Ideation of the Walking Sim Controller

INFR 3380U - Industrial Design for Game Hardware

Colin Charleson
colin.charleson@ontariotechu.net
The Hopeful Boats
Programmer

Mark Toufic
mark.toufic@ontariotechu.net
The Hopeful Boats
Assembler

Seif Helaly
seifeldin.helaly@ontariotechu.net
The Hopeful Boats
Designer

Abstract

We noticed that there seems to be a lack of interactive active controllers in the market for an affordable price. We came up with the idea to create a controller that could simulate the motion of walking to allow players to get physical exercise from the comfort of their own home. We also wanted to make the controller affordable and available to anyone interested. We feel that this is a very important issue to address since getting physical activity every single day is essential to a healthy lifestyle, walking for just 30 minutes a day has many health benefits, such as stronger bones, reduced risks of heart disease and stroke, increased muscle strength, decreased body fat, and the list goes on. We believe that we were able to create an effective solution to the problem that provides users an easy way to get their daily physical activity in.

Introduction

As mentioned previously, the problem we are looking to solve is the lack of active controllers on the market for reasonable prices. We believe that active controllers are super important because they help provide a fun way for people to get exercise. This way they will have more motivation to and encouragement through the game so they are more likely to actually exercise. This issue is more relevant than ever today, due to the recent outbreak of Covid 19 people have lost a lot of motivation to go to the gym or to go outside to get exercise. We want to provide people with the option to get exercise while still at home. Our solution to the problem was to create a controller that the player could step on to simulate the motions of walking. We plan on using cost effective materials so that anyone can afford the controller. Our design needs to be simple so anyone can use it even if they are not used to using gaming controllers to help expand our market. The design also needs to allow people with any foot size or shape to use it comfortably. Throughout this paper we will go through the ideation process of the controller, explaining how we developed The Walking Controller to become what it is today.

Literature Review

Our group analyzed two scientific documents on the two different commercial devices that we determined were similar to ours, which are Nintendo's Wii Fit Board And Nintendo's Ring Fit Controller . After analyzing two research documents we saw that using Ring Fit Controller as well as Nintendo's Wii Fit controller has had a noticeable increase of people who have lost more weight than traditional exercise. This is due to the fact that when people have been using the controllers for their daily activity they become more invested into the exergame (exercise game) as it is more engaging with the visual, audio and player feedback. This has also led many to alleviate their fatigueness, lower their own anxiety and pain intensity. Aswell, both controllers, both being simplistic in its design, have also been used for those in rehabilitation and seen success through it. Our Team has been taking inspiration to incorporate these traits into our controller but at an

affordable price.

Methods

When it comes to designing a controller, iteration is key. Our group went through many steps to get to where our controller is today. Taking a look at the flowchart (Figure 3) we created to represent all these changes you can see the thought and planning that went into our project. We started off by coming up with a couple of designs. This way we could analyze each design and come to a decision on which would be the most effective to solve our problem. Once we decided on the best idea we started the process of creating a digital prototype. With the digital prototype we could see the parts we would need and how we would construct the components. After receiving feedback on our designs we were able to finalize our digital prototype. Since we knew all the materials we would need we ordered them. When we received the materials we constructed a physical cardboard prototype. With a physical prototype it was much easier to understand scale and we could finally test how the final product would look, feel and work. With the electronics integrated we could test how the board can interact with a game so we created the unity demo for testing purposes. After testing with the physical prototype we received more feedback. We made adjustments based on the advice given and our prototype was ready to present at the live demo session.

Results

A few days after our ideation process we had finally come up with a design we were happy with at the time. On september 28th we submitted our first assignment and waited for feedback for improvements that can be potentially made, and the first design change we had made was the replacements of the two buttons that were replaced with 2 force sensors based of feedback, this also makes the controller more accessible to people because if you wish too you can use the controller with your two hands as well as your feet. Up until October 19th there were no other changes that needed to be made. On October 19th our first cardboard prototype was made with no changes since the replacement of the buttons. Later on the 15th of november we realized that the cardboard prototype was too high off the ground which could lead to injuries such as falling, twisted ankle etc, we also realized that the board did not have enough space to contain all the electronic integrations. On November 11th was completed and submitted, we waited for feedback and on november 15th we decided that our final version of the controller was the way we intended on it, and even got great feedback from the professor.

We needed to get feedback from the consumers so we conducted an SUS analysis (Figure 2 and 2.1). By surveying 6 people with 10 various questions we were able to get good feedback on what areas needed improvement. Our SUS score was a 74 which is considered to be above average so we were pleased with the score. We were especially happy to hear that users thought the system was easy to use and to learn since that was one of our main focuses.

