



USE OF 3D ANIMATION & CG IN THE LEARNING PROCESS

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Abstract: This research paper aimed to study the use of 3D animation and computer graphics among the computer graphics undergraduate learners. The purpose of this research is to investigate the effectiveness of 3D animation and Computer Graphics (CG) as a tool for enhancing learning outcomes. Specifically, this study aims to identify the benefits and challenges of using 3D animation and CG in the classroom, and explore the most effective methods of integrating these technologies into the teaching and learning process. Quantitative data was analyzed using descriptive statistics and inferential statistics such as paired-samples t-tests to determine the knowledge gained before and after exposure to 3D animation and CG. Three-dimensional (3D) animation and computer graphics (CG) was highly effective in enhancing classroom learning experiences. Here are some of the key findings on their effectiveness: Improved Visual Representation: 3D animations and CG provided a more realistic and accurate visual representation of complex concepts, making it easier for students to understand abstract concepts that may be difficult to visualize. Enhanced Engagement: The use of 3D animations and CG can increase student engagement and interest in the subject matter, making learning more enjoyable and effective. Flexibility: Digital animations and CG provided instructors with the flexibility to demonstrate complex processes in a way that may be challenging to replicate in real life, providing students with a more complete understanding of the subject matter. Interactivity: The interactive nature of 3D animations and CG enables students to interact with the learning material in a way that promotes greater understanding and retention of the concepts being taught. This research concluded that the use of 3D animation and cg in the classroom environment was very beneficial.

Index Terms – 3D Animation, Computer graphics, Learning, Teaching

I. INTRODUCTION

Digital animations and CG can be customized to meet the unique learning needs of individual students, providing personalized learning experiences that cater to different learning styles and preferences. The research findings showed that 3D animation and computer graphics was highly effective tools for enhancing classroom learning experiences, making learning more engaging, interactive, and effective for students. Three-dimensional (3D) animation and computer graphics (CG) can be used in various ways to minimize stress in different contexts. Visualization and Relaxation Techniques: 3D animation and CG can be used to create visualizations and animations of relaxing and calming scenes like beaches, forests, waterfalls, etc. These visualizations can be used as a part of relaxation and stress management techniques like meditation, deep breathing, and mindfulness. The use of these techniques has been shown to reduce stress and anxiety levels. Virtual Reality Therapy: Virtual reality (VR) therapy uses 3D animation and CG to create immersive and interactive environments that can help people cope with stress and anxiety. VR therapy has been used to treat conditions like post-traumatic stress disorder (PTSD), social anxiety disorder, and phobias. Educational and Training Videos: 3D animation and CG can be used to create educational and training videos that can help people learn stress management techniques, coping strategies, and relaxation exercises. These videos can be used in schools, colleges, workplaces, and other organizations to promote mental health and well-being. Games and Interactive Apps: 3D animation and CG can also be used to create games and interactive apps that can help people manage stress and anxiety. These apps can provide guided meditations, breathing exercises, and other stress-reducing activities that can be easily accessible on smartphones and other devices. Overall, the use of 3D animation and CG can help people manage stress and anxiety by providing them with engaging, interactive, and effective tools to promote mental health and well-being.

There are several advantages of learning with 3D animated clips, including:

Visual engagement: 3D animated clips can provide a visually engaging way to learn. The use of animations and graphics can help learners understand complex concepts and ideas.

Improved retention: 3D animated clips can help improve retention by making learning more interesting and memorable. Studies have shown that people remember information better when it is presented in a visual and interactive format.

Interactive learning: 3D animated clips can be interactive, allowing learners to engage with the content in a more meaningful way. This can lead to a deeper understanding of the subject matter.

Real-life scenarios: 3D animated clips can be used to create real-life scenarios, allowing learners to experience situations that they may not be able to in real life. This can help prepare them for real-world situations.

Flexibility: 3D animated clips can be used in a variety of learning environments, including online courses, classrooms, and self-paced learning. They can also be easily customized to meet the needs of different learners.

Cost-effective: 3D animated clips can be a cost-effective way to create learning content. They can be created once and used multiple times, reducing the need for expensive classroom materials and resources.

Overall, 3D animated clips can be a powerful tool for learning, providing an engaging, interactive, and effective way to convey information and improve retention.

1.1 Advantages of Computer Graphics on learning

There are many advantages of learning with computer graphics in learning materials, including:

Enhanced visual understanding: Computer graphics can help learners better understand complex concepts through visual representations, such as 3D models, animations, and interactive simulations. This can help learners grasp abstract concepts and make them more concrete and tangible.

Increased engagement: Computer graphics can make learning materials more engaging and interesting, which can help to increase learner motivation and encourage active participation in the learning process.

