ID: Embodied Interactions

Initial Research

From the offset my group and I had decided on Clifton Suspension Bridge, especially after our visit there. We looked into various factors of the bridge which were discovered through the use of our research questions before investigating the area onsite as shown in Figure 1.

Questions:

- Who appears to be visiting the most? Locals? Tourists?
- What time does the place become most populated?
- Are there any nearby landmarks?
- Is there any information on the location nearby?
- Who visits? Age? Sex? Size of groups?
- Where would our idea fit into the location?
- Why should our idea exist? What does it bring?
- Is the location looked after?
- Is there visible history in the location?
- Has the area been refurbished or anything new added?

Figure 1 - Questions for Investigating Area

The questions in Figure 1 aided us in discovering the real problems in the area, "it is all too easy to see only the surface problems and never dig deeper to address the real issues".[1] Therefore, we were very thorough in conducting our investigations. During this process we noticed the Visitor Centre is heavily overlooked with little to no traction, this was including us.

Figure 2 - Clifton Suspension Bridge & Visitor Centre

[1] Norman, D (2013) The Design of Everyday Things. pp.218

Design Brief

Following the Double-Diamond Model of Design, as covered by Norman, 2013 we "converged upon a single problem statement".[2]

CHALLENGE SUMMARY

- The Clifton Bridge Visitor Centre is hidden away on the west wing of the bridge.
- With its out of date interactions, it lacks entertainment and engagement for tourists. In turn, there is a deficiency in strong pull factors, leading to short term visits.
- We want to increase the overall outcome of visitors' experiences by creating a fun interactive artifact that mitigates the current issues.
- This can be accomplished with a variety of visual and/or audio methods.

Figure 3 - Design Brief Challenge Summary

As Don Norman states, "never start by trying to solve the problem given… start by trying to understand what the real issues are"[3]. In consideration of this, we engaged in talks with the onsite manager of the centre and were informed that the place was an educational facility but there was indeed room for entertainment in the centre. The centre has two floors with a few interactions.

Figure 4 - Clifton Suspension Bridge Visitor Centre

[2] Norman, D (2013) The Design of Everyday Things. pp.220
[3] Norman, D (2013) The Design of Everyday Things. pp.218

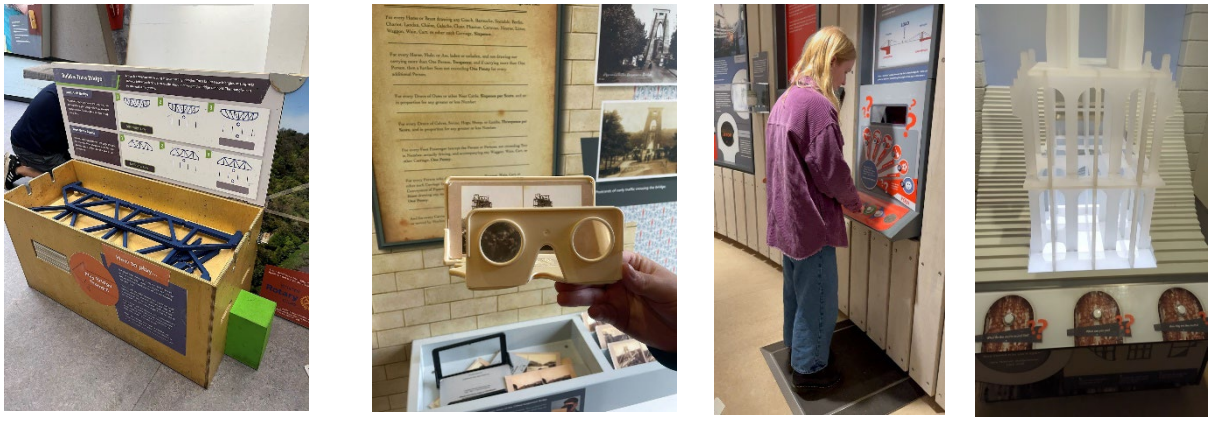

Figure 6 - Interactions within Visitor Centre

Design Research

Conducting research included the fields of sound design, and motion detection. “Interactive systems, physically embedded within real spaces, offer opportunities for interacting with tangible devices”[4] and so “meaning is created in the interaction”.[5]

One of the first interactions was “Colston’s Last Journey… an interactive audio project. A sea of interactive audio is layered over the centre of Bristol/UK”.[6] This was an eye-opening piece and allowed me to explore, “sensory richness and action potential of physical objects”.[7] Due to this interaction, it enabled me to construct the idea of possible noises within the bridge, perhaps as construction was going on.