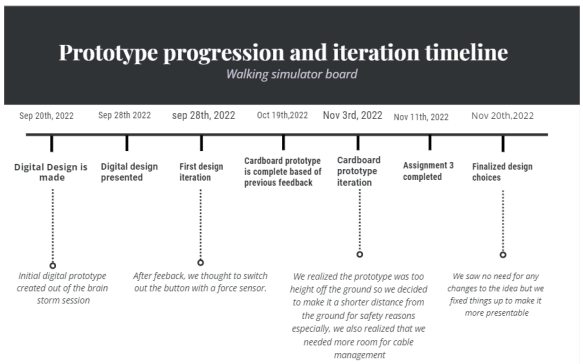
We used a QFD to manage the expectations and desires of our controller (Figure 4). When looking at the controller with consumers we asked them what they would like to see in our controller. They wanted it to be user friendly, durable, comfortable, affordable, quiet to use and to have a good appearance. We were able to use a QFD to compare our product with competitors based on these requirements. Based on our analysis we thought that our controller would meet

the needs of the consumers while staying competitive with the other products in the market.

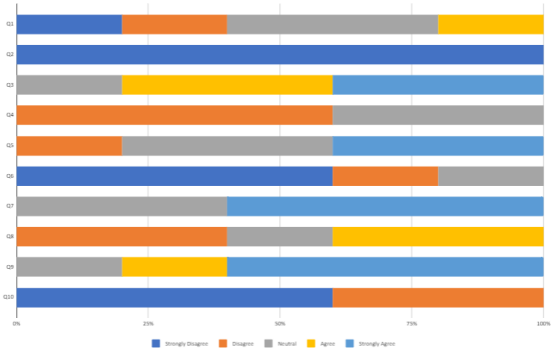
Takeaways

Over the term, assignments as well as feedback given has taught us that there is much to learn. Takeaways we have noticed is that a lot of time preparing and studying is essential for a project such as ours. We learned that the process should not be rushed and should be given the time it deserves. We shouldnt get hungover and attached to our first design because more often than not many changes will need to be made to the project to reach desired outcome. Communication is key when it comes to working in a small group, each member has a specified role but with teamwork and communication all these different responsibilities will be brought together to create the final project. Overall we would say the biggest takeaway of this project is to stay calm, it helped us with various issues throughout the semester, whether a project issue or issues out of our hands, being calm helped us solve all the problems we had, as well as made it a stress free environment. If we as a group were given the opportunity to get to work on a project of this kind again, I think what we would do differently is as follows, while coming up with ideas for the project we would come up with more ideas that way we have more options to decide from when finalizing our prototypes. I also think we would start our physical prototyping earlier on in the process so we have more time to conduct testing and make adjustments. However we are very happy with how our end result came out and enjoyed the process of creating it.

Appendix



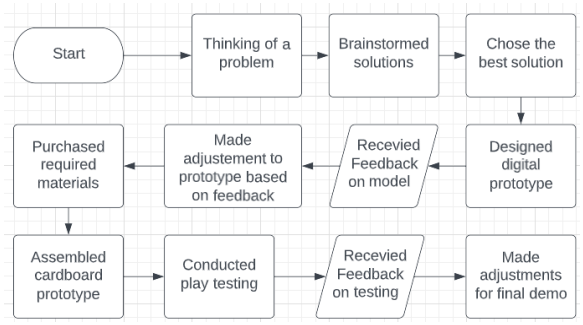
(Figure 1) Prototype progression and iteration Timeline



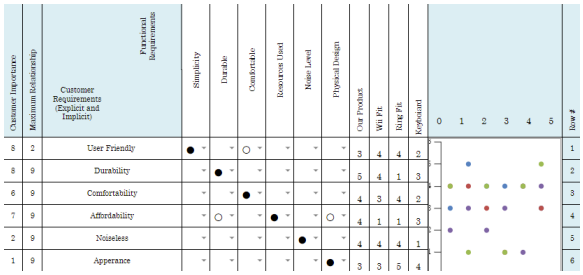
(Figure 2) SUS Results displayed on bar graph

Paticipant	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	
	I think that I w	I found thi	I thought I	I think tha	I found thi	I thought I	I would lir	I found thi	I felt very	I needed t	Score
1	3	1	5	2	5	1	3	2	4	1	82.5
2	4	1	5	3	5	2	5	4	5	2	80
3	1	1	4	2	3	1	3	4	5	1	67.5
4	2	1	3	2	3	3	5	2	5	2	70
5	3	1	4	3	2	1	5	3	3	1	70
5	5	1	3	3	2	1	5	3	3	1	72.5

(Figure 2.1) SUS individual Question Results



(Figure 3) Workflow and Iterative Design Flow Chart



(Figure 4) Quality Function Deployment Chart

Citations

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