Theses

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Interaction with Accessibility on Digital Gaming Platform

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by

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A Thesis Submitted in Partial Fulfillment of the Requirements for the
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Interaction with Accessibility on Digital Gaming Platform

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Abstract:

This project focuses on the designing an user-interface to solve these issues with these certain accessibilities could lead to a better, functionable platform that allows the user with disabilities to be able to play the digital games. It can be projected on projector or touchscreen technology, using its function to provide more availability to support the players to reduce their struggle interacting with an actual physical board and card games. These struggles include opening the packaging, losing pieces, instructions are confusing and constantly moving around to be on the right spot. The features with accessibility will include icons for the main player to recognize their profile then select the game of their choice. Before the game starts, the multiple users are able to sign in their profile and choose their position that depends on the user's location. The player placards for each user are shown as visual clues for their location, giving instructions for step to step, then notifying them if it's their turn to play and giving an ability to configure settings. If any new player decides to join in, they can tap on empty space for a panel to appear that gives them the ability to join in and it may restart the game. Only the main player can use the main menu that allows all the players to leave the game without losing anything, unless they decide to restart the game. Using the large sized screen can provide easier interaction for users, better readability with big fonts and icons. These accessibilities can bring the directions for how games and platforms can continue to break new ground in future.

Keywords:

Essay: Critical Analysis and Summary

This article focuses on the design of user interface for games which includes the support that serves as an accessibility for the users who have disabilities. Over the years, the game companies have caused a downward spiral in relationships between their products and the community of individuals with certain limitations. Because some of their products including games were too difficult to interact with the majority of users with disabilities. This led to the development of an awareness with the accessibilities which is not always available on both physical games and digital games with technology that could provide necessary support for the users who could have difficulties with these games. All of this brings a lot of issues that can cause the limitation of what kind of interaction between the individual with disability and the games which can become more difficult even if it could bring frustration to them. Otherwise it would cause them to lose interest and could post a review about it which could lead anyone to avoid trying out or purchasing these contents just because of unavailability of these certain conveniences. This can negatively affect the sales of the games in the market which could bring unwanted impacts to the role of the game designers and their company. Including the loss of the profits, products end up becoming unsellable, it could potentially lead to bankruptcy and companies may be forced to lay off their workers. All of this situation can be avoided if the game company encourages their designers to focus more on creating better support for users with disabilities.

(1) There is a study that has revealed that the majority of gamers have certain disabilities that cause them to restrict their abilities when it comes to playing games that are both physical and digital. For the physical games which can be purchased from any stores that come in containers that are prepackaged which can be difficult to open and usually contains a lot of small pieces that can be easily lost. There are more to it being limited with accessibility such as lack of readability with fonts which can be very small which is difficult to read, step-to-step instructions are not clear, confusing layout for position of each player and this can be challenging for any individual with certain disabilities. It could become wasteful if it doesn't sell well and companies eventually would have to recall it to be pulled off from store's shelves in order to resolve any issues to improve its user experience. The other form for games are video games that could be considered as digital games which can be obtained through the network or physically from the store. It can come with more advantages than physical games while the digital games could provide better support to meet with the user's needs due to availability of the accessibilities and the game developers are able to update it constantly with patches without needing to pull them off from shelves. Currently, there are few of the available contents that are used on the technology that includes these unique features to support the users with disabilities such as special controller, simple way to configure settings for each user to adjust readability by changing fonts or size, altering with range of colors and players are able to create their own profile that can be easily selected. (2) Unfortunately, these kinds of features may not be widely available for both physical and digital games. It could be the reason that the game designers may not be aware of the user's struggle with their impairments or not following the existing guidelines and due to complexity of the game. When it comes to the absence of these accessibilities can cause negative impacts on the users with disability, they become frustrated and lose interest quickly. Which could cause these game contents to receive mixed reviews and might end up with returning the product back to the store. The game designers need to start taking action by starting to focus on developing a game that can provide support that focuses on the majority of the issues that the users with disabilities are currently struggling with. (3) If there is such a thing as the perfect game content that includes accessibilities which fulfill the users' needs and it would have become preferred by most of the users rather than other contents that lack accessibility. Plus it would be an enjoyable user experience for any users without or with disabilities. There are certain guidelines that were created solely for the range of issues that the game creator have to explore through in order to create better user experience along with

availability of accessibility that is best suited for certain games. It would be frowned upon if the creator does not follow through the guidelines that meet with the current standards that had been set to support the individuals who are going through everyday with struggling due to their disabilities that affects their daily life.