Figure 7 - Clock Screen in Schiphol Airport, Netherlands

Figure 7 showcases if a design is accessible and provides a user with clear feedback and purpose, it is a viable interaction. This is due to the design “building upon users’ experience of interacting with the real world lowering the threshold for activity”.[8]

Finally, there was research into motion detection, due to “increasingly being used in the design of interactives spaces, computer-mediated environments, and virtual user experiences”[9], our target audience of teens should potentially find such interaction second nature and understand the goal at a quick glance, alleviating the “access bottleneck”.[10] Additionally, motion sensors can “allow human and interface” to display “*coordinated effort* towards achieving a common goal”[11], in the case of my interaction, the common goal would be for the user to inform and educate the interface with

[4] Djajadiningrat, T., Overbeeke, K. and Wensveen, S. (2002) But how, Donald, tell us how? pp. 285-291
[5] Ciolfi, L. (2004) Situating 'Place' in Interaction Design: Enhancing the User Experience in Interactive Environments.
[6] Colstons Last Journey (2023)
[7] Ciolfi, L. (2004) Situating 'Place' in Interaction Design: Enhancing the User Experience in Interactive Environments.
[8] Hornecker, E. Buur, J. (2006) Getting a Grip on Tangible Interaction: A Framework on Physical Space and Social Interaction
[9] Escamilla, A. Melenchón, J. Monzo, C. and Morán, J, A. (2012) Interaction designers’ perceptions of using motion-based full body features.
[10] Stanton, D. et al. (2001) Classroom Collaboration in the Design of Tangible Interfaces for Storytelling.
[11] Mueller, F, et al. (2020) Next Steps in Human-Computer Integration

movement and in return the interface will educate the user on the bridge while ensuring "the experience of use is positive and enjoyable".[12]

Early Design

After completing my research as well as configuring the design brief, I proceeded to create two user personas - one for a student and another for a teacher. It was key that I created one for both demographics as this will be the focus of my interaction.

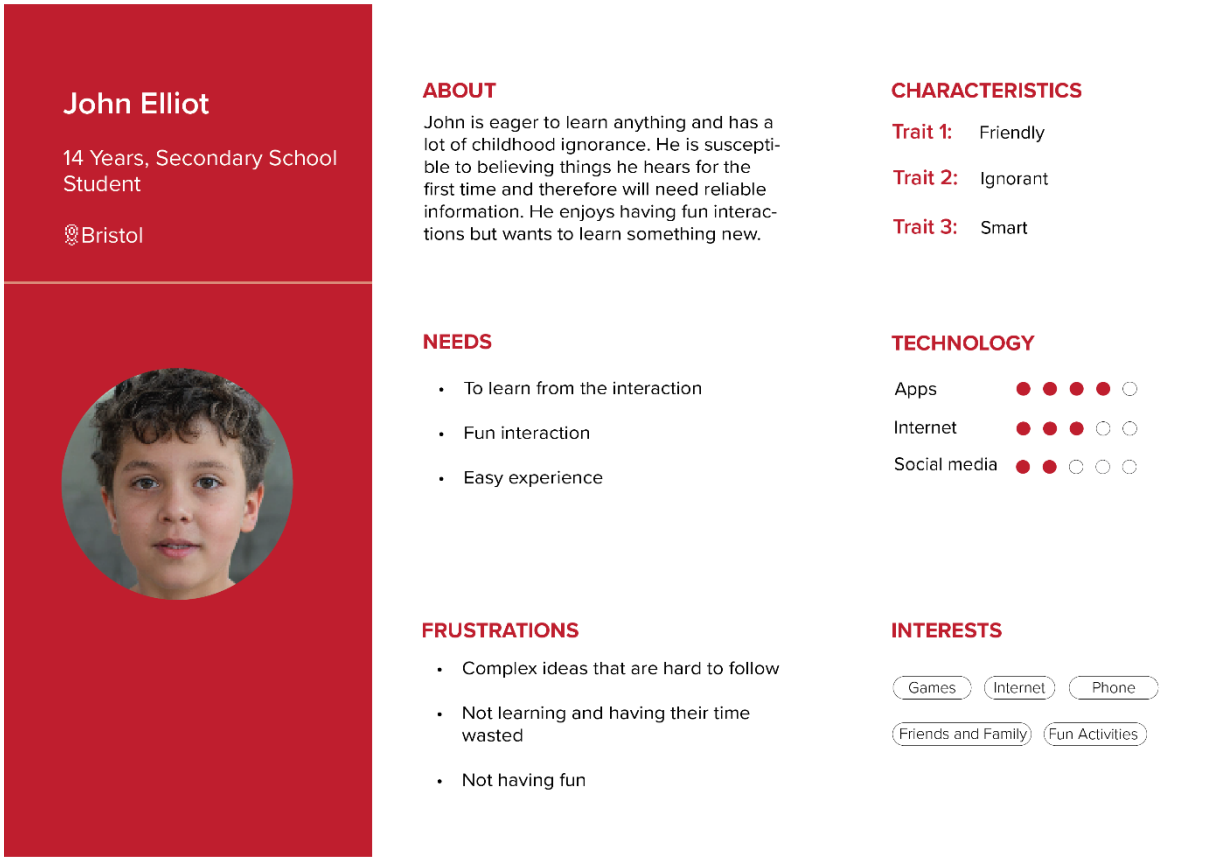

Figure 8 - Student User Persona

Early design for my idea started as a tournament bracket for participants in the initial bridge design, this is so users can decide upon their own winner before seeing how their design choice compares towards the official bridge. The ideal position of placing this interaction will be within a clear view of the bridge, this means it will be placed on the second floor of the Visitor Centre as seen in Figure 9.

