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CTEC3451 Development Project

**“Creating a control mapping program for game accessibility”**

First Deliverable

Project Supervisor: Jethro Shell

Project Author: Ruya Kumru-Holroyd (P2512547)

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# Abstract

There are millions of video games out there in the world, but how many are truly accessible and have the right representation? The answer is less than you would hope, which is why I am creating a project that will show it is possible to do and can be used and adapted for future use.

This report details the research into creating a control mapping program, as well as the two prototype games created to test the control mapping program. For these games, I wanted to include the right representation and accessibility options, to really deliver the importance and the ability to be able to include these in video games. Therefore, I took the time to research different disabilities, types of game accessibility in current games as well as looking at controllers and mapping solutions to create this project.

# Literature Review

## Introduction

Video games, “a game in which the player controls moving pictures on a screen by pressing buttons” (Cambridge Dictionary, (2020). VIDEO GAME), have become an everyday presence in today’s modern society. Being around since the 1950s, they have gone from military machines to arcade systems, to home consoles, to handheld consoles and mobile devices (History.com Editors, 2019). With the evolution of video games has also come the evolution of technology itself, with great improvement on new hardware, graphics, and performance.

It first started out as electromechanical games that were introduced in military bases, to offer relaxation to recruits, for example in 1951 Marty Bromley ran a games room in a military based and launched SEGA (Service Games) (Carrera, S. (2016), pg. 16). They also started as dissertations in universities by avid student programmers such as OXO, known as noughts and crosses, created by A.S. Douglas at the University of Cambridge in 1952 (History.com Editors, 2019). In 1958 the first electronic game, Tennis for Two was created by Willy Higinbotham, which was then adapted in 1968 by Ralph Baer who sold it to Magnavox and, in 1972, released it in the first console named the Odyssey. Also, in 1972 was the release of Pong in the arcades by the company Atari which started the first court battle of rights of a game. In 1980, the Japanese company NAMCO released Pac-Man in the arcades which brought in a broader variety of players, as the game was even popular to the female audience (Carrera, S. (2016), pg. 16) and in the same year Nintendo, also a Japanese company, launched Donkey Kong and an office in the United States. Both games brought a lot of success to the arcade business. However, in late 1982 there was a crash in the video game industry which lasted until 1985 with the release of Nintendo’s Famicon, more widely known as the Nintendo Entertainment System (NES) (mentioned in the History of Video Games timeline (Wolf, M.J.P. (2008), pg. 18), due to its graphically advanced technologies and story based characters, with titles such as Mario Bros and The Legend of Zelda, that were responsible for the NES success of selling over 50 million consoles. From this, Nintendo was able to hold out with the most sold console of all time even with their upgraded Super Nintendo Entertainment System (SNES) beating out SEGAs Genesis console release in 1991. This was until Sony released the PlayStation in 1995 which was able to become the most sold console of all time until they were beaten by their next generation, PlayStation 2 in 2000. Finally, in 2002, Nintendo returned with the GameCube and Microsoft joined the console market with their release of the XBOX, since then these three companies have been battling the console market with new generations of consoles being released every few years, as mentioned by (Carrera, S. (2016), pg. 17) in their account of console history. A brief timeline of video game history can be found in Mark J. P. Wolf’s book The Video Game Explosion: A history from PONG to PlayStation and Beyond, (Wolf, M.J.P. (2008), pg. 17-21).

According to (Clement, J. 2021), the number of video game users in the UK is 44.32 million people, over 50% of the whole UK population. The game industry in the UK itself is the biggest in Europe and the sixth worldwide, with a market value of £5.3 billion, this makes it one the highest market in the entertainment industry, compared to music and film.

And, since the 1950s, video games have grown massively in the games market and in technological advances. The number of people playing video games has also risen massively over the years, and with more players come more different types of players and player styles. Back in the early days of video games, controls were very simple with only a couple of buttons, or a joystick needed to play them, however with the advancement of hardware and technology over the years, controllers have become more complex with multiple buttons and keypads or joy sticks on just one controller. This makes it a lot more difficult for those with motor disabilities to enjoy or be able to play modern video games. Also visually, graphics in games have come a very long way, “It is no longer about the dark background with characters represented by white rectangles” (Carrera, S. (2016), pg. intro) it is now full 3D animation, with complicated environments and full-fledged stories. According to AbleGamers, a charity that aims to improve accessibility in video games, around 46million video game players in the United States have a disability (Valentine, R. 2020). Which is around 1 in 5 of video game players in the United States, which is why there is a need to have awareness and for action. Many of these players are unable to play popular games due to the complexity and lack of accessibility options for them.

## Reviewing Materials

Silvio Carrera has been mentioned throughout this Literature Review, with his book Accessibility in Games: Including people with disabilities, being a perfect source of information for my project. I have been able to learn about the history of video games and see what game developers need to do to make games more accessible, with details of different genre’s, types of disabilities and the three issues that disable gamers come across within video games the most; “1. No clear information of the disability supports the game provides, 2. The way feedback is given in games, players might not realise when feedback is given, meaning they won’t be able to tell when an important audio cue is presented to them, 3. They might not be able to use the default controller the platform suggests, which means they won’t be able to do input in the game.” (Carrera, S. (2016), pg. 13) …(continue)

Game Usability: advancing the player experience by Katherine Isbister and Noah Schaffer is a book that I first had on my mind when starting this project, my first thought was that usability and accessibility were one in the same, however this was not the case. Usability is about making software usable by paying attention to human limits in memory, perception, and attention ‌Isbister, (K. and Schaffer, N. (2008), pg. 4). As Silvio Carrera rightly says, accessibility “must not be confused with usability which is to what extent can a product be used by a specific user in order to attain a specific goal” (Carrera, S. (2016), pg. 13) But this book still gave me some insight into controllers and other UI interfaces within video games which can still be applied in this project towards the creation of the two prototype games. …(continue)

My project to create a control mapping program for game accessibility, will need a couple of prototype games to test the program on, whilst I could create any simple prototype game, I thought it would be best to create a couple of prototypes that would include some disability representation within them. For example, my first prototype is a simple 2D basketball shooter, where the main character is in a wheelchair.

Prototype 1 is a wheelchair basketball game, it will be a simple 2D basketball shooter, where you must aim for the basketball hoop and gain points as you score, where the main character you control is a wheelchair basketball player, and you move up and down to aim towards the hoop and have lines to see where you are throwing the ball. The levels will get harder with different hoop positions and later moving hoops, can have different difficulty levels possibly, using my fuzzy logic system to output recommended game difficulty. This idea came about as I read through (Brody, 2020)’s article for the AbleGamers Charity called *The Need for More Disabilities in the Games We Play*. Where they discuss how there is little physical disability representation in games in our current society, and a good way to overcome this is to have a game such as Wheelchair Basketball, which could be like any other sport games out there. Another approach is to include disabled people in a wheelchair for basketball video games. I also got inspiration from the android game

The second prototype game is.

# Functional Requirements

A Functional Requirement, as described by (Martin, M. 2019), is a statement that describes the service that the software must provide. It refers to a software system or a component of one. A function is nothing more than the inputs, behaviours, and outputs of a software system. A calculation, data manipulation, business procedure, user interaction, or any other unique functionality that defines what function a system is likely to execute can all be considered. Functional Requirements are also known as Functional Specification in Software Engineering.

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