When it comes to understanding that the disability does come in different forms of mentality and physically that can affect any individual since it could limit them in many different ways. It's difficult for them to be able to function normally with their daily life while dealing with impairments. This can impact any kind of individual from birth through to age and they cannot control how this impacts their lifestyle. (4) To come up with these solutions for accessibility might be limited, because when it comes with the games that provide these conveniences might reduce its playability and this could make it less interesting to players. The designer needs to figure out how to make these conveniences to overcome these problems and be able to make the game more enjoyable to all of the users. They need to understand their struggles clearly and be capable of providing the users with disabilities the equal gameplay with any other players. Before proceeding on with designing the concept, it is crucial to start with interviewing the users with disabilities and then observing how they interact with a variety of games. This step will assist with figuring out which kind of disabilities are struggling the most and what kind of accessibilities that is beneficial for their gameplay. There are several factors with these problems that users with disabilities who have been struggling in games which are auditory, visual, motor, and difficulty. Including another group of users that are of senior age that leads to developing disabilities, they could struggle with certain games and technology. While it could be difficult for old age to adapt to the new technology and games that can be complicated to understand. (5) To come up with the concept of designing these contents with accessibilities that needs to be well-thought out and be able to provide support for each of these different kinds of disabilities. This could approach a positive outcome by giving an opportunity for players to be able to enjoy the game by using its conveniences and most likely that it could lead to improvement with the user's satisfaction. That way they longer don't have to deal with any kind of disappointment when it comes with certain obstacles and will not be frustrated by limiting them from playing games. (6) It will give an opportunity for the users to be able to play their favorite digital or physical games while they are able to overcome the barriers that prevent them from struggling with their interaction with any games. The research will include observing how these users with disabilities interact with the previous to current physical and digital games. This can assist the designers with inputting the information with what kind of issues that they are experiencing from small to big which could be resolved with the design. That way, this can approach closer to the best accessibility to offer for the future physical and digital game.

After researching these different kinds of disabilities and when it comes with figuring out what kind of accessibility that could help them to overcome these certain obstacles that had been putting them through frustration. (7) To start with the process of design, it will be necessary for designers to follow through the policies that had been established under American Disability Acts from 1990 which covered the disability interaction with technology. Establishing the guideline requirements is one of the necessities for developing the conveniences for the interactive game platform. While focusing on accessibility for each of the certain impairments that the players could have which limits them with playing the games. For those who have the limited mobility who are already confined to their wheelchairs that will be in a need of an user-interface that is easier for them to reach in to interact with or may require a special controller to assist them with ease. The game platform's feature can offer them the player's placard which will provide them an option to choose any location that will greatly reduce the need for them to repeatedly move around while playing games and no need of requiring them to change their position. There are other users with limited vision impairment that are able to configure the settings which are under their profile's image on the corner of the display and that way it could be simple that they could know where these settings are. On the settings, it will allow them to adjust the size of the fonts, screen and alter themes or colors

that can help those who have issues with colorblindness. (8) When it comes to the disability of blindness that causes the game platform being not visible due to lack of their eyesight. This will include a convenience for them that will offer the audio assist and they could use the voice-based action to interact with the user interface without need to perform the touch-based gestures on display. When it comes to using the icons are another essential for the feature with accessibility that can be provided as visual clues that are easily recognized for those who have learning disabilities. In addition, the simple step to step instructions on the player's placard will inform the user to tap the button which will attempt an action such as rolling the dice, drawing the card, moving pieces and other different kinds of interaction that is used for the game. That will give the user interface an ability to support more than one disability ranging from an individual to multiple users and it could even solve the majority of the issues that they've been struggling with.