Figure 9 - Clifton Suspension Bridge Visitor Centre Upstairs Window

For my interaction to work it required having a screen, this is because the initial idea was to have the users touch the screen to make their selection of what design was better in the tournament round. This is a showcase of "Human-Computer Integration (HCI)… with the key property that computers become closely integrated with the user".[13] However, due to

[12] Norman, D (2013) The Design of Everyday Things. pp.219
[13] Mueller, F, et al. (2020) Next Steps in Human-Computer Integration

wanting to increase interest and make the interaction appeal to my target audience, I decided upon on using motion sensor for entertainment purposes.

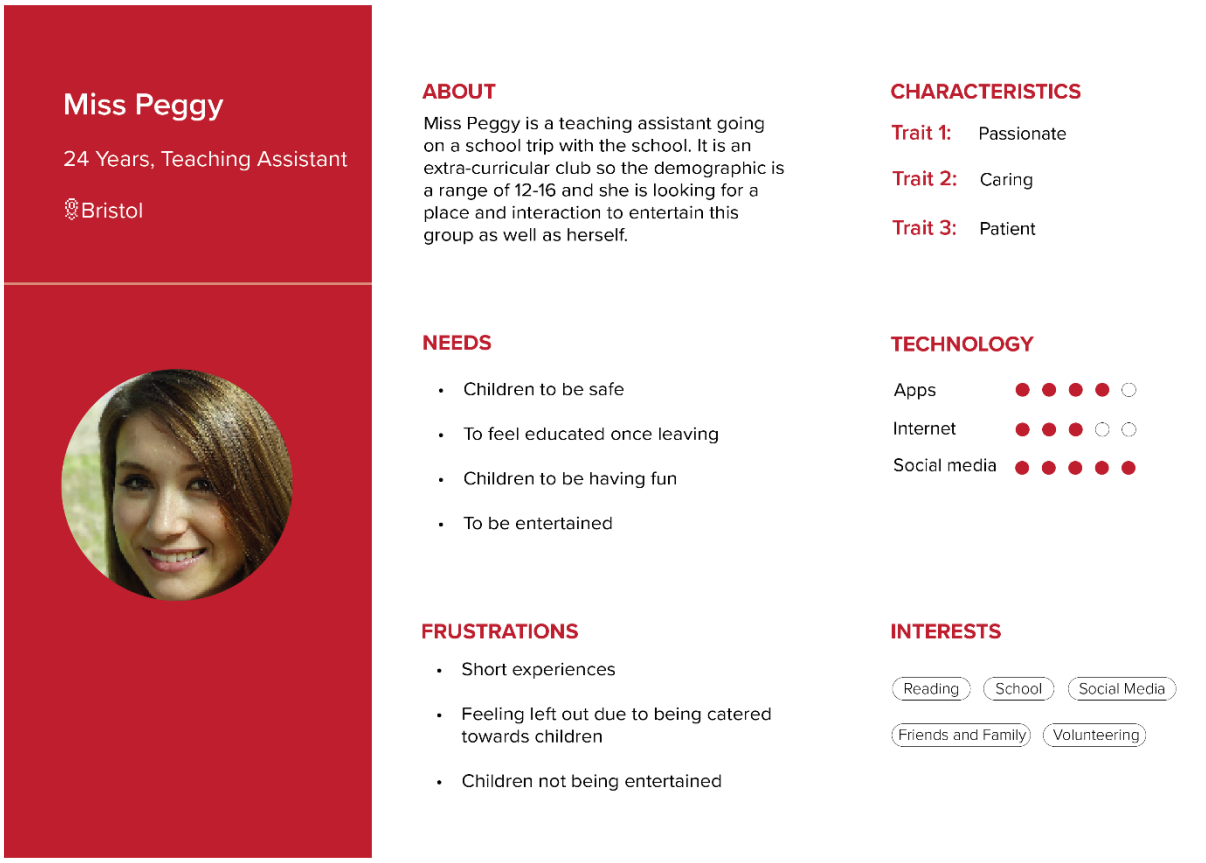

Figure 9 - Teacher User Persona

Figure 10 - Mood board

As seen in Figure 10, the ideation process for my design was to be informative and entertaining as pertaining to the design brief. With my initial design concept having been thought of I created a flow chart to demonstrate how the interaction would take place as well as a description of each stage.

