Technical novelty, utility.** 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;





**Implication of 3d modeling by software.** The user operates the application with the Timnith-Hand user interface, using head movement, thumb tracking, pinch gloves, and a menu system to perform the following object manipulation tasks: Constructive Solid Geometry allows the construction of complex 3D graphical shapes using. Object selection –the user can point at objects and select them, placing them into one of several clipboards. Object transform–perform translate, rotate, and scale operations, in a variety of different ways. Create primitives – 3D primitives can be created in the virtual world, from infinite planes as the simplest, to complex graphical models such as a water heater. Combine primitives – previously constructed and manipulated primitives may be combined together using Constructive Solid Geometry (CSG) operations to produce higher level graphical objects. only a small number of primitives. Solid shapes contain an inside and outside, and using set operations, it is possible to perform 3D union, intersection and difference operations (see Figure 3). By combining these operations, it is possible to produce any kind of object required. We create internal avatar model while using in virtual reality (VR) and augmented reality (AR) interfaces.



Fig. 3. Modeling using the Body Cylinder

Body avatar is a Kinect-based interactive system that allows users without professional skills to create freeform 3D avatars using body gestures. Unlike existing gestures-based 3D modeling tools, Body avatar centers around a is first person “you the avatar” metaphor, where the user treats their own body as a physical proxy of the virtual avatar. Based on an intuitive body-centric mapping, the user performs gestures to their own body as if wanting to modify it, which in turn results in corresponding modifications to the avatar. Body avatar provides an intuitive, immersive and playful creation experience for the user.



Fig. 4. Human skeleton - human skeleton drawn through the 3D Max program. To do this we model the 3D Max program by using the Box element in the Geometry section.

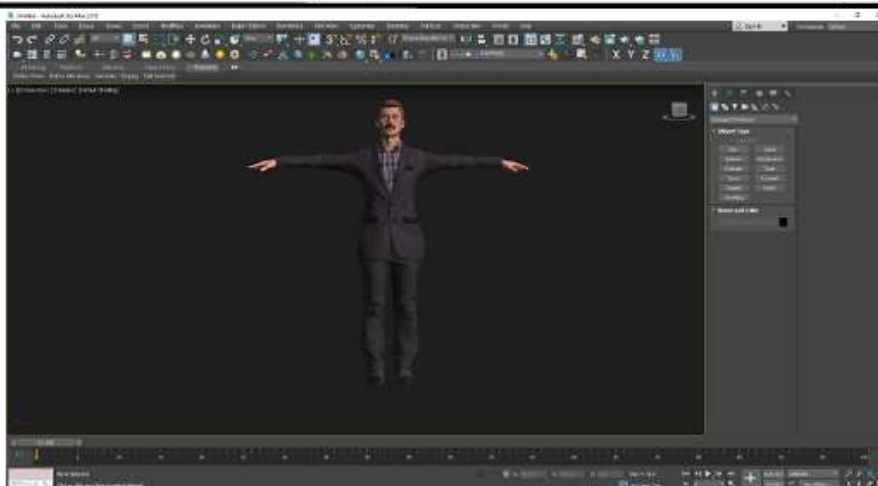


Fig. 5. This is the case with the Elements of Editing Poly by using the Elements of the Geometry section of the male teacher's clothing.

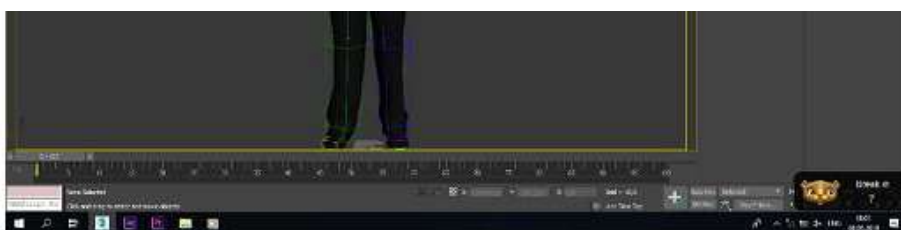


Fig. 5. This is the case with the Elements of Editing Poly by using the Elements of the Geometry section of the male teacher's clothing.

**Conclusion.** This paper presents new way of review in this example model of University and there are students choose their subjects where they learning his timetable. Students can now experience the topics they are learning about. Use of virtual reality technology has been shown to increase student engagement and focus, while the immersive and interactive environment encourages the students to become active learners.

We will produce the following results:

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