# Avatars for Mobility Impaired Players in Games and Virtual Reality

## Introduction

Existing research has studied the design of movement-based games to support mobility impaired players (wheelchair users) [see 1,2]. This has focussed on particular design elements, such as interface. Thus far, little work has considered the effects of player representation (avatar) on their experience, nor player's preferences on how they are represented in-game. This is particularly relevant to VR games, which can convey a strong sense of player embodiment.





## Objectives

1. To design and develop a suitable research game which can be used to explore user's response and preferences to different player avatar types.

2. To implement different configurable human avatars: able-bodied, wheelchair users, other vehicle users (quad bike).

3. To create a VR version of the game to support different study conditions.

## The Game

We designed an infinite three-lane running game, in which the player must evade pursuing zombies.
"*Infinite runners*", such as Temple Run, have a wide audience appeal, are easy to grasp conceptually, and support either short or long play sessions. In addition, this type of game naturally supports different locomotion modes (running, using a wheelchair, and quad-bike), allowing easy comparisons of player experience.
We also added coins and collectables to create more sophisticated game play.
The game is set in a city environment and echoes popular representations of "zombie apocalypse" narratives.

## Further Work

We are planning to use this game in a series of user studies over the next year.

The aim of these studies is to investigate the effects of the different avatars on both able-bodied players and wheelchair users. This will include difference in player experience, perceptions of player's abilities, and user preferences.

We will explore both non-VR and VR versions of the game.

## References

[1] Kieran Hicks and Kathrin Gerling. 2015. Exploring Casual Exergames with Kids Using Wheelchairs. In *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play* (CHI PLAY '15). ACM, New York, NY, USA, 541-546.

[2] Kathrin M Gerling, Conor Linehan, Ben Kirman, Michael R Kalyn, Adam B Evans and Kieran C Hicks. Creating Wheelchair-Controlled Video Games : Challenges and Opportunities When Involving Young People with Mobility Impairments and Game Design Experts. International Journal of Human-ComputerStudies94 (2016), 64-73.

## Virtual Reality with the Oculus Quest

The game was initially created to be played in any WebGL2 enabled browser. This facilitates user studies which can be deployed online as well as in the lab.
We also developed a VR version which runs on the Oculus Quest and creates a sensation of being located in the virtual body. Our VR version supports different control methods, including joystick and free movement.

**Student: Sam Stubbings**          **Supervisors: Patrick Dickinson, Kieran Hicks & Kathrin Gerling**