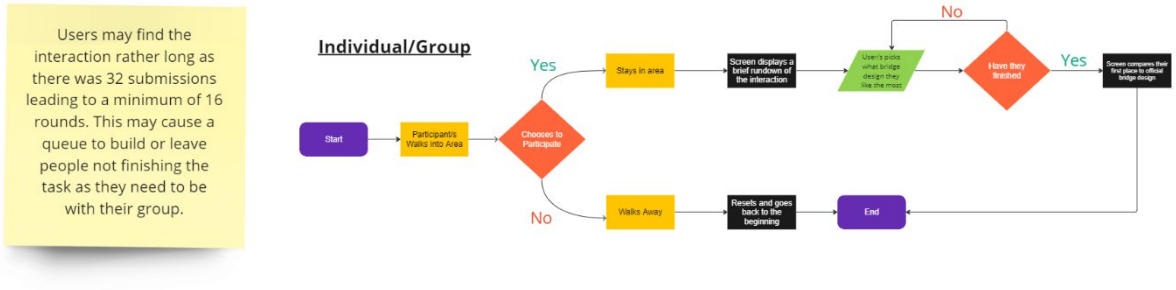

Figure 11 - Flow Chart of Interaction

Step 1 – **Users Read Instructions and Overview**

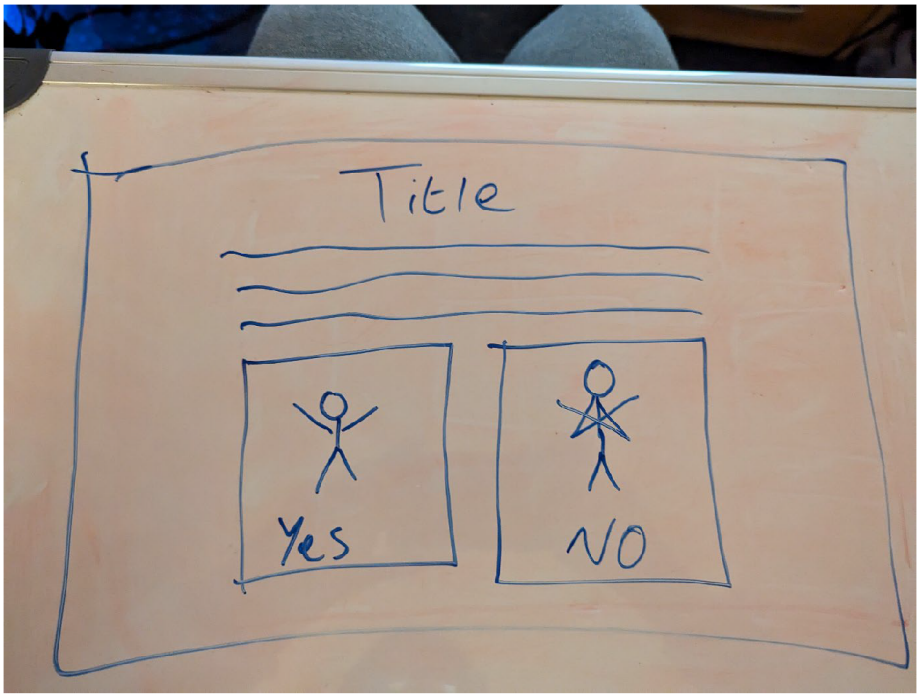

Figure 1 - Overview of Interaction and Instructions

The user will engage with the interaction, and this will be the first screen they encounter with the option of sliding the screen. At the end of the screen, they will be informed to move on they must perform the 'Yes' option to showcase understanding. This is significant as the user will become more familiar with the interaction as well as get a better understanding of the design, hopefully making for a smoother experience. This will make the user feel informed and empowered having performed an interaction with feedback of moving to the next page. An option to consider is the accessibility of the movement of the screen and perhaps thinking of other ways to move on.

Figure 12 - Showcasing Step 1 - "Users Read Instructions and Overview"

Step 2 – **First Round Begins**

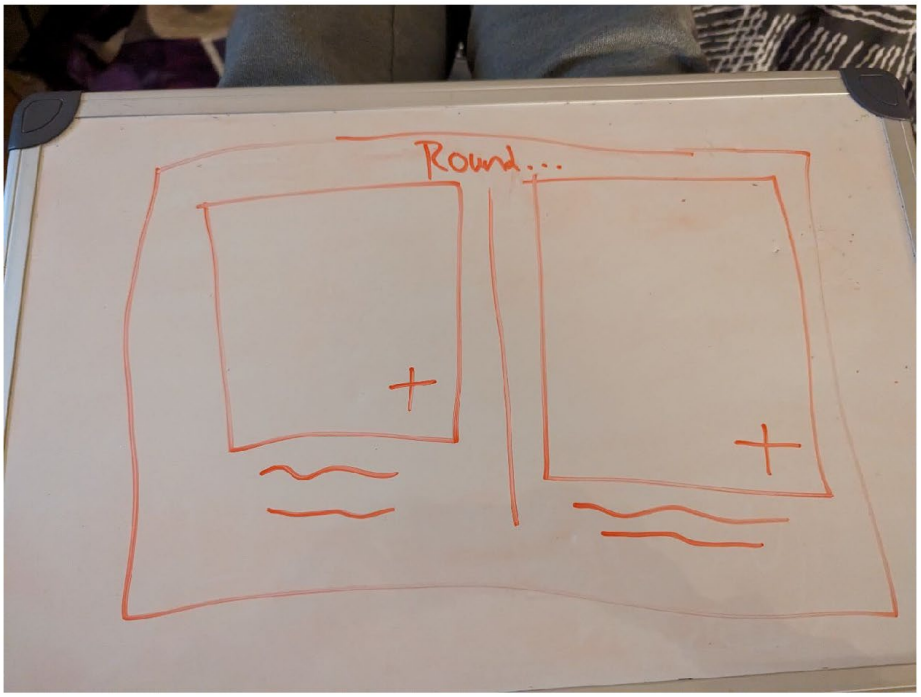

Figure 2 - First Round of the Interaction

The user will soon engage in the first round where they are given three choices. They can either perform the 'Yes' option and move on to the next screen, perform 'No' and move on to the next screen or click on the '+' sign to display more information on the bridge design shown to them. This is important if a user needed that little extra information to come to a decision as well as being educational, which is one of my design challenges.

