

# The UNI

1<sup>st</sup> Jeremy Kan

*Faculty of Information Technology*  
*Ontario Tech University*  
Ontario, Canada  
Jeremy.Kan@ontariotechu.net

2<sup>nd</sup> Daniel Hong

*Faculty of Information Technology*  
*Ontario Tech University*  
Ontario, Canada  
Daniel.Hong1@ontariotechu.net

## I. ABSTRACT

Controllers made in present-day often require the simultaneous use of both hands for proper function. While this requirement does not pose a problem for the vast majority of players, for those who only have one functional one hand, this modern design makes it very difficult utilize and experience certain forms of media. Although one-handed controllers exist on the market, most are not whole controllers but instead controller add-ons that make the device clunky and non-ergonomic [1]. Other single handed controllers are custom made and typically are restricted to one or two devices causing a need to buy several expensive personalized controllers [2]. This shows a crucial need in the market for a high quality, easily accessible and compatible one handed controller.

## II. INTRODUCTION

By creating a single-handed controller, it would allow certain handicapped players to comfortably experience interactive technology and increase their likelihood of enjoyment and fun. Without a reliable and easy to access one-handed controller, this community of players would be more or less cut off from playing console games and have great difficulty playing most PC games. With over one billion people suffering from a form of disability at some point in their life[3] it is important to expand the horizons of hardware in gaming to increase accessibility. Additionally with the vast majority of persons with disability being in lower to middle class income, these options need to be affordable and reliable. These one handed devices could also potentially have use outside of gaming, such as furthering the accessibility of 3D simulations [4] and even allowing for everyday activities such as driving[5].

## III. LITERATURE

Few studies on single handed controllers have been conducted, there were several tangentially related and useful articles and products that inspiration could be drawn from. For market options there were several custom modified controllers that were available for sale [2] as well as larger company attempts at accessibility options that didn't quite hit the mark [1]. Scientific studies were also reviewed, A study was conducted on a one handed automobile controller. This study was very promising, creating a complete device that allows the driver to pilot a car relatively normally. This study was a big step in bridging the gap between the handicapped and

normal operators, however we wanted our device to be more recreational and household oriented. Also viewed was a study on a miniature motion controlled one handed controller [4], while this device was wonderfully functional, it didn't have full accessibility capabilities; only having motion controls and a joystick. While allowing the user to experience many options, any media requiring the use of multiple buttons was more difficult to access with this controller.

## IV. METHODS

The process began with identifying and defining the problem we wanted to solve, that being a affordable, comfortable and high quality one handed controller. Continuing, data was collected from various sources as well as identifying other available options on the market and what this new product could improve on. A concept and ideation process then began where drafts of concepts were made for how the UNI was to function and look. Following this a version of the UNI was developed with basic function and a 3d model created to visualize practicality and function. With this rudimentary adaptation of the idea a review process was initiated, checking to see if the product met standards and solves the initial problem. Depending on the result, the product would see further development into a true prototype or new ideas would need to be formed to solve whatever was unsatisfactory about the design.

## V. RESULTS

First we began with concepts, we drew inspiration from the Wii as well as various custom one handed controllers. Our focus was on comfort and usability. We wanted players to be able to play any game without rebinding or having any additional pieces needed. Once we were happy with our design, we began planning the internal architecture as well as making adjustments for practicality. Afterwards we moved onto creating a digital prototype and having a 3d model.

## VI. TAKEAWAY

This project taught us that it is hard to design something that fully fits the scope of what you planned for. We also learned that the designs need to account for more than you think, in our plan we wanted the UNI to be small and comfortable, but we needed to make the design larger in order to fit the electronics in and have proper spacing for the buttons. If we were to go