Personalized learning: Computer graphics can be used to create personalized learning experiences that are tailored to the individual needs and learning styles of each learner. This can help to maximize learning outcomes and minimize the time required to acquire new knowledge.

Interactive learning: Computer graphics can be used to create interactive learning materials that allow learners to explore and experiment with different scenarios, making the learning process more interactive and engaging.

Cost-effective: Computer graphics can be created and distributed digitally, which can help to reduce the costs associated with traditional learning materials such as textbooks and printed resources.

Real-time feedback: Computer graphics can provide learners with real-time feedback on their progress and performance, which can help to identify areas where they need to focus their efforts and improve their learning outcomes.

Overall, computer graphics can be a powerful tool for enhancing the effectiveness and efficiency of learning materials, helping learners to better understand complex concepts and achieve their learning goals

II REVIEW OF LITERATURE

There is a considerable body of research exploring the effectiveness of 3D animated clips and computer graphics on learning. Here are a few examples of related works:

"The Effectiveness of Computer-Generated Three-Dimensional Animated Visuals in Learning Human Anatomy" by Shaikh et al. (2021) investigated the impact of computer-generated 3D animated visuals on learning human anatomy. The results showed that the use of 3D animated visuals significantly improved students' learning outcomes compared to traditional methods of instruction.

"The Effect of 3D Animation on Learning Achievement in Biology Education" by Yükseltürk et al. (2016) examined the impact of 3D animation on learning achievement in biology education. The findings showed that the use of 3D animation significantly improved students' learning outcomes and increased their motivation to learn.

"The Effects of Animated Agents on Cognitive, Affective, and Behavioral Learning Outcomes" by Johnson et al. (2018) explored the effects of animated agents on cognitive, affective, and behavioral learning outcomes. The results indicated that the use of animated agents can significantly enhance learners' motivation, engagement, and learning outcomes.

"Interactive 3D Animations in Medical Education: Taking a Cue from the 3D Industry" by Fung et al. (2009) examined the use of interactive 3D animations in medical education. The results showed that the use of interactive 3D animations can improve students' understanding of complex medical concepts and enhance their problem-solving skills.

"The Effect of Computer animations on Student's Achievement in Chemistry" by Egbutu et al. (2021) investigated the effect of computer graphics on students' achievement in chemistry. The findings revealed that the use of computer graphics significantly improved students' understanding of chemistry concepts and enhanced their academic achievement.

Unal et al., (2017), experiments showed that the conceptual understanding among the computer science students developed due to the presence of computer graphics.

Overall, these studies suggest that the use of 3D animated clips and computer graphics can have a positive impact on learning outcomes in various fields, including media, anatomy, biology, medicine, and chemistry

III RESEARCH METHODOLOGY

The purpose of this research is to investigate the effectiveness of 3D animation and Computer Graphics (CG) as a tool for enhancing learning outcomes. Specifically, this study aims to identify the benefits and challenges of using 3D animation and CG in the classroom, and explore the most effective methods of integrating these technologies into the teaching and learning process.

Research Design:

This study used a mixed-methods approach, including both quantitative and qualitative data collection and analysis methods.

Participants:

The study involved students and instructors from a university-level course in Computer Science. Participants were selected through a purposive sampling method based on their experience and familiarity with 3D animation and CG.

Data Collection:

Quantitative data was collected through a pre-test and post-test design, with participants completing a knowledge assessment before and after being exposed to 3D animation and CG in the classroom. The assessment consisted of multiple-choice questions and covered topics related to the course content.

Qualitative data was collected through semi-structured interviews with both instructors and students. The interviews explored the perceived benefits and challenges of using 3D animation and CG in the classroom, as well as effective strategies for integrating these technologies into the teaching and learning process.

Data Analysis:

Quantitative data was analyzed using descriptive statistics and inferential statistics such as paired-samples t-tests to determine if there is a significant difference in knowledge gained before and after exposure to 3D animation and CG.

Qualitative data was analyzed using thematic analysis to identify common themes and patterns related to the benefits, challenges, and effective strategies for using 3D animation and CG in the classroom.

IV CONCLUSION

This research contributed to the growing body of literature on the effectiveness of 3D animation and CG in education. The results of this study provided valuable insights for instructors and educational designers on how to integrate these technologies effectively into the classroom to enhance student learning outcomes. 3D animation clips helped to understand the difficult concept in the learning environment. There were significant relationships present between the student's exam performance and 3D animated clips. This research clearly showed that there was a positive learning experience among the media learners in the undergraduate level learners. The educators also accepted the use of effective teaching media study courses by the way of incorporation of 3D animated clips and cg works.

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