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INNOVATIVE TECHNOLOGIES IN EDUCATION

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Abstract
The modern education system is increasingly competing with the entertainment sector, necessitating new methods to actively engage students in learning. Given the rapid advancement of Virtual Reality (VR) and Augmented Reality (AR) technologies, it is essential to incorporate educational content, particularly school subjects, into application development. This approach aims to create an optimal blend of the learning process and the gaming experience.

Keywords: Virtual reality, augmented reality, computer technology, script, multimedia.

Introduction

In contemporary society, modern technology is ubiquitous and has become an indispensable part of daily life. In the field of pedagogy, integrating these technologies with traditional teaching methods has provided both teachers and students with greater flexibility, significantly enhancing the effectiveness and visual clarity of lessons.

The rise of the Internet led to the creation of new models of instruction, such as electronic learning (e-learning) and blended learning. Blended learning is defined as an instructional model that merges traditional face-to-face classroom time with online learning. It allows students to exercise some degree of self-control over the pace, timing, location, and path of their studies, effectively integrating both instructor-led and electronic learning experiences.

The drive for innovation in education is fueled by contemporary learning goals. The competition with the entertainment industry requires educational institutions to adopt mechanisms to attract and retain student involvement. Consequently,

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Augmented Reality (AR) and Virtual Reality (VR) technologies are rapidly being adopted in international schools and universities.

- Augmented Reality (AR) enhances the real world by adding interactive, digital elements to create a unique experience.
- Virtual Reality (VR) uses computer technology to create a three-dimensional, interactive world that gives the user a genuine feeling of immersion and presence.

VR and AR applications can be classified according to the roles of the teacher and student, and the sequence in which information is acquired and tasks are completed. The text outlines four distinct pedagogical scenarios:

1. Linear Structure: Similar to a book or lecture, this presents material sequentially. The student has limited control, primarily choosing which material to view.
2. Interconnected Elements: This uses static or dynamic links to connect various elements, allowing the student to autonomously choose the sections to study and manage their own learning path.
3. Creative Generation: This enables students to independently create materials and elements, promoting creative thinking and innovation.
4. Practical Consolidation (Group Work): Focused on applying knowledge through collaborative problem-solving. This interactive scenario allows for self-paced learning and is primarily suited for group instruction, often with a teacher's involvement, whereas the first three scenarios can support independent study.

It is important to note that the interactive nature of VR requires a user or participant. Developers prioritize involving all senses during interaction, compensating for simplified graphics, rather than striving for perfect realism.

Formats for VR-Based Education

VR technologies can be adapted for the educational process in several formats:

1. Full-time/In-person Education: A standard lecture format where a short 5-7 minute immersion into an interactive VR world is integrated to engage students and provide clear visual illustrations of the material.
2. Distance Education: Students, regardless of their physical location, can complete tasks and attend lectures together, experiencing a full sense of presence. These sessions are typically longer (around 45 minutes).
3. Blended/Mixed Education: For students unable to be physically present, VR headsets, coupled with 360-degree cameras and real-time broadcasting

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capabilities in the classroom, allow for remote attendance and participation without limitation.

4. Self-education: Many existing courses can be redesigned for independent study using a smartphone and a VR headset. Examples include the *PhysicsPlayground* project for exploring the universe and the *MITARG ames* project, like the *Environmental Detectives* game, which overlays virtual scenarios onto real-world terrain.

These VR formats are valuable not only in schools and universities but also as training grounds in various organizations. For example, most airlines and aircraft manufacturers use flight simulators to train pilots and air traffic controllers, and similar technology is used by locomotive drivers and athletes.

Conclusion and Challenges

In summary, AR and VR technologies significantly aid material mastery in education by providing clear visual representation of processes and enabling interaction with individual elements. The inclusion of game elements naturally boosts student engagement. Furthermore, the use of a program script helps focus students' attention on core course materials, promoting concentration and eliminating external distractions.

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