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CREATION OF DIGITAL EDUCATIONAL RESOURCES FOR TEACHING 3D TECHNOLOGIES AND METHODOLOGY OF THEIR USE

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АБСТРАКТНЫЙ

The purpose of this article is to provide general information about designing educational activities in a 3D technological environment and its pedagogical opportunities. It discusses models and stages of designing educational activities in a 3D technological environment, as well as the technologies for selecting resources for designing virtual environments for teaching.

INTRODUCTION

Currently, digital technologies are rapidly developing, and every sector demands continuous progress in line with the times. In today's world, where the speed of obtaining and utilizing information has drastically increased, the use of digital technologies in the education system plays a crucial role in improving the quality of education and in shaping socially active young people. With this goal in mind, the process of digitizing education has begun to enhance the quality of learning.

The current state of the education system is characterized by the growing role of non-traditional educational technologies. With their help, learners can acquire knowledge much faster than with traditional methods. These technologies change the nature of knowledge development, acquisition, and distribution, allowing for the deepening and expansion of the content of the subjects being studied, rapid updates, the application of more effective teaching methods, and significantly broadening access to education for everyone.

Although technologies play an important role in education, they must be properly integrated into the teaching process along with new teaching models. The introduction of digital technologies in foreign language teaching has its own characteristics, but it depends on the teacher’s ability to choose the right teaching strategy and digital tools, which in turn affects the students' success level.

MATERIALS AND METHODS

Digital learning resources are widely available on the internet and provide the ability to gather information for students, making it easier and faster to search for relevant content. These resources offer a more effective and efficient way for students to find information quickly. There are various types of digital learning resources, such as online courses, websites, forums, social media, and online articles. Each of these resources presents unique features for students. For example, online courses help students learn various programs, while websites help students acquire knowledge in a short amount of time. One type of digital learning resource is designed for starting small businesses. These resources provide students with information about business activities, enterprises, and startups, helping them start and grow their own businesses.

Digital education resources offer numerous benefits for both teachers and students by integrating a digital approach to teaching methods. These resources include interactive textbooks, video lessons, tests, audio, and various other types of content. Digital learning resources make learning easier for students and make the teaching process more convenient for teachers.

Digital education resources provide short-term, convenient, and effective learning methods, and they come in various types. These resources offer various benefits for students, such as programs designed to help job seekers acquire necessary skills or courses specifically tailored for learning business programming.

The development of information technologies has also led to significant achievements in the field of computer-based three-dimensional (3D) modeling. As a result, software that offers amazing possibilities has emerged. The use of these programs has resulted in the creation of various educational content, video games, and even films like "Avatar," where virtual elements and animals coexist in fully or partially virtual worlds. In some of the latest video games, Google, Inc. is laying the foundation to present entire virtual cities, offering wide-ranging capabilities with the 3D digital archive of the world (Google Earth).

In general, the possibilities of modeling technologies are limitless, and their future looks even more fascinating. Given the complexity of the real world, these technologies are being used to create content for virtual worlds such as video games, films, and online applications. However, creating detailed 3D content using today’s modeling technologies is inconvenient and time-consuming. This requires significant amounts of time and financial resources for producing educational content, games, and films, and it also makes it easier to create 3D models, almost as if drawing them with a pencil. Our challenging and long-term goal is to enable digital content creators—whether experienced digital artists or casual hobbyists—to quickly display and synthesize rich virtual worlds that resemble the real world. To achieve this, extensive research needs to be conducted to enhance the ability and speed of synthesizing 3D content.

The graphic design of visual communication in 3D is a newly emerging but important field for presenting digital content in any subject, as scenarios, settings, graphics, models, sounds, and colors mainly determine whether users choose to stay in the 3D environment or not. Therefore, it is crucial to develop a design methodology that identifies the technological tools to be used, meaning defining a team with designated roles and functions; optimizing

development time, reaching design agreements, and thus avoiding repetitive processes and achieving the desired product.

We will outline various important and complex problems in 3D modeling and explore potential solutions. Specifically, we will apply optimization based on data graphics to key tasks of modeling from the perspective of computer graphics and computer vision. From a graphics perspective, the goal is to develop powerful and intuitive modeling tools that help artists create 3D content in the digital world. From the vision perspective, the goal is to reconstruct real 3D models of objects and scenes from image data.

