Implementation and effectiveness of the virtual educational environment (system) in special, higher and post-ot (re-education and training system) education

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Abstract: in this article, the introduction of the virtual educational environment (system) to Special, Higher and post-OT (re-education and training system) education, its role and importance in education is explained. The article presents the processes of creating courses and introducing fams on the vAcademia virtual platform implemented in the project. Some experimental results, lessons learned, generalizations and conclusions are made on improving the effectiveness of V-Learning.

This article describes a new online virtual classroom-like environment for higher education. Students can enter this virtual world as their avatars and watch lectures and labs together. An initial evaluation with 20 users showed that overall the online virtual learning environment was enjoyable and usable.

Keywords: computer graphics, distance education, teaching, technological development, education and learning, 3D environment, serious games, virtual training, vAcademia, Virtual Worlds, v-Learning, virtual environments.

I. INTRODUCTION

Education, in a broader sense, refers to the action or perceived knowledge that has the purpose of forming the mind, character or physical capabilities of a person. As lifestyles become more complex, education must change its forms and models in order to develop and better integrate with modern society. The use of virtual worlds has become very popular in recent years, and users already control the experience of virtual worlds in social groups and environments. The control element makes the use of virtual worlds attractive and therefore attracts users.

In recent years, the use of virtual worlds has become very popular, and users have already taken control over the experience of virtual worlds in social groups and environments. The control element makes the use of virtual worlds attractive and therefore attracts users. Recent studies indicate that there are more than 100 virtual world applications [1] and more than 100 virtual worlds for children and youth are currently available or in development [2]. Classroom teaching using games (i.e., game-based learning and serious games) is an area of interest in higher education [3]. In 2008 alone, the serious gaming industry was worth US$1.5 billion, which some

analysts see as the next wave of technology-mediated learning, [4] and online serious gaming is now the largest number of computer games available globally. is one of the most successful types. market.

There are various research approaches, publications, and best practices that focus on the components of education, their interactions, and their impact on the development of the entire process. For thousands of years, learning and teaching have always been closely related, and this has become a classic model of education. A virtual environment platform or distance learning has emerged as a source of information and a process that provides access to learning when students are separated by time and distance. Starting with the need to provide education in remote places, development and various scientific research works were carried out in this field. There are various chronologies that list specific activities and events that influenced the development of this discipline. Isaac Pitman, recognized as the first modern distance teacher (Leedham & Downton, 1987; Nagabhushan & Murali, 2003), adapted the basic principles of his shorthand system to postcards [24]-[25]. He sent the postcards to students, who were instructed to transcribe passages of scriptures into shorthand and send them back to them to correct the transcription. It was simply an attempt to guide, instruct and educate students across a large geographical distance.

The virtual environment platform is often associated with technology and its development, practical implementation and new solutions. New communication tools, video conferencing, teleconferencing solutions, web-enhanced instruction and web-based resources have brought a new dimension to education by providing an enhanced virtual environment platform.

However, the process of a virtual environment does not always have to be defined by the latest and greatest technological solutions. The general idea that this type of education is adding technology to traditional education is wrong and completely beyond understanding. In essence, the virtual environment platform includes open opportunities and a different organization of resources that changes the balance between institutions and individuals to create a global approach to learning and teaching and a more efficient process.

With such an approach, this form of education means that funds directed to education and training by institutions will be more effective and economically useful.

Therefore, this study focuses on one aspect of distance education in evaluating various factors to enhance the learning experience of students. The ability of these systems to store, index, and deliver information through computer-assisted instruction, exercises, simulations, and collaboration has transformed the way students interact with content and learning materials. Identifying the relevant variables of such a learning process can provide tools to increase the likelihood of a positive student experience. By evaluating these systems, we explored the relationship between several variables that may influence the level and perceived quality of students' educational experiences. This paper presents a systematic model that captures several aspects of how students interact with content and how different variables relate to each other when using these learning systems.

Currently, the virtual environment platform must develop algorithms to render 3D objects without loss of quality and to simplify the number of polygons. This article

considers a scenario in which the educational process is considered as a complex (psychological, physiological and pedagogical) object aimed at creating virtual computer models. We all know that the whole world has been fighting the coronavirus for almost a year and a half. The coronavirus or COVID-19 pandemic has been described as the most obvious global health crisis of our time. Naturally, the current pandemic situation in the world also affected the quality of education. The establishment of virtual universities abroad is recognized as a modern innovative pedagogical technology. The number of supporters of virtual education is increasing. The number of virtual participants in higher education in countries such as the USA, Great Britain, Germany, Korea, and Japan, where the system has been implemented, is several million people per year.