Figure 13 – Showcasing Step 2 – "First Round Begins"

Step 3 – **Extra Information Display**

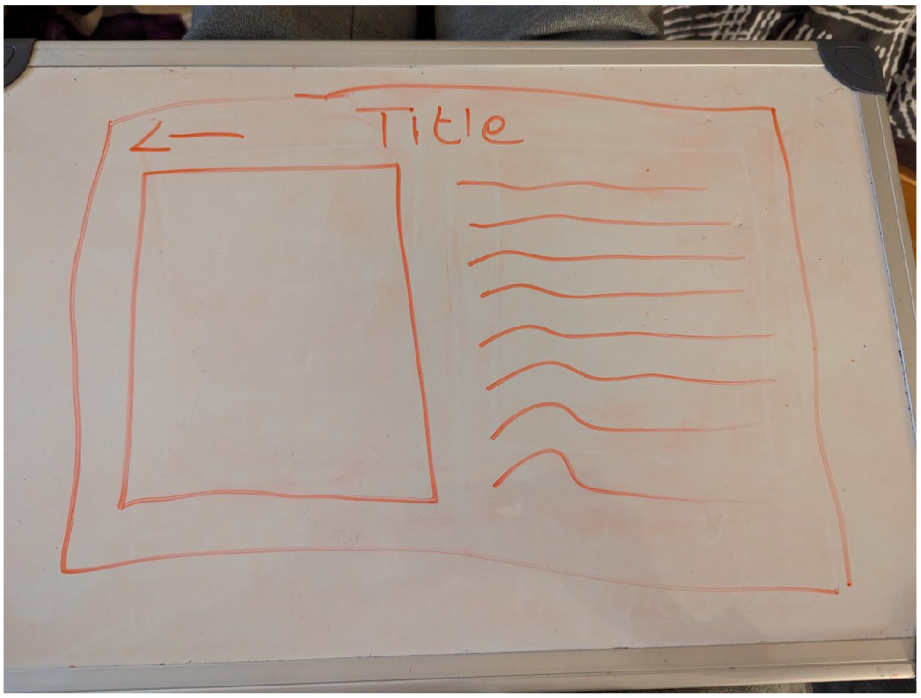

Figure 3 - Extra Information

This page gives the participants more information and will hopefully educate them on the submission as well as the candidate that submitted the design. It will also give the user a bigger image and the option to go back to the previous page. This is important as users can get a closer look at the design and come to a conclusion based on the further reading, rather than basing their decision on an image and title. This should empower the user to feel educated as well as believe that their decision was based on logic rather than purely emotion.

Figure 14 - Showcasing Step 3 – "Extra Information Display"