Overall, this mockup of the user-interface had been developed and it may have solved the majority of the issues for accessibility. The survey from the participant thought this design would be a great addition for any gaming platforms since it is user-friendly for any kind of users. The others would think that the user interface could use some of the improvement on designs and add in a few more features to teach people with disabilities to learn how to interact with the device itself. (9) Yet, these designs were created mainly for accessibility and it might be well thought out. But it is certainly not the best final solution and it still could be able to help with the people who have disabilities to be able play with the games. When the design proceeds on to the prototype stage, it should be rigorously tested with both participants who have disability and others who don't. This process in order, the designer can figure out what revisions they can do to improve the user experience and bring it close to the final product. This will ensure that the game could feel like it's complete and functions well so that it is playable. It will be better rather than lacking the essential contents and having a lot of contents that might not be needed because it could cluster the space on the display. The design of the user interface had some revisions to add in features to provide accessibility, including the player's selection for their position and placards in that selected location were later added on. Then other contents for networking and tutorials were removed because they had become too complicated when it came to solving accessibilities for these contents. For this article, the games can serve as an educational tool for the individuals who interact with it, they are able to learn important things along with acquiring skills and improving their learning abilities. Observing the user's interaction, it helps the game designers to acquire the knowledge of accessibility should exist in any games and be able to assist along with the people who have disabilities in order to create a better user experience for them. (10) These games can be essential to teach children with disabilities, since they could be able to learn how to become more independent with their lifestyle and develop social skills. For that way, the children could be able to enjoy the games and it makes learning more enjoyable for them. This becomes one of the major reasons why accessibility is a necessity in every game so that no person of any disability should go through any kind of frustration when it comes with lack of accessibilities. It would be best for them to receive the support for the game so they are able to learn and enjoy most of the content. While the gaming that falls in the category of entertainment, it's absolutely for any individuals, including those with disabilities and all they want to be able to enjoy gaming which it's intended for.

In conclusion, this article explores these potential designs for conveniences that are used in the games which could be used to educate the game designers to understand clearly what kind of barriers that the users with disability have been struggling through. They could figure out how to offer these varieties of accessibilities that are capable of serving more than one disability to be able to overcome these struggles with game play. While it comes to availability of accessibilities, these individuals' lifestyle could have improved while they can be able to start socializing with other users by interacting with the user interface to play the games all together. These games can serve as educational tools for the users with disabilities and it can help them to adapt with learning abilities better compared with courses that are involved with

special education. The game designers should always keep making sure to use or create the guidelines and follow these certain policies to continuously apply throughout their games with accessibility. That way, they will need to ensure that any of their developed games, including other games that are under development will not cause any issues when it is related to accessibility. Because not every game is capable of supporting the users with impairments due to the age of the game and how complex it could be.. It could pose a challenge for the game designers who would have to figure out the solution to overcome these challenges through games and technology for accessibilities. At the end, the game designers may do want the users with the disability to be able to enjoy being able to play their games.

Appendix A - References

(1) "Estimates are provided on the total number of people in the United States whose ability to play games is affected by a disability. A large number of accessible games are surveyed for different types of impairments, across several game genres, from which a number of high- and low-level accessibility strategies are distilled for game developers to inform their design. Software technology is often difficult to access for players with disabilities. In the past decades, considerable research efforts have been spent investigating how software can be made accessible."

(2) "Awareness of game developers about the need for game accessibility is still growing, and appropriate guides are being created. However, they are often too general and difficult to fit into the appropriate category of games. Accessibility in games is defined as the ability to play a game despite limiting conditions, which can be temporary functional limitations or permanent disabilities – such as blindness, deafness or reduced mobility"

(3) "The lack of accessibility in digital games imposes barriers for people with disabilities. Currently there is not a standardized set of guidelines however there are researches that consisted in integrating guidelines disperse in several sources. Issues related to accessibility in the development of digital games have stimulated several improvements in current games e.g. closed captions for game characters, and visual representation of aural clues. There are several studies that aim to increase accessibility on digital games (e.g. external ATs, games designed for people with a specific disability, and games designed to be universally accessible)"

(4) "Disability raises many interesting questions for the social sciences: What is disability? How has the concept changed at different times? How do societies treat people with impairment? What implications do impairment and disability have for social identity and social interaction? How are disabled people represented in the media and culture? It is obvious that these academic issues have major political implications. Disability was a problem for social policy and a research domain for medical sociology, but not a central concern of mainstream sociology."