Distance learning is convenient and affordable compared to traditional education in educational institutions, and most importantly, it allows users to learn at their own convenience through virtual simulation and virtual simulator training. Developed countries have created their own 3D constructive national virtual university platforms. For example, the Russian National Virtual University platform, the American National Virtual University platform, the British National Virtual University platform, the German National Virtual University platform and the Finnish National Virtual University platform. Currently, projects on geometric modeling of the generalized national system of the virtual university on information technologies based on 3D technologies have not been implemented in the republic.

Currently, virtual reality technology has become a new educational tool for the development of education. Traditional education only provides students with knowledge, now virtual reality technology can be used to help students create a vivid and lively learning environment so that students can experience it in real life. Compared with passive infusion, compared with passive infusion, the sense of memory enhancement, using virtual reality technology, the implementation of autonomous learning can allow the student to accept, it is easier to stimulate students' interest in learning. a virtual world about topics that help students learn better using virtual reality technologies.

In particular, significant work is being done on the use of virtual education in the higher education system of Uzbekistan. As an example, we can take the innovative project work No. IL-4721071198 entitled "Creating a national virtual university of information technologies based on 3D technologies". This project is intended for 2022-2023, and it is planned to carry out large-scale works within the framework of the project

II. MAIN PART

Virtual Academy offers a qualitatively new approach to learning in virtual worlds. The use of Web 2.0 technologies and the possibilities of the virtual world allows creating interactive educational content available to all Internet users.

Virtual worlds provide excellent opportunities for effective distance and online learning by supporting groups or communities that bring together subject matter experts, teachers, and students from different countries or locations. Thus, the development of new collaborative e-learning approaches is facilitated.

Virtual Academy is a three-dimensional multi-user educational platform that allows you to conduct training courses, meetings, presentations, trainings for groups of one to several dozen users at the same time and provides services in which you can participate.

The use of the vAcademia program is effective in organizing virtual education. After enrolling in this program, it will be possible to participate in the classes of scientists from all over the world by organizing an optional course on any subject.

One of the main partners of the work carried out within the framework of the project, quality work is being organized together with the head of the Multimedia System Laboratory, Associate Professor Mikhail N. Morozov. The many tutorials they have created using vAcademia are a good resource for students and freelancers alike. We also organize virtual classes in Uzbek using the vAcademia program as part of the project.

First of all, we register in the vAcademia program and organize the course. This process continues with entering information about the course.
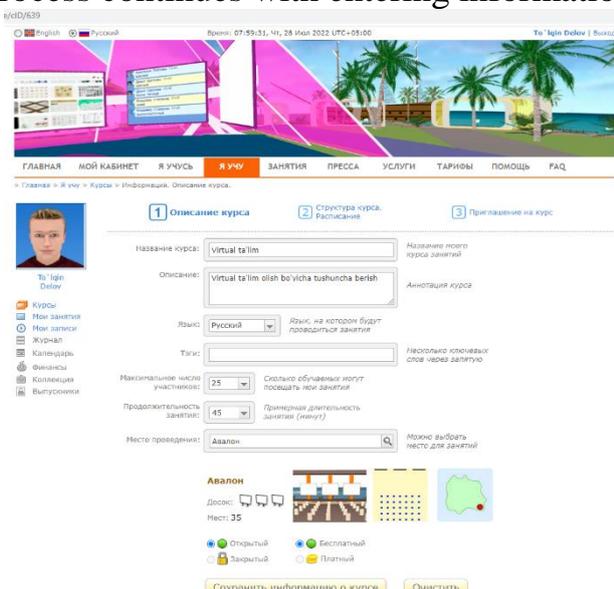

Figure 1. Enter information about our course.

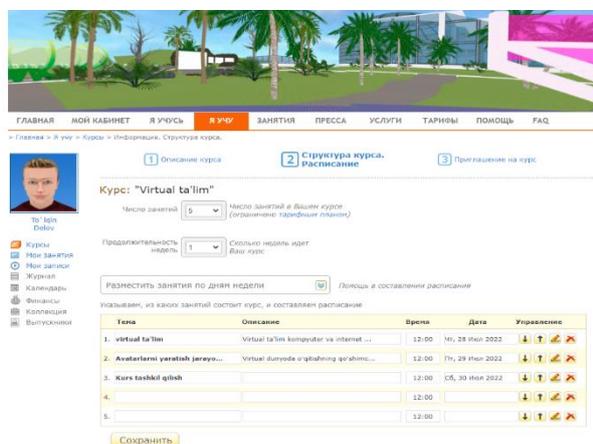We will make a lesson schedule:

Figure 2. Creating a lesson schedule.

