The Intersection of VR And Education

Maherah Muqri

INTRODUCTION

This project is a literature review focused on exploring the intersection between VR and education. This project focuses on the creation of VR experiences, such as escape rooms, as a method of reviewing and learning concepts in the classroom. Aside from the literature review, I have also begun the process of creating an educational escape room using the Unity Game Engine.

VIRTUAL REALITY

Virtual Reality, is a technology in which the uses will put on a headset or other hardware on to immerse themselves in an environment. Through the newfound accessibility of VR, this technology has begun to be introduced in a variety of disciplines, included education.

UNITY GAME ENGINE

https://unity.com/legal/branding-trademarks

- Supports: Oculus Rift, HTC Vive, PlayStation VR
- Large selection of assets, plugins, easy UI interface
- For many VR developers Unity is the preferred development environment
- **Pros**: Beginner friendly, access to toolkits [6]
- **Cons**: Not open source, low performance [6]

UNREAL GAME ENGINE

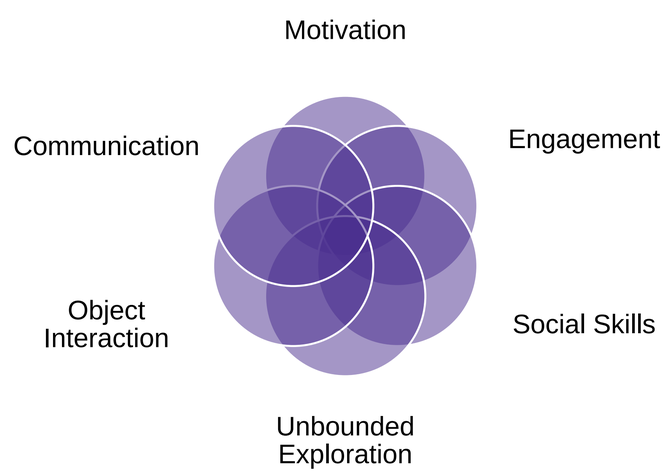
https://www.google.com/url?sa=i&url=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FFile%3AUnreal_Engine_Logo.svg&psig=AOvVaw12XUXTZCkUFKbgijbkkUE_&ust=1712169125251000&source=images&cd=vfe&opi=89978449&ved=0CBIQjRxqFwoTCNjd_paVpIUDFQAAAAAdAAAAABAO

- Supports: Oculus Rift, HTC Vive, Valve Index
- High fidelity, graphics focused VR projects
- Less accessible to developers of various skill levels
- **Pros**: Open source, great for graphics [6]
- **Cons**: Not beginner friendly, high system requirements [6]

https://mkmuqri.github.io/educational_escape_room/

VR IN THE CLASSROOM

Testimony by some teachers has suggested that there are quite a few benefits of learning with VR. [1] [7]



While there certainly are benefits, as outlined above, it's important to note any drawbacks or issues with the integration of VR technology in the classroom. [3] [4] [5]

- Accessibility
- Safety While Using
- Funding to Purchase
- Lack of Evidence on Benefits

HOW VR IS BEING USED

VR has already started being used in classrooms. The following are examples of implementations introduced in the articles used for the literature review:

- **Escape Rooms [7]:** Stereochemistry Escape Room
- **Virtual Garden [2]:** Gardening and Plant Life Simulator
- **Virtual Labs [2]:** Physics Lab
- **Virtual Worlds [2]:** Math and Physics Virtual Worlds
- **Virtual Exhibit Visits [2]:** Gorilla Zoo Exhibit

THE CREATION OF AN EDUCATIONAL ESCAPE ROOM

While creating my own educational escape room, I tracked the process:

- Deciding between Unity and Unreal
- Starting the tutorials
- Initial set up
- Working with escape room assets
- Problems running the project

FUTURE STEPS

After the completion of the escape room, the goal is to do the following

- Testing the escape room
- Drawing conclusions on the process
- Evaluating the effectiveness by testing on an elementary age group

CONCLUSION

VR technology allows students to interact with objects they may not have been able to interact with before, let them explore remote areas, immerse themselves in an environment unknown to them, and much more. With the recent rolling out of VR field trips in school districts, VR carts (much like iPad or laptop carts) there's no doubt that eventually, VR will become a very real part of our education system. In my opinion, this change will be an adjustment but overall, a great opportunity for students to learn things they may not have had access to before.

REFERENCES

1. Raimundo Castaño-Calle, Amparo Jiménez-Vivas, Raquel Poy Castro, María Isabel Calvo Álvarez, and Cristina Jenaro. Perceived benefits of future teachers on the usefulness of virtual and augmented reality in the teaching-learning process. Education Sciences, 12(12):855, 2022
2. Don Allison and Larry F Hodges. Virtual reality for education? In Proceedings of the ACM symposium on Virtual reality software and technology, pages 160–165, 2000
3. Anubis G de Moraes Rossetto, Thauany C Martins, Luís Augusto Silva, Daiana RF Leithardt, Beatriz María Bermejo-Gil, and Valderi RQ Leithardt. An analysis of the use of augmented reality and virtual reality as educational resources. Computer Applications in Engineering Education, 31(6):1761–1775, 2023
4. Sirisilp Kongsilp and Takashi Komuro. An evaluation of head-mounted virtual reality for special education from the teachers' perspective. In Proceedings of the 25th ACM Symposium on Virtual Reality Software and Technology, pages 1–2, 2019.
5. Charles M. Schuster and Martin J. Moloney. The future of virtual reality in education. In Proceedings of the 13th International Conference on Education Technology and Computers, pages 85–89, 2021.
6. https://kevurugames.com/blog/unity-vs-unreal-engine-pros-and-cons/
7. Daniel Elford, Simon J Lancaster, and Garth A Jones. Stereoisomers, not stereo enigmas: A stereochemistry escape activity incorporating augmented and immersive virtual reality. Journal of Chemical Education, 98(5):1691–1704, 2021.