Step 4 – **Pop-up Display & Confirming Final Pick**

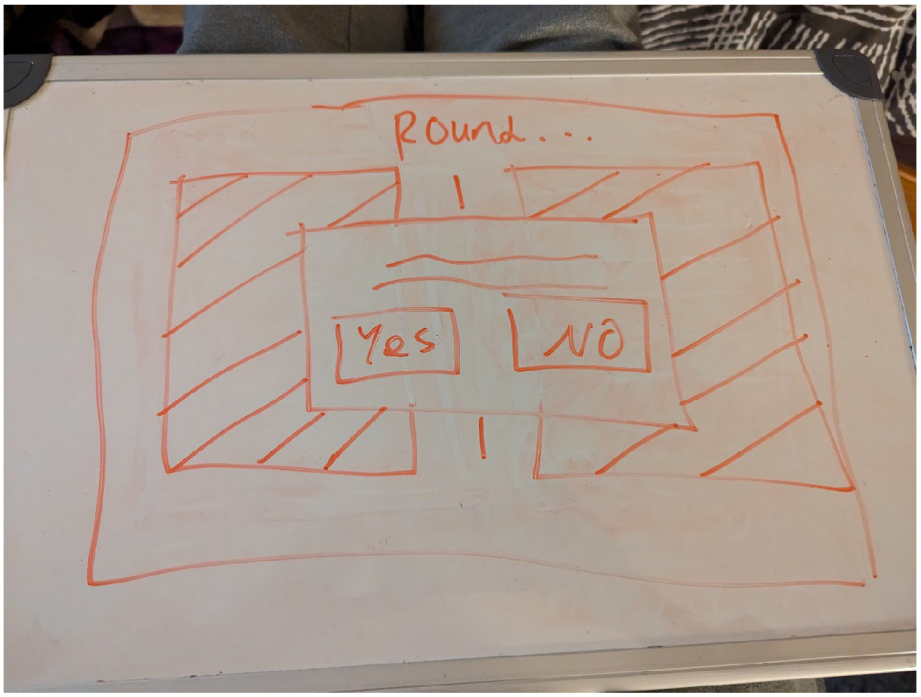

Figure 4 - Pop-up Display to Confirm Choice

This will give the user the option to confirm their final bridge design and if they agree with their decision, they can perform the 'Yes' pose to move on to the final page. However, if they had a decision they did not agree with at the end, they can perform the 'No' pose and be taken to a different page. This page will display the options they went through during the experience. They can once again select the bridges to display more information as well as select their final bridge choice from this page. The option of sticking with the final bridge is still with them if they click to go back. This will help comfort the user if a mistake was made during their selection process. It also allows for a final conclusion and gives the user a database of information to educate themselves on if they desire to.

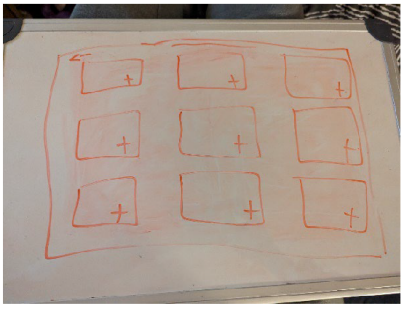

Figure 5 - Bridge Selection

Figure 15 - Showcasing Step 4 - "Pop-up Display & Confirming Final Pick"

Step 5 – **Comparison of Chosen Bridge to Official Bridge**

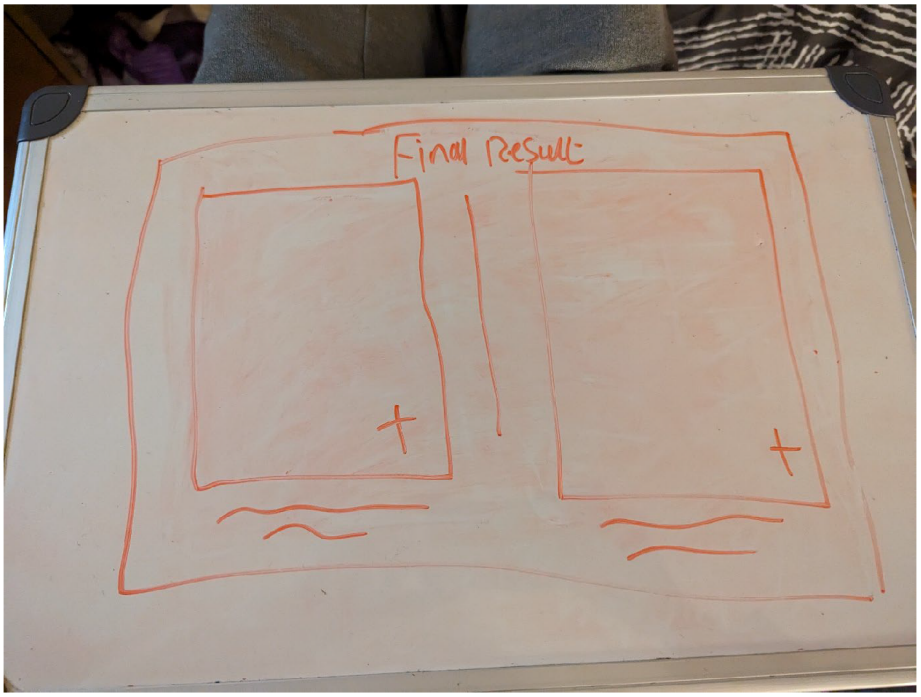

Figure 6 - Comparison of User Selected Bridge to Clifton Suspension Bridge

This page will display the final outcome of the interaction and compare the bridge the user has finished with compared to the winning Clifton Suspension Bridge. This page will once again give the user the option to display information on each design and give the user the opportunity to educate themselves on the bridge. This will hopefully end with the user having had an enjoyable experience as well as a sense of understanding of the background to the suspension bridge and how it came to be. In addition, hopefully the experience is interesting and interactive enough that users want to visit the suspension bridge to learn more about the history in a fun and interactive way.

Figure 16 - Showcasing Step 5 - "Comparison of Chosen Bridge to Official Bridge"

Following the creation of my descriptive flow I compiled all the steps into a story board which accurately showcases how the interaction will respond in command to a user's input.