(5) "While specific needs vary from person to person, the common issue is the same. The need to address accessibility in gaming is real. The number of people interested in gaming transcends age, gender, income, and disability. The disabled are often misunderstood and underestimated in terms of potential and participation. By better understanding the needs of the disabled, in relation to gaming, and assistive technology solutions, developers can better understand part of the gaming population (their customers). "

(6) "Besides traditional accessibility aspects as barriers and users' satisfaction, results show that distinct game aspects are considered during game accessibility evaluations. In addition, the most part of works refers to evaluation of exergames or games related to users' mobility. Studies also refer to evaluations regarding more than one category of impairment, especially motor and visual impairments. Future researches in the field should focus on inspection-based methods, because traditional user-based methods have been largely referred as applicable to game accessibility context."

(7) "The purpose of this paper is to explore the issue of access to digital technology by using the lens of accessibility as set forth by the Rehabilitation Act of 1973 and the American Disabilities Act (ADA) of 1990. More specifically, this paper focuses on gamification, considers the needs of all learners, including those who identify as disabled, and raises important inquiries about equity and access to technological instructional materials."

(8) "Over the past four decades video games have become a worldwide phenomenon and one of the preferred leisure options for many. However, game accessibility remains a pending issue, due to the visual and interactive nature of the medium. Mangiron and Zhang analyse the current state of game accessibility, particularly for the blind and visually impaired. They discuss the barriers and gaming options for this target group, such as audio games and 'video-less' games."

(9) "The current state of video game design trends is therefore evidence of such discourse: they establish expectations for design and reflect expectations of game producers and players. And it is not possible to adequately express best practices, as suggested through a design-focused paradigm, without properly understanding the current state of accessibility in game design. Put simply, contemporary design informs what accessibility standards will be carried forward in the future."

(10) "This paper introduces the design of a Serious Games (SG) that will be developed to help students (aged 15-21) attending special education schools, with mild or moderate Intellectual Disability (ID) and/or high functioning Autism Spectrum Disorder (ASD), to improve Independent Learning (IL) skills. It is believed that the game would enhance the learning process and work as a helpful means for special education teachers and professionals. The game will be designed and developed based on design guidelines that have been extracted from state-of-the-art literature of SGs for people with ID and SGs for people with ASD."

Appendix A - Bibliography

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(10) Tsikinas, Stavros, Stelios Xinogalos, Maya Satratzemi, and Lefkothea Kartasidou. "Designing a serious game for independent living skills in special education." In *European Conference on Games Based Learning*, pp. 748-XXIII. Academic Conferences International Limited, 2019.

Appendix B - Thesis Defense

The introduction to the game's user interface with the interaction on one of it's feature that provides accessibility for multiple users.

Using the big images for the profile images can be easily recognized when it comes to the users with limited vision and the positioning of these content in the middle of the screen helps to make it more easier to reach.