Manual modeling is the most common method for creating 3D models, and it primarily involves using tools by hand. Polygonal modeling and digital sculpting are popular manual modeling techniques, and the choice between them depends on the type of 3D model being created. Polygonal modeling is preferred for modeling artificial objects like furniture and buildings, as the polygonal mesh typically fits the shapes of man-made objects. On the other hand, digital sculpting is favored for modeling organic objects like virtual human characters, due to its additional flexibility during the modeling process, allowing for more intricate detail and adaptability. Manual 3D modeling is typically carried out through interactive modeling software such as 3ds Max, Maya, and ZBrush. These interfaces provide the scope for creating highly detailed and realistic 3D models. However, the complexity of the controls often leads to a steep learning curve, making 3D modeling a skill mastered by professional digital artists. Even for well-trained specialists, creating high-quality 3D models with extensive features still requires a significant amount of time and effort. Programs that demand a large number of high-quality 3D models—such as educational software, modern video games, and films—require substantial investment in both time and financial resources. This significantly limits production speed and the number of annual releases. Unlike in the 1980s, when video games typically featured simple 2D graphics and the entire production could be handled by a small team, today the use of 3D technologies in video game and film industries has introduced some challenges in production. While a manual approach to creating 3D models may not pose significant difficulties for an artist, the development of powerful and intelligent modeling tools and interfaces has made achieving success easier. In fact, ongoing efforts are being made to improve interactive modeling methods in the study of computer graphics. Within the scope of the research on the topic “Creation and Methodology of Using a 3D Format Electronic Guide for the Subject of “Informatics and Information Technologies” in General Education Schools,” an electronic guide for the subject of "Informatics and Information Technologies" was developed.

RESULTS

Many teachers are expecting to accelerate the learning process through the use of multimedia educational materials:

- Enhance motivation;
- Improve the informational potential of the learning content;
- Activate students' educational and cognitive activities;
- Accelerate the speed of learning actions.

In the system of continuous education, an interactive electronic educational guide in 3D format is a practical and highly convenient program. It contains audio, video data, and

lecture texts created using multimedia technologies. The program has a simple and user-friendly interface. Students can access such guides via the internet or through a CD. Some types of 3D format interactive electronic educational guides are equipped with electronic automation systems aimed at developing creative abilities.

Interactive electronic educational guides in 3D format can consist of chapters, information, tasks, and practical exercises taken from any textbook. The 3D format interactive electronic guide should be in the form of a compact disk (CD), and even if all the textbook's information is available, it should allow the use of various programs.

Another achievement of modern computer technologies is the ability to freely use the internet system, as well as the integration of videoconferencing with information on traditional marker boards through interactive whiteboards. Interactive whiteboards, developed based on smart technology, provide students with the opportunity to learn modern languages. The process of learning and teaching a language becomes more effective by seeing and hearing interesting 3D representations of body parts, enhancing the learning experience.

Students don't always have the opportunity to open and examine the internal parts of a computer. This is especially difficult with modern computers, such as monoblock systems, which are becoming more common in society, where accessing the internal components is quite challenging. Computers that do offer such access have largely become outdated and are starting to phase out. Additionally, the rapid updating of curriculum content further complicates this. On the other hand, explaining the relationship and sequence of the internal parts of a computer through modeling is one of the key features of modeling. Another advantage of modeling is the ability to view and capture the 3D model in any desired position using rendering techniques. Today, these capabilities of modeling can be considered a highly effective educational tool in teaching Informatics and Information Technologies.

REFERENCES:

1. Lap-Fai Yu. Data-Driven Optimization for Modeling in Computer Graphics and Vision. A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy in Computer Science. University of california. Los Angeles. 2013. 198 P.
2. Aldrich C. Virtual worlds, simulations and games for education: A unifying view. Innovate, 5. 2009. Retrieved from http://www.innovateonline.info
3. Antonacci D.M., Modaress N. Envisioning the educational possibilities of user-created virtual worlds. AACE Journal, 16(2), 2008. 115-126.
4. Bronack S., R. Sanders y otros cuatro autores. Presence Pedagogy: Teaching and Learning in a 3D Virtual Immersive Worldlnt, J.Teaching and LeARNING IN Higher Educ.,20(1) 2008. 59-69.
5. Akramovich N. A. The priority of using innovative technologies in the agricultural education system // Journal of Academic Research and Trends in Educational Sciences. – 2022. – Vol. 1. – No. 10. – Pp. 185-191.

6. Akramovich N. A. HISTORY, SUBJECT, AND OBJECT OF FORMATION OF "MACROECONOMICS" // Galaxy International Interdisciplinary Research Journal. – 2022. – Vol. 10. – No. 1. – Pp. 209-210.

7. Isakulov T.M. "Technologies for Creating 3D Interactive Multimedia Software Products".

8. Tursunov S.Q. Computer Graphics. A Textbook for Pedagogical Higher Education Institutions. T.: "Lesson Press" Publishing House, 2021, 264 p.

9. Fayziyeva M.R., Bagbekova L.K. Computer Graphics Textbook. Ilm Ziyo Zakovati. – Tashkent, 2022.

10. Fayzieva Makhbuba Rakhimjonovna,. (2023). Use of ar Technologies in the Context of Digital Transformation. CENTRAL ASIAN JOURNAL OF MATHEMATICAL THEORY AND COMPUTER SCIENCES, 4(4), 62-67. https://doi.org/10.17605/OSF.IO/ZQX7C