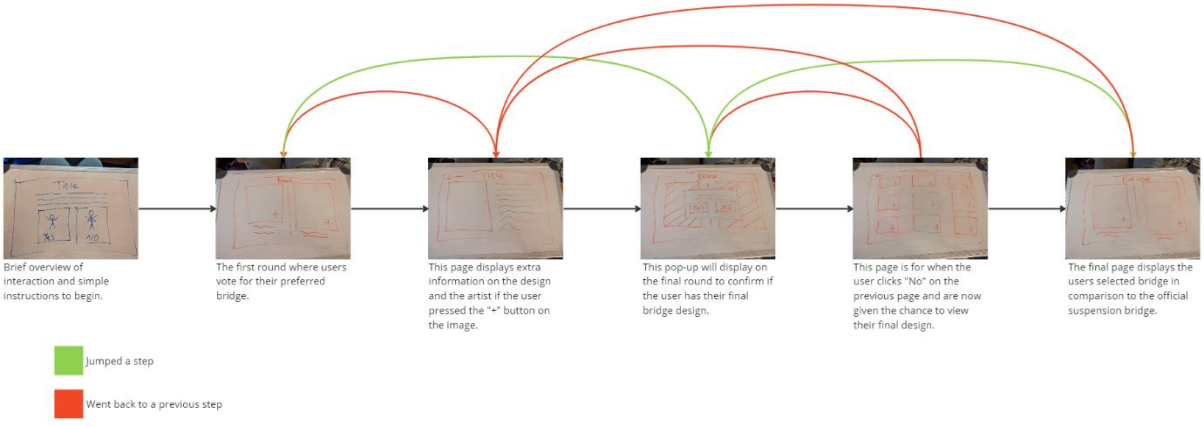

Figure 17 - Story Board for Interaction

Final Design Solution & Prototype

To portray my prototype, I created a video in Adobe After Effects which utilised a green screen and actors.

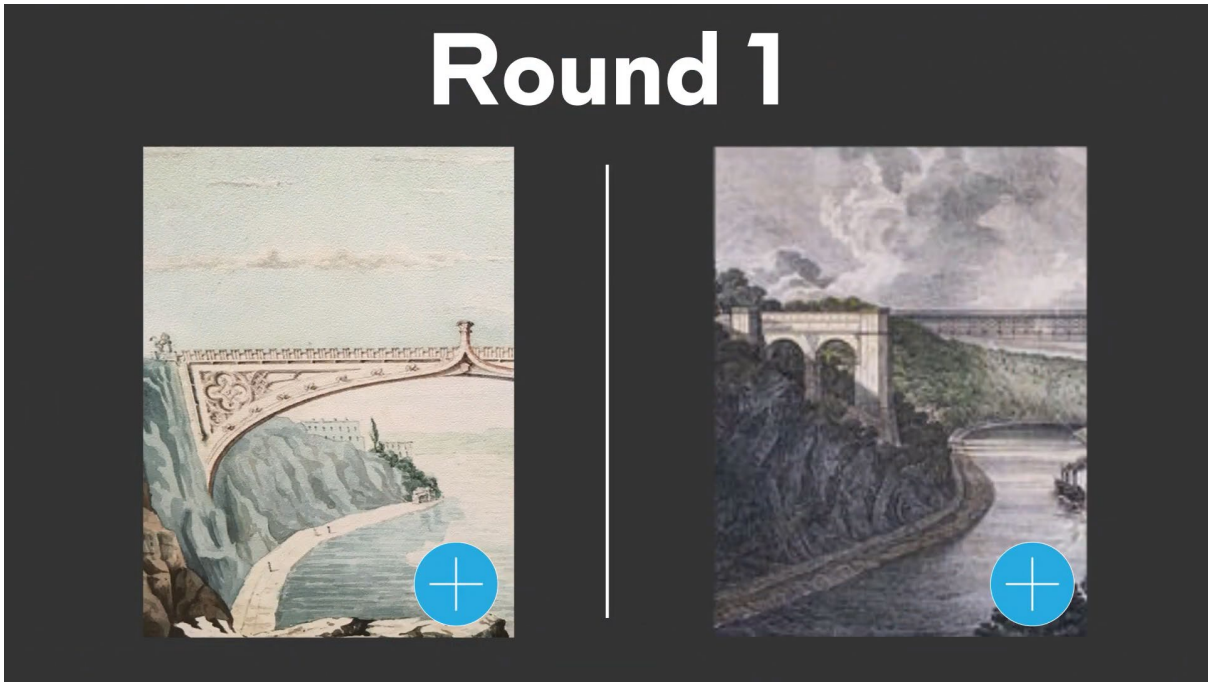

Figure 18 - Prototype Video

Figure 18 displays a basic layout of my prototype video and close to what a screen will look like, this is based on Figure 13.