Appendix B - Thesis Defense
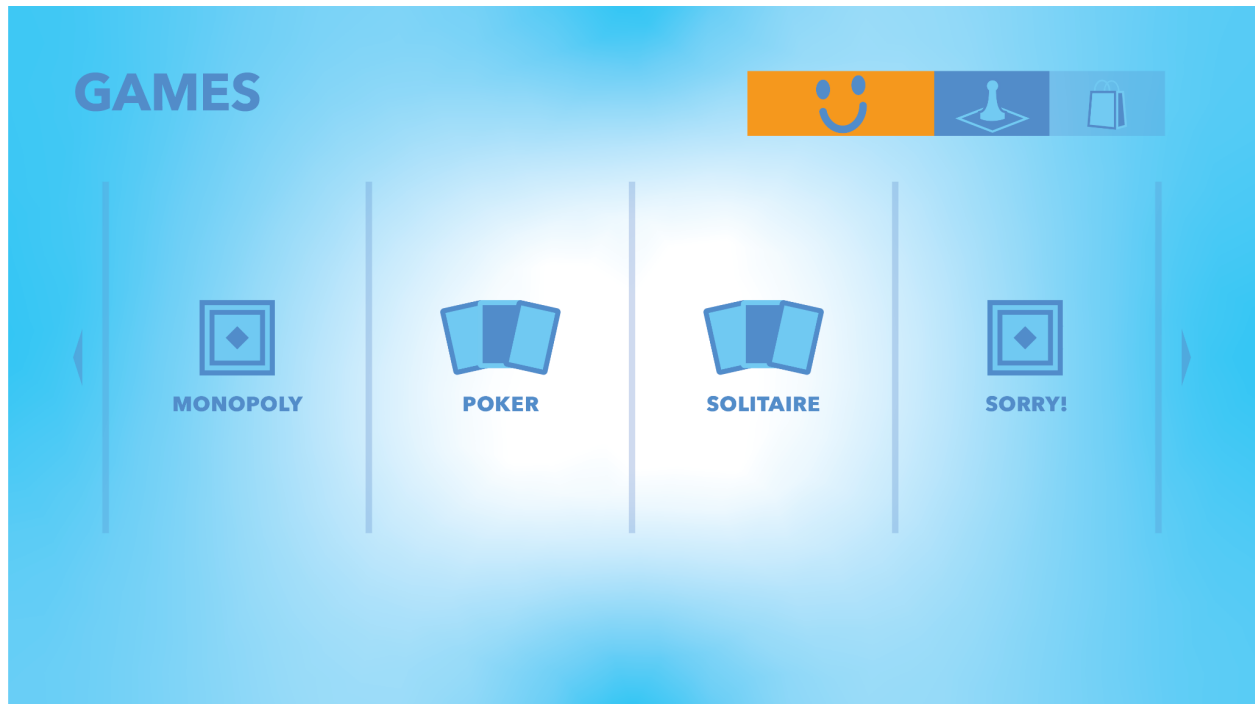
The icons could be easily recognized for any users, profile image included with general settings, there are other two icons of games and stores that are next to the profile image. Large text helps to make it readable.