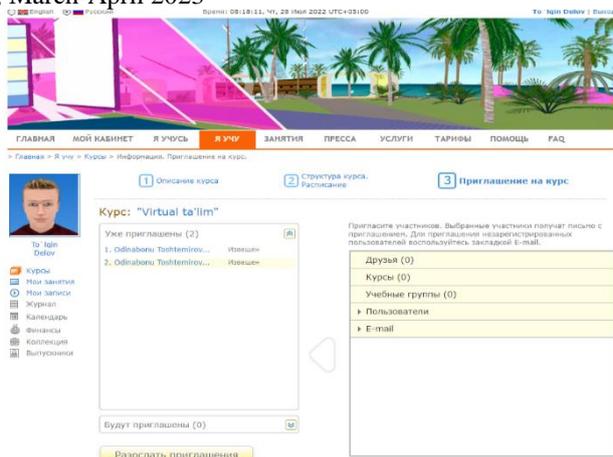We invite students to attend our classes via email:
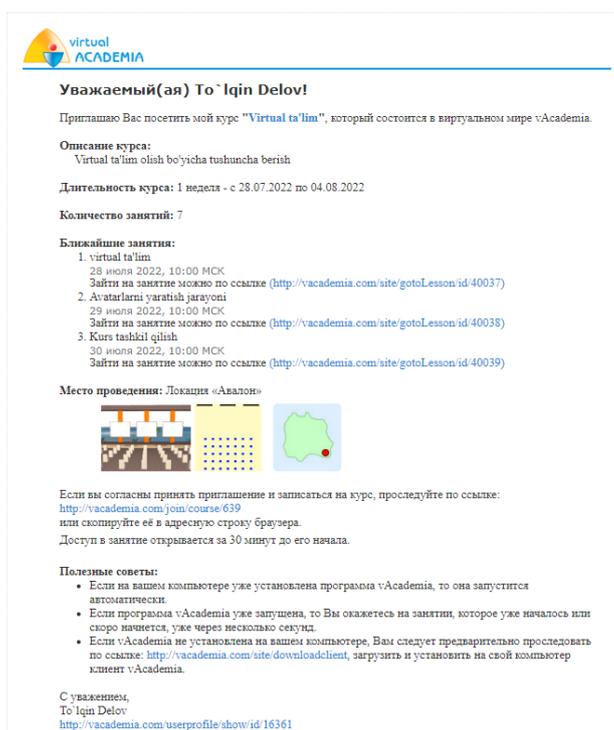
Figure 3. Invite participants to the lesson

Figure 4. electronic invitation.

The main goal of this project was to improve the quality of teaching by creating an innovative AVATAR learning environment. The development of educational environment, methodology and resources within the framework of the AVATAR project made it possible to expand education in the traditional classroom. As a result, tools and functionality were provided that allow for the use of various educational strategies and methods for conducting virtual training in various disciplines, encouraging the active participation of students and their involvement in the educational process. The AVATAR learning environment is a hybrid environment that includes an e-learning platform and a virtual learning environment.

Figure 5. Choosing an avatar in vAcademia.

The user representation in vAcademia is a three-dimensional character - an avatar, which has a unique customizable appearance.

Avatar selection is done during registration on the site. In the future, we can change the appearance using the avatar editor.

Figure 6. Workflow with 3D objects in vAcademia.

Tools for working with 3D objects are grouped into the following tabs:

Objects - for placing objects

Landscape - saving and restoring the placement of objects in a location.

Bots - for hosting computer characters-bots.

Scripts - for programming the behavior of three-dimensional objects in the vJS language.

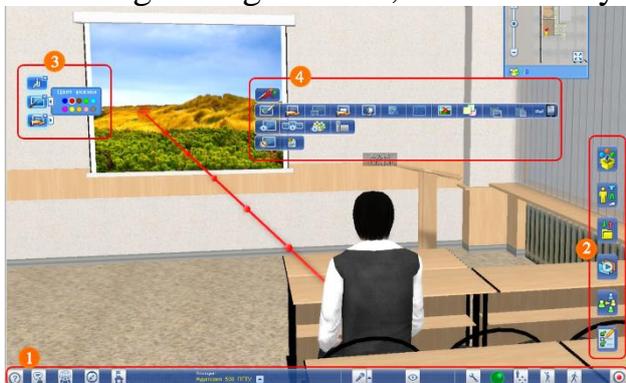When organizing a lesson, it is necessary to equip the auditorium.