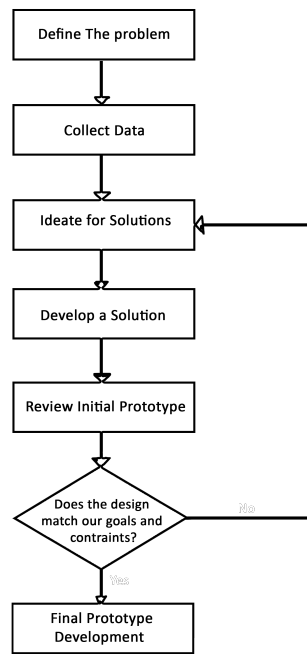


Fig. 1. Flowchart showing our workflow and ideation process

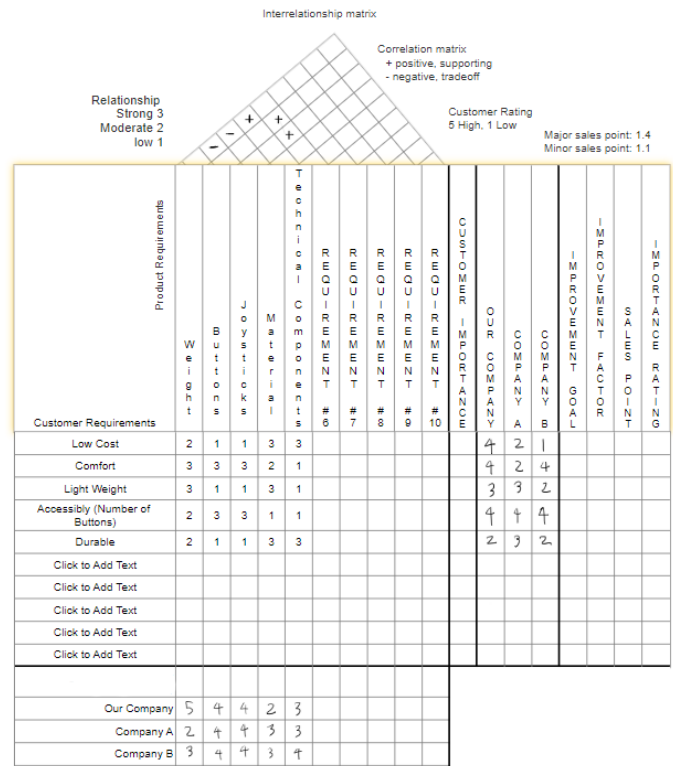


Fig. 3. A QFD showing how the UNI compares to its competitors and meets customer needs

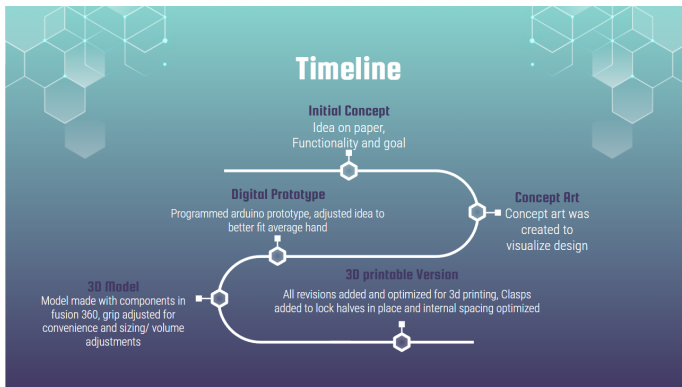


Fig. 2. Timeline of design development and improvements

back and change what we would have done, it would have been to plan more from the start and get a more solid understanding of the requirements needed for our designs.

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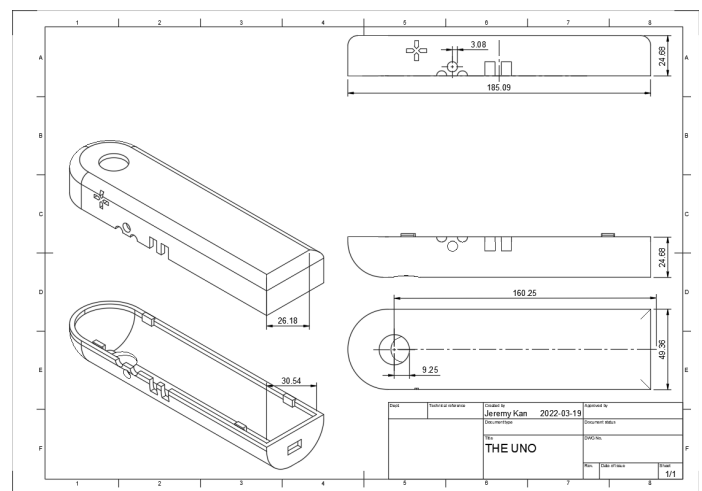


Fig. 4. Technical drawings from later stages of development

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