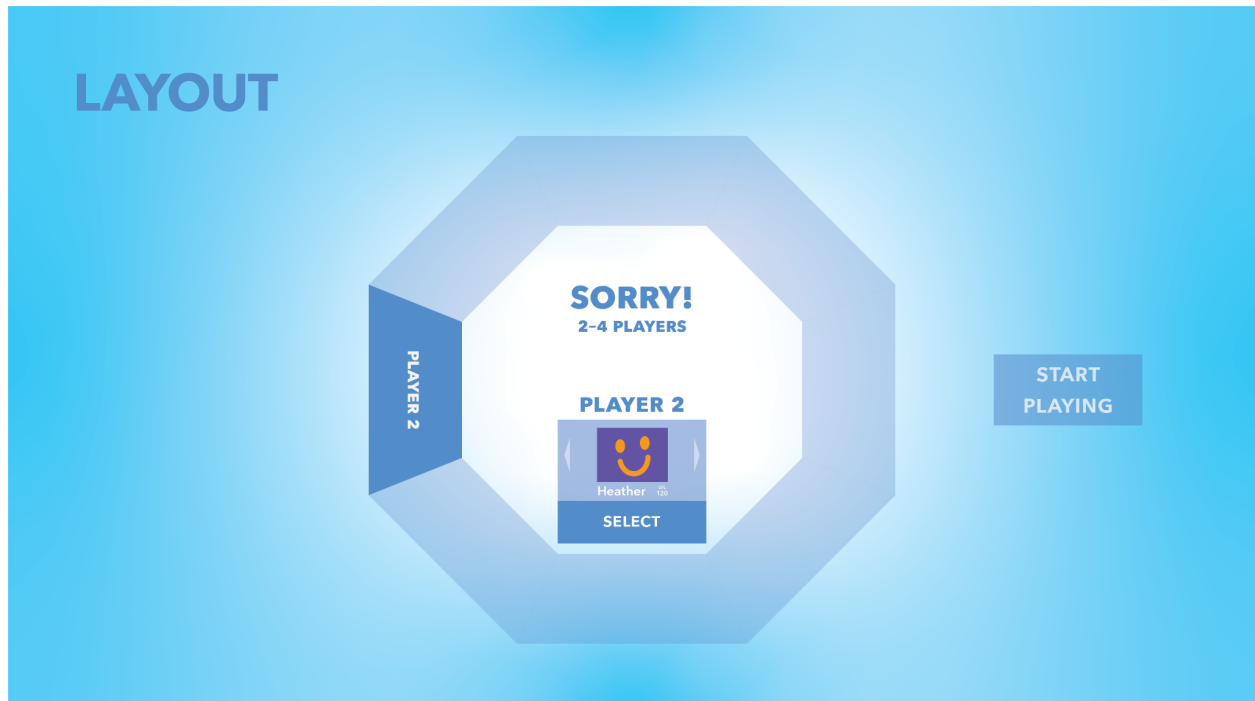
The selector for the positions that help the users to stay in their location throughout the game without needing to move around frequently. They can able to select their profiles and then after selecting the location, "Ready to Play" appears