Figure 7. Let's take a look at working with our interactive whiteboard.

In this case, the process of working with an interactive board consists of the following:

1. The main menu contains buttons for changing application settings, controlling the movement and communication of avatars.

2. Toolbar - consists of buttons for placing objects, setting the appearance of the avatar, working with a set of resources, conducting lessons and viewing records, inviting other users and creating tests.

3. The notification panel is formed when working with the application through the context menu, and the context menu can contain different sets of buttons depending on the object to be called. Used to exit modes and applications.

4. Context menu - is called by right-clicking on an object and contains a set of buttons for performing possible actions on this object.

We will include the necessary information for our lesson in the lessons of our course.

Figure 8. Entering the necessary information for our lesson.

Figure 9. Carrying out the lesson process.

Our lesson is about distance education, in which the formation and development of competences among the participants of the interaction in the educational process, based on the laws specific to the information, distance and communication technologies of education, mainly depends on the students' different it was found that it occurs as a result of independent work with training. and methodical manuals (electronic textbooks, interactive educational programs, electronic knowledge base), in addition, in the use of communication networks (Internet), this is a constant enrichment of the experience of creative activity to a greater extent, a mechanism of self-management helps to form.

III. RESULTS

The sample consisted of 20 students studying in the 3rd-4th year of the Bachelor's degree at the Tashkent University of Information Technologies named after Muhammad al-Khorazmi. Participants enrolled in Distance Learning Technologies reported that they had some understanding. Students were first asked to complete the activities designed for this experiment in a traditional classroom and then had to use virtual classes to complete the same activities. This virtual education is selected because it offers many opportunities to learn authentic subject-specific information and online learning tools. The participants were 7 women and 13 men aged 20 to 27 years.

A mixed methods design with qualitative and quantitative data was used. To measure the outcomes, a questionnaire was administered to the participants before the start of the trial and after completing each of the proposed tasks of this study. Quantitative data were supplemented by interviews to elicit participants' opinions. To obtain feedback on the virtual classroom processes, a two-stage evaluation was conducted with 20 participants and qualitative and quantitative feedback was recorded.

All end users had some computer literacy or some experience with online virtual environments. The assessment took approximately 1 hour per participant and the feedback recorded is presented in the subsections below. On the positive side, most of the participants noted that the virtual class through the platform is very enjoyable and has great potential for distance learning. One user commented, "I feel this is one of the most convenient learning solutions available today and it's going to be a big bang in the tech market," while another commented, "Sounds like a new learning curve." "he noted. At the same time, it was noted that there are additional opportunities for further learning. As an example, he noted that "he has the ability to learn new things around the system and do things that he cannot do in the audience." In addition, users positively evaluated the idea of distance education.

Another commented, "Well developed because I work full time and come home in the evening. This way, I can easily re-learn the lessons that I didn't learn in class at home using the system" and another "Great, I don't have to sit in the classroom all day or waiting for the lessons to finish."

In addition, users liked the idea of creating additional thematic "interesting zones" during virtual lessons. Finally, one of the users preferred to combine traditional methods with the proposed platform and said, "I can learn more useful information at my own pace than sitting together in traditional classes. interesting concept" he said.

On the downside, some participants didn't like spending a certain amount of time familiarizing themselves with the platform. One of them commented, "I don't have extra time to use it because it takes a while," while another said, "I don't have time to go into the virtual world as I'm busy with university". Only two users were not satisfied with the educational platform and it was very satisfactory. One is "I can learn things in a classroom instead of virtually, bad idea doesn't work for me" and the other is "It's no different than online learning classes, they have all the features. So what's the point of using virtual platforms?" they expressed their opinion.