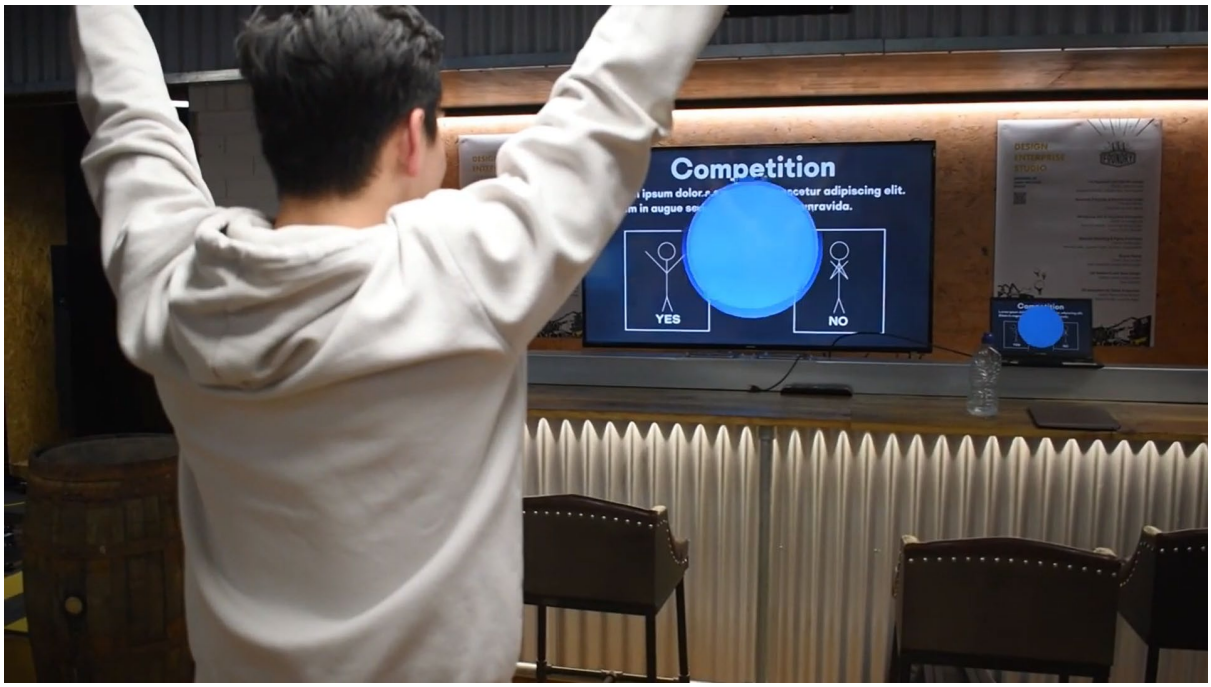

Figure 19 - Demonstration Video

Figure 19 displays a performance of the interaction and showcases one of the possible three states a user may be in.

During production of the prototype as well as recording a demonstration I "observed"[14] a few issues that should be addressed for the final production, the main problem was the lack of accessibility with the interaction. "Accessibility is making user interfaces perceivable, operable, and understandable for people with a wide range of abilities".[15]

The design heavily caters towards people who are mobile and has little regard for individuals who may not be able to perform the corresponding actions. Therefore, it is imperative I add other possible interactions, this could be in the form of sound/speech, touching the screen or including other poses that do not involve arm movement but perhaps head movement instead.

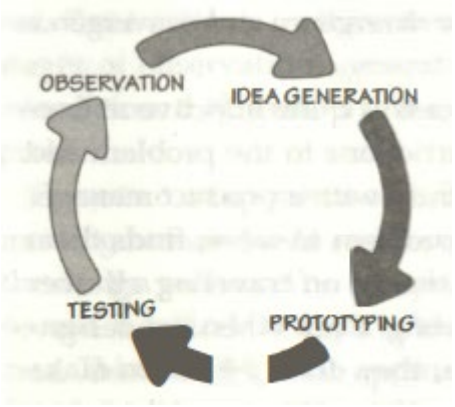

Figure 20 - The Iterative Cycle of Human Centred Design

Additionally, I want my design to be educational for my demographic, however the primary method of this is through visual information. As a result, I need to add an audio option to the interaction so who may have visual impairment can also gain from the experience equally. However, the interaction is primarily visual and relies heavily on users being able to see the screen to choose the image they desire to win. Therefore, a user who has a visual impairment will need some assistance with the interaction, this will mean I will need my motion sensor to be able to detect more than one user and still function correctly. To accomplish this, I will need the sensor to assign roles to participants such as who has the dominate position, so decisions are not interrupted outside of their choice. "Accessibility also makes products more usable in a wide range of situations – circumstances, environments, and conditions". [16]

Furthermore, the interaction is currently very bare and repetitive, to truly make this a source of entertainment, I will need to add a few more possible interactions or methods throughout the interaction to retain the participants attention.

Conclusion

Overall, the design is effective in creating an educational interaction which will inform users of the bridge and its history, adding as a new interactive piece for the Visitor Centre. However, as the Centre already has a section for the judging and subsequent bridge ideas, the design needs to possibly add another feature or make the form of education more entertaining to have a long-term purpose of staying within the Centre.

As previously stated, the design has a few accessibility issues which will need to be considered before the final product, however the interaction fulfils its job of being an entertaining and educational interaction for the target audience.

The next step for the interaction would be to increase the entertainment factor, resulting in more visitors to the Centre. This can be accomplished with new features to the design as well as making the design more accessible for a variety of audiences. One such audience would be young adults,

[14] Norman, D (2013) The Design of Everyday Things. pp.222
[15] Henry, S, L. (2007) *Just Ask: Integrating Accessibility Throughout Design. pp. 2*
[16] Henry, S, L. (2007) *Just Ask: Integrating Accessibility Throughout Design. pp. 2*

similar to *Miss Peggy* from Figure 8. Additionally, the design could benefit from more feedback to the user, so they may feel a sense of accomplishment after performing an action.

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