Appendix B - Thesis Defense
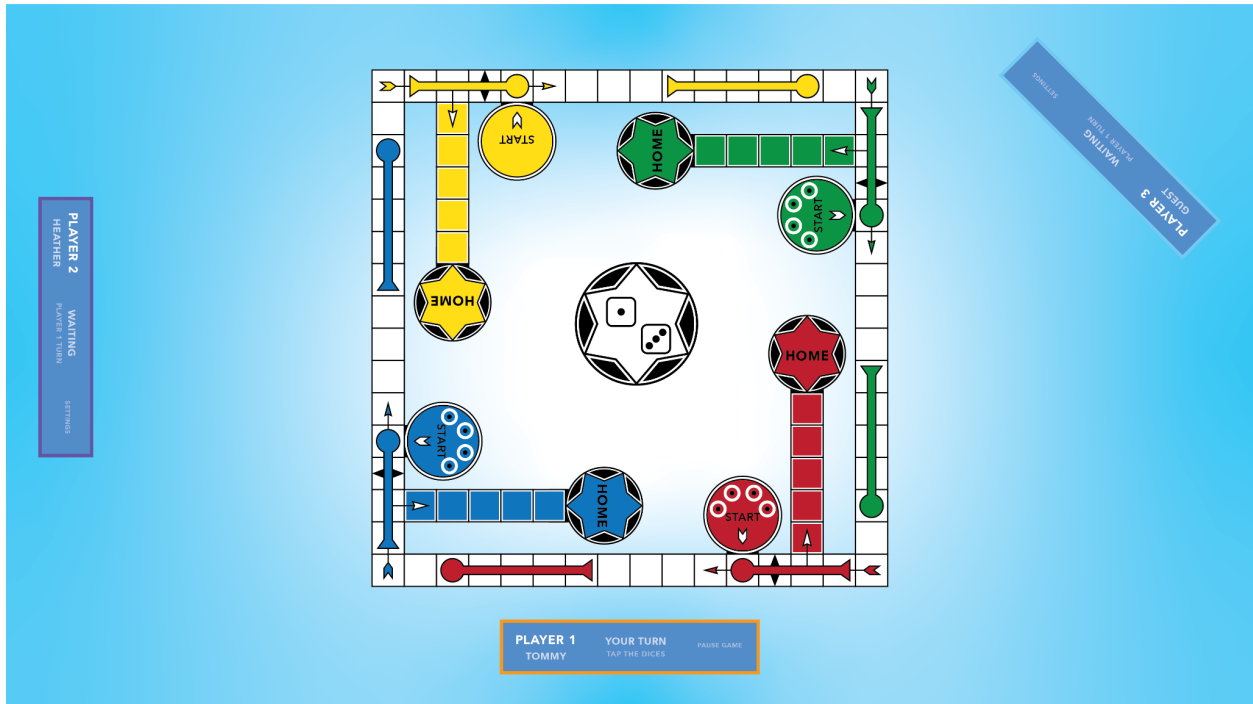
The players start the game with their placards that are set on their location from their choice on the selector. For the placard, it will be used to instruct the users to do what they need to proceed on.
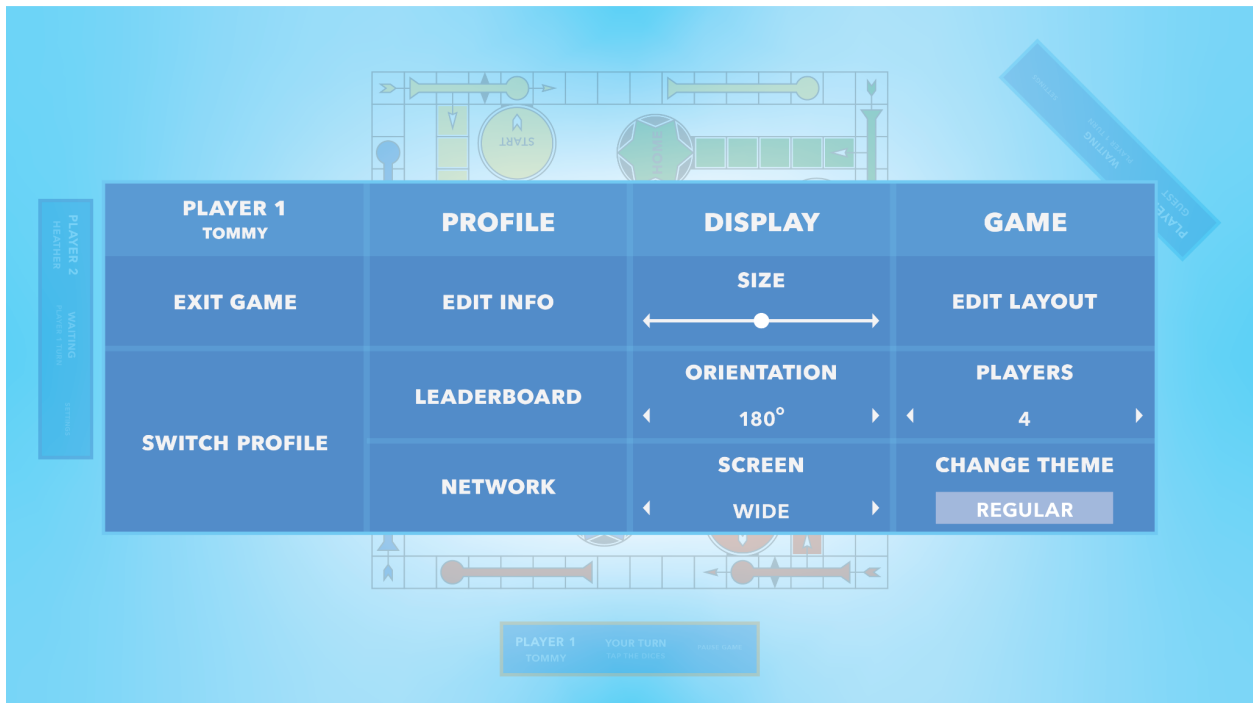
After playing the game, the main player can open up the main settings to decide either exit game or configure what they need to in order to make the game play more easier for everyone.

