**Aims**

The primary aim of this project is to explore the viability of Virtual Reality (VR) to assist people with learning disabilities with independent travelling.

A subsequent aim of this project is to demo a suitable system through a VR1 study and a VR2 trial on appropriate navigation paradigms that enable individuals with learning disabilities to navigate a virtual space with minimal risk of experiencing motion sickness.

**Objectives**

• Examine and analyse the current Independent Travel Training process by reviewing the positive impact it has had and its current limitations.

• Investigate the current effectiveness of VR as a Travel Training tool through comprehensive research into Travel Training studies and the predecessors to this application.

• Learn and gain an in-depth understanding of the experiences of those with learning disabilities, especially regarding independent travel.

• Prototype a VR Travel Training application that aligns with existing research and includes new ideas to create a useful tool that can be used by people with learning disabilities to build up their independent travel confidence.

• Conduct research and testing ethically, legally, and professionally in compliance with the British Computing Society’s (BCS) Code of Conduct.

• Document and report on the findings of this project in a detailed and comprehensive manner so that it may be used to supplement the understanding of interaction paradigms and locomotion in future research.

**Brief Description**

This project aims to build upon existing research into the use of virtual reality for independent travel training. To achieve this, the project will focus on a particular question concerning navigation and interaction paradigms in the virtual world and what method might cause the least amount of motion sickness in the application’s users.

To achieve this, the project will trial different methods of locomotion through the application’s content with the inclusion of varying latency rates via VR hardware to determine the most suitable combination of hardware and content for its VR application based on conclusions drawn from the testing results with the participant group.

**Outline of Methodology**

The aim of this research is to test the effectiveness of the different implemented locomotion paradigms within the Virtual Reality Travel Training simulator context. The application will involve the user progressing through a series of different levels designed to look like typical UK streets wherein they’ll be challenged to cross a road using different crossing types. The users will need to navigate through to complete the level. Level types will include zebra crossing, pelican crossings, crossroad crossing and plain road crossing. With regards to locomotion paradigms, users will have the option to select their preferred method of locomotion at the start of the level. The locomotion paradigm options will include joystick movement and ‘arm-swinging’ walking. The latency rates will be compared through the use of different headsets (PICO 3 or the Oculus Quest 2).

“NICER” are a group of adults with learning difficulties who have prior experience of participating in academic research. Users from the “NICER” group will be invited onto campus to participate in the testing of the developed virtual reality travel training application to provide valuable feedback on the effectiveness of the application. Attending teachers/supervisors from Oakfield School will also be present to take part and to help the students, but also to get their views on what the project should focus on going forward.

Each participant will attend a single session guided by the student and supervisor. Each session will be attended by 5 participants. While one participant uses the headset the others will have the opportunity to watch. The HMD perspective of the participant within the VR world will be displayed through a monitor. Prior to a participant beginning their session in VR, they will be given a VR Sickness Questionnaire (VRSQ) to answer. Upon completion of the VRSQ, participants will have the opportunity to pick their preferred headset.

While immersed in the VR application, participants will not be permitted to spend longer than 10 minutes continuously using the headset to avoid motion sickness being caused because of prolonged exposure. The sessions will be 2 hours long allowing for the participants to attempt the multiple levels and locomotive options of the application. Upon completion of a level, participants will be asked to complete another round of the VRSQ.

After a participant has completed all the activities that they've wished to participate in within their allocated 2 hours, they will be asked an additional set of questions regarding what they thought of the application, more specifically if they thought the application would be effective in aiding themselves/others in traveling safely/independently and any improvements they feel would be necessary to achieve this outcome in the future, and their thoughts on whether Virtual Reality is suitable for this kind of training.

These sessions will be audio recorded, then transcribed and anonymised afterwards. Notes will also be taken throughout the sessions. Insights from these sessions on how the participants found each activity/what worked/what didn’t will be written up and analysed.