The first question was related to the general evaluation of the virtual learning experience. All of the participants responded very well and liked the idea of organizing learning and learning processes in the Virtual World (Figure 10).
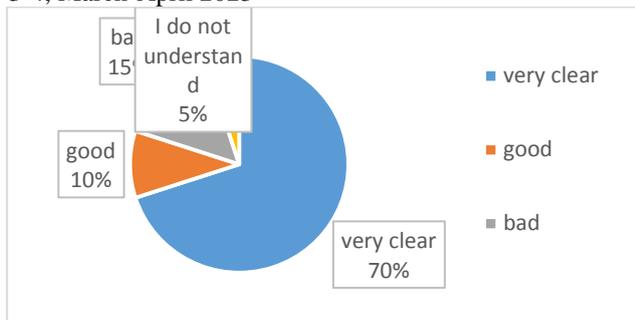
Figure 10. Virtual learning experience.

In practice, it seems that the idea of virtual learning has aroused great interest among students of all ages, as can be seen from the answers to the question. 70% of students agree with the idea of learning things virtually and they think that this is the idea of learning things. 10% of people said that the idea was just "good" but that an interactive teacher was also needed. The next type of person who thinks the whole idea is "bad" and confusing, and they make up 15% of the total opinion. 5% of users said they don't fully understand yet because they don't know how much it will help users and will it be useful in the real world? The question remains open to them. These questions are addressed by answering the following test questions to the users.

The next question concerned the distance learning experience of users for interactive learning in higher education institutions (Figure 11). Here, participants were asked this question to test and see how a virtual learning environment can help them learn while staying at their homes. Their advantage is that they can log in at any time and start following the module. They can also interact with students and staff.
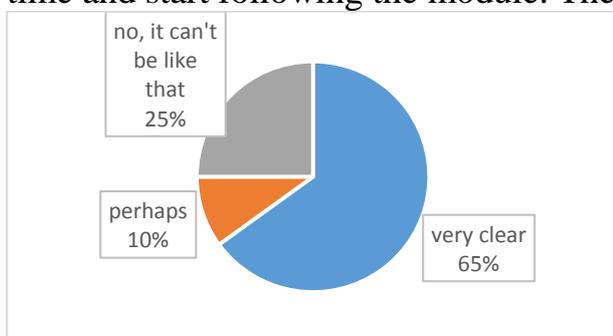

Figure 11. Distance learning experience.

In the next question, participants were asked to comment on the effectiveness of combining audio-visual aids. During the training session, they will be able to navigate to web pages/blogs, stream videos online and activate executable demo applications. Participants were asked about this question and their responses to the level of interactivity in the virtual world were recorded in the form shown in Figure 12.
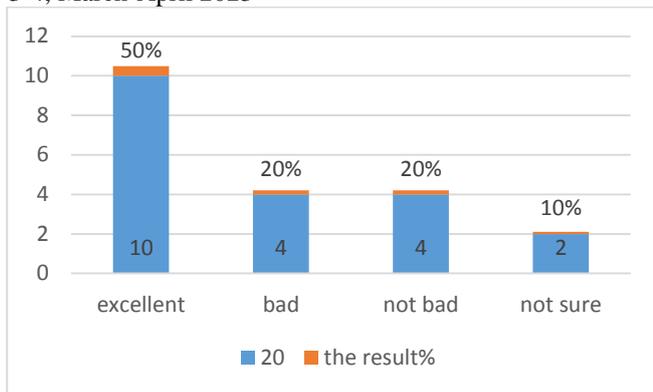
Figure 12. Effectiveness of audio-visual aids.

IV. DISCUSSION

Virtual worlds also have different technological requirements. They can be accessed via a standard web browser by installing a plug-in (if they don't have full 3D graphics), or if they have a full 3D world, the user will need to install the appropriate computer hardware and a standalone software client (app). Most advanced virtual worlds also require a broadband internet connection on the user side.

The analysis of the reviewed data shows that the participants of the experimental group were first used in traditional education, and then conducted training in the virtual world. By the end of the lesson, students' abstract questions about the organization of training in the virtual world decreased significantly. Organizing courses and planning lessons in a virtual system is a really clear, suggested activity.

V. CONCLUSION

Preliminary results with 20 users showed that, overall, online virtual learning environments are useful and can be used to develop distance learning courses and degrees. In general, most of the participants liked the system and would like to see it used in practice in teaching more subjects. Only two users were very negative and clearly stated that they prefer traditional teaching methods. Integrating online virtual learning environments with higher education can increase student engagement and possibly lead to more effective learning. Those who are not interested in traditional learning practices can adjust things for themselves and increase their confidence level.

Virtual world platforms are software frameworks that allow users to create their own virtual worlds, and some of these platforms (mostly open source) allow users to host their own worlds on their own servers.

The use of the vAcademia virtual platform is convenient even for science teachers who are not informatics teachers.

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