Appendix B - Thesis Defense

On home page, the main menu contains the features for accessibilities that player can access into and adjust it to their liking

This game platform can be used on the technology that can be capable of displaying the user interface in large format. Including the touch capabilities for the screen and projection mapping will be used for projector.

Appendix B - Thesis Defense

Rough sketches of the storyboard and exploration of the user interface along with its accessibility features.
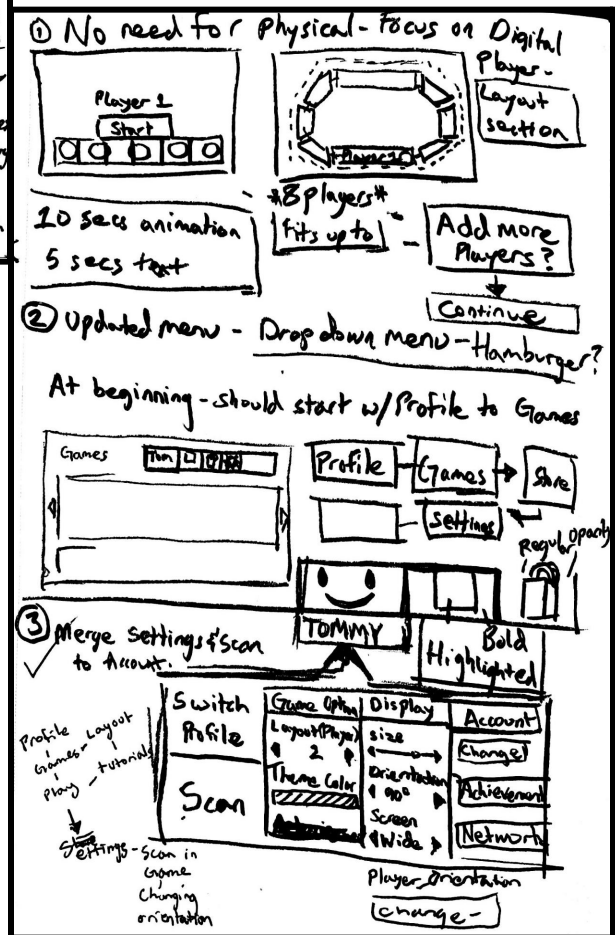
Appendix B - Thesis Defense

Typography

Avenir Next

Demi Bold pt sizing 20, 28, 60	ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 1234567890
Bold pt sizing 40, 50, 80	ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 1234567890

Color Palette

Light Blue	Royal Blue	Black	White
RGB 114, 200, 241 CMYK 50, 3, 0, 0 HEX 72C8F1	RGB 84, 140, 201 CMYK 68, 38, 0, 0 HEX 548CC9	RGB 0, 0, 0 CMYK 0, 0, 0, 100 HEX 000000	RGB 255, 255, 255 CMYK 0, 0, 0, 0 HEX FFFFFF

Background Gradient
White + Light Blue

Icons
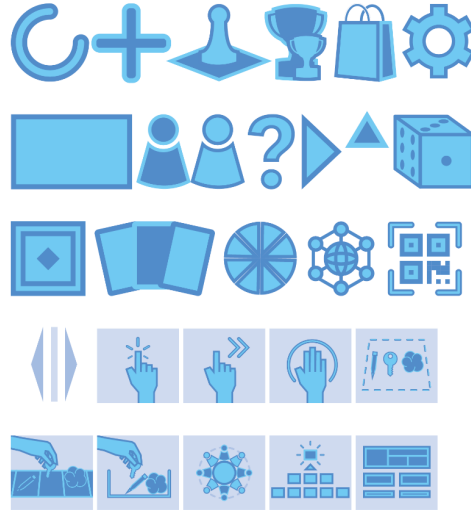
Typography, color palette and icon set.

Sitemap for User Interface

Part 1	Part 2	Part 3	Part 4	Part 5
Start-Up (Loading Screen)	**Game Selection** (Game Library)	**Tutorials** (Hand Gestures/ Physical Pieces/ Digital Features)	**Game Store** (New Games/ Popular/ Deals Scan your game)	**System Settings** (Account/ Display/ Games)
Profiles (Profile Selection)	**Game Settings** (Amount of Players/ Tutorials/ Other Settings)	**Tutorial walkthrough** (Sliding through tutorials mode)	**Explore Game Store** (Amount of Players/ Tutorials/ Other Settings)	**Changing Settings** (Account Settings)
Main Menu (Game Library/ Game Store/ Settings)	**Play Game** (Starting up game)	**Start Game** (After tutorials, game starts up)	**Purchasing game** (Add to cart/ Information/ Scan game)	**Back to Main Menu** (Showing hand gesture to go back)
	Game Demonstration (Board and Card Games)		**Game Download** (Downloading game will appear on library)	

Sitemap for the User Interface containing in separate parts that follows through the storyboard.

Appendix C - Semplice