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INITIAL PLAN: EXPLORING THE USE OF
VIRTUAL REALITY IN EDUCATIONAL
ENVIRONMENTS

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PROJECT DESCRIPTION

Virtual Reality (VR) is an emerging technology whose practical uses in education have not been fully utilized (Pantelidis 1993), I believe that it has a big potential in facilitating learning in an educational environment. The virtual reality market has been growing rapidly over the last few years with such things as the Meta's Metaverse or the Meta Quest 3 and I think the possibilities for the use of virtual reality will only grow as the technology gets improved and more sophisticated.

After the Covid-19 pandemic, it became clear that additional educational tools are vital to facilitate students' learning (Brannen et al. 2020), as such developing a remote virtual reality application could help students to engage in learning remotely. However, I acknowledge that the technology is not currently available to a lot of students, but I believe there may be a future where they are more affordable and widespread.

For this project I have chosen to explore the practical uses of virtual reality in educational settings with a focus on the process of teaching the topic of astrophysics. Gamification can allow for better engagement with many students (Buckley et al. 2017) and I believe this technique can be utilized to improve the process of teaching by utilizing the unique aspects of virtual reality.

My project is distinct from these as it will focus on the practical aspects of using virtual reality technology in lessons. I have had previous experience with using the Unity game engine however I have little experience with virtual reality using Unity so I believe this project will be feasible within the time set and provide sufficient challenge to help push my project management skills and software development skills.

AIMS AND OBJECTIVES

Aim: Develop a virtual reality application to immerse students in their learning

- Create a model solar system in Unity
 - Risks: Difficulty creating 3d models
 - Mitigation: There is a free library of models in unity and if needed I can use Blender which is free modelling software to create my own models.
- Allow interactivity using the VR controllers
 - Risks: New technologies could hinder progress - I have previous experience using unity however I have not developed a virtual reality app
 - Mitigation: Unity Learning Pathways provide a learning material to facilitate development.
- Deploy the application to the Meta Quest Virtual Reality headset
 - Risks: The program is too resource intensive.
 - Mitigation: I will optimise the program to be able to run on the headset and if I cannot run it natively, I will use university systems.

FEASIBILITY

I will be gathering feedback from university students and potentially from teachers to analyse the effectiveness of my project. This will provide me with valuable insight from these demographics, and I have decided to use university students rather than GCSE/A-Level students because the timeframe allocated to this project will not be enough to receive approval and find suitable participants.

I will require ethical approval for my presentation due to the collection of personal data and I will be using the streamlined approach as I am not collecting data from vulnerable individuals.

The special resources that I require is a Virtual Reality headset. This will be provided by my supervisor however if that cannot happen then I can provide it myself.

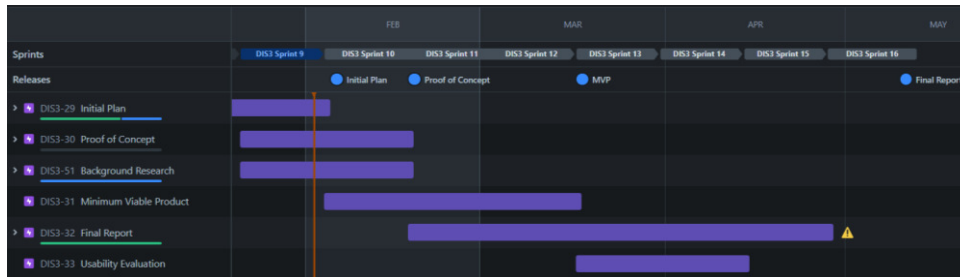
Risk Number	Risk Factor	Severity	Probability	Mitigation
1	Time Mismanagement	High	High	A minimum viable product will be created as soon as possible to ensure that even if I run out of time then I have something to upload. Also, I will be utilising Scrum which will allow me to change my priorities if it shows that I cannot complete certain objectives in the allocated time.
2	Task Overflow	Low	High	I will review the velocity reports and will allocate enough story points that is feasible in each sprint.
3	Data loss	High	Low	My reports will be automatically saved to the cloud so if a crash does happen it is minimal, for programming code it will be regularly saved to minimise data loss in case of a crash. I will also use a git repository for version control and to enable branches for each feature to ensure that it will not break the entire system.
4	Ethics issues	Med	Low	I will be in contact with the ethics committee and will only use approved methods, if I desire to use a different method of data gathering, I will wait until ethical approval before starting to gather data which may delay my project.

WORK PLAN

I have planned on having weekly regular meetings with my supervisor where we analyse the workflow and review the current sprint progress and decide on future progression with the project. I am using Jira as a project management tool to develop my skills and to utilise the Scrum methodology to facilitate a dynamic development process that will allow me to accurately target pressing issues within the project with constant reviews to analyse the project's progress.

By reviewing burnup and velocity reports it will allow me to accurately dictate the progress that I am able to achieve each sprint, this will lead to a more accurate allocation of story points for each sprint and can help complete the project in the allocated time.

The milestones that I have highlighted for this project are the initial plan, background research, proof of concept, minimum viable product (MVP), usability evaluation and the final report. I have included a buffer at the end of the project to account for any unseen delays.



Milestone	Tasks	Deliverables
Proof of Concept	A simple deployment showing how VR can be used (no quality models or content just basic functionality)	Basic interactivity with objects and deployment onto a headset
Background research	This will provide me with the base for my project and allow me to research other similar projects to	Documents containing information relating to relevant research papers, potential technologies, and information on stakeholders.
Minimum Viable Product	Development of the core features	Virtual Reality interactivity Interactive simulations Learning materials and data Tracking which courses the student has completed
Usability Evaluation	Using research participants, evaluate the effectiveness of the application giving tangible data.	Interview with participants outlining their experience with the app.
Final Report	Includes all the progress made and details the progression of the project	Final project report.

Core features:

- Virtual Reality interactivity
- Interactive simulations
- Learning materials and data
- Tracking which courses the student has completed

Optional features:

- Provide a learning portal for other potential topics
- Narration
- Assessment to consolidate learning

REFERENCES

Brannen, S., Ahmed, H. and Newton, H. 2020. *Covid-19 Reshapes the Future*. Center for Strategic and International Studies (CSIS). Available at: <https://www.jstor.org/stable/resrep25198> [Accessed: 4 February 2024].

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Pantelidis, V.S. 1993. Virtual Reality in the Classroom. *Educational Technology* 33(4), pp. 23–27.