Project 3

Day at the Museum

Group 4: Mikaela Thompson, Ella VanderMolen, Tejasvi Bhagwatkar, Evan Brehm, Chloe Choi, Lorraine Hairston, AJ McGinley

Table of Contents

Introduction

For this project our team chose to dive deeper into the history of Disney film and animation technology and observe the progress of technological advancements made by the company throughout its 100+ years of business. As a team, we decided to embed our exhibit in a film museum instead of a technology-focused museum since our catered audience of 13+ would be more interested in the film and nostalgia aspect of the movies. We also did not want to restrict our museum to be only enjoyed by technically advanced audiences and wanted to open it up to as many visitors as possible. Through the use of our cultural probe, we were able to narrow down which specific touchpoint and technology to focus on, which will be highlighted throughout the documentation below.

Project Overview

Project Goals

1. Understand the underlying motivations, needs, and wants of museum-goers as they participate in a museum exhibit experience.
2. Create and successfully deploy a cultural probe that informs our final animation technology exhibit solution.
3. Iteratively sketch and prototype low- high-fidelity solutions that contribute to a coherent museum exhibit within the scope of the history of Disney animation technology.
4. Construct an engaging and interactive exhibit experience for users with multiple touchpoints based on our insights found in the points above.

Narrowing Down on a Project Scope

For this exhibit, we first started with conducting secondary research on different areas of art, design, and technology. We then ideated possible exhibits based on the history of:

- 3-strip Technicolor animation
- Rotoscoping
- CGI technology
- Music technology, including records, cassettes, CDs, to digital forms

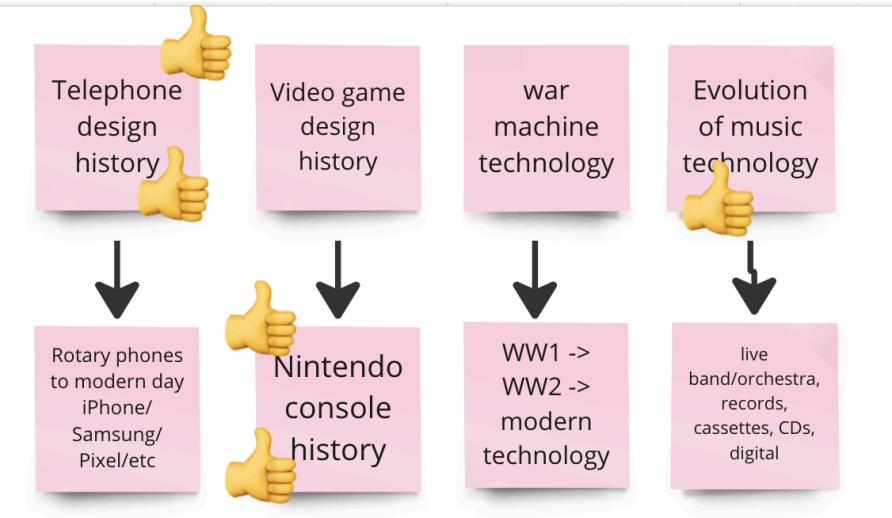


Figure 1: The different exhibit topics explored.

Following the brainstorming of topics, we decided to move forward with a museum exhibit focusing solely on the history of the various technologies used in Walt Disney animation studios.

The objective of our exhibit for visitors are to...

1. Learn about animation techniques used in Disney films.
2. Know of examples of such animation techniques found in Disney films.
3. Be able to recreate the same animation techniques to increase immersive involvement between visitor and exhibit.

Rationale

Why a film museum, and why Disney animation technology?

We chose to place our exhibit within a film museum because a film museum would cater more to our chosen user group as well as **provide us with the flexibility to include more interactivity** within each stage of animation history covered. We decided to focus on the history of animation technology as the central concept for our museum exhibit because the majority of our group was interested in learning more about the subject.

In addition, focusing solely on the technological processes behind creating a Disney animated film would offer a **new, exciting perspective of animation history** that isn't as **widely explored** as often as the more artistic side. We also know that Disney is a well-recognized brand, and so our exhibit would provide a **low-barrier entry point** for people that are

interested in animation history as an artistic concept, but want to learn more about the technical side of animation history.

User Group & Stakeholders

Rationale

Why our primary user group?

We chose to focus primarily on **film museum-goers who have an interest in film and animation tech as well as an interest in Disney who are aged 13-35** for a multitude of reasons. While this exhibit would not be closed off to any group of people, we needed to have a specific group of people in mind while we designed our touchpoints. We chose 13 years old as a starter age because it is about the age where teenagers want to **gain a deeper understanding of their interests**, as they are encouraged to start thinking about college. We chose 35 as an upper age limit because there would be **higher tech literacy** amongst members of that group. We also generalized this group as having at least a basic curiosity about how Disney animated films are made, since this age group would likely have nostalgia for Disney films. Therefore, they'd be interested in the history and technology behind the making of Disney's animated films. We also had the most access to people within this age range for gauging interest in and testing our touchpoints and getting feedback.

Secondary User Group

Our secondary user group was **film museum guests of all ages with a general interest in film and animation.** This is because our exhibit would be located within a film museum. Even if this user group does not have a particular interest in Disney or animation, the production of the films may pique their interest.

Stakeholders

The stakeholders we had to consider in this project were ourselves as **user experience designers**, **museum guests** and **museum staff**. As designers, we utilized our best judgment and understanding of best practices to prioritize a fun and engaging exhibit for guests. For museum guests, they are stakeholders because they are **investing their time and money** in coming to our exhibit, so focusing on their experience was essential for our project. Museum curators are also stakeholders, as they are investing time and money in this exhibit and museum as well.

On reflection, we gave the most focus to our primary users, as we considered the experience they would have as front end users to be the priority of our research and general project plan. If we had to consider a wider scope within our project, we would put more emphasis in researching guest-staff relations in museums, or research into a museum curator's role would be good next steps.

Understanding Museum Goers' Motivation

Creating a Timeline

We first started with researching **what** animation technologies were used throughout history as well as the general timeline of **when** the technologies were used.

This timeline helped us move forward with creating our basic exhibit flow (mentioned later in our document here). Specifically, we were able to use the timeline to generate three separate stages of animation technology: early, middle, and late-stage, described below:

1. **Early stage:** This includes animation technology from when Walt Disney studios was first created, around **1932-1960**. Some of the common technologies used include: celluloid sheets, the multiplane camera, 3 strip technicolor, rotoscoping, and the Xerox method.
2. **Middle stage:** This includes initial computer technology and CGI used from **1970 - late 1990s**, such as live action animation, 3D backgrounds, and the first introduction to 3D CGI with Toy Story.
3. **Modern/late stage**: This includes films created from the **early 2000s to present day**, with more advanced CGI and modernized hand drawn animation.

You can see the details of our entire timeline and the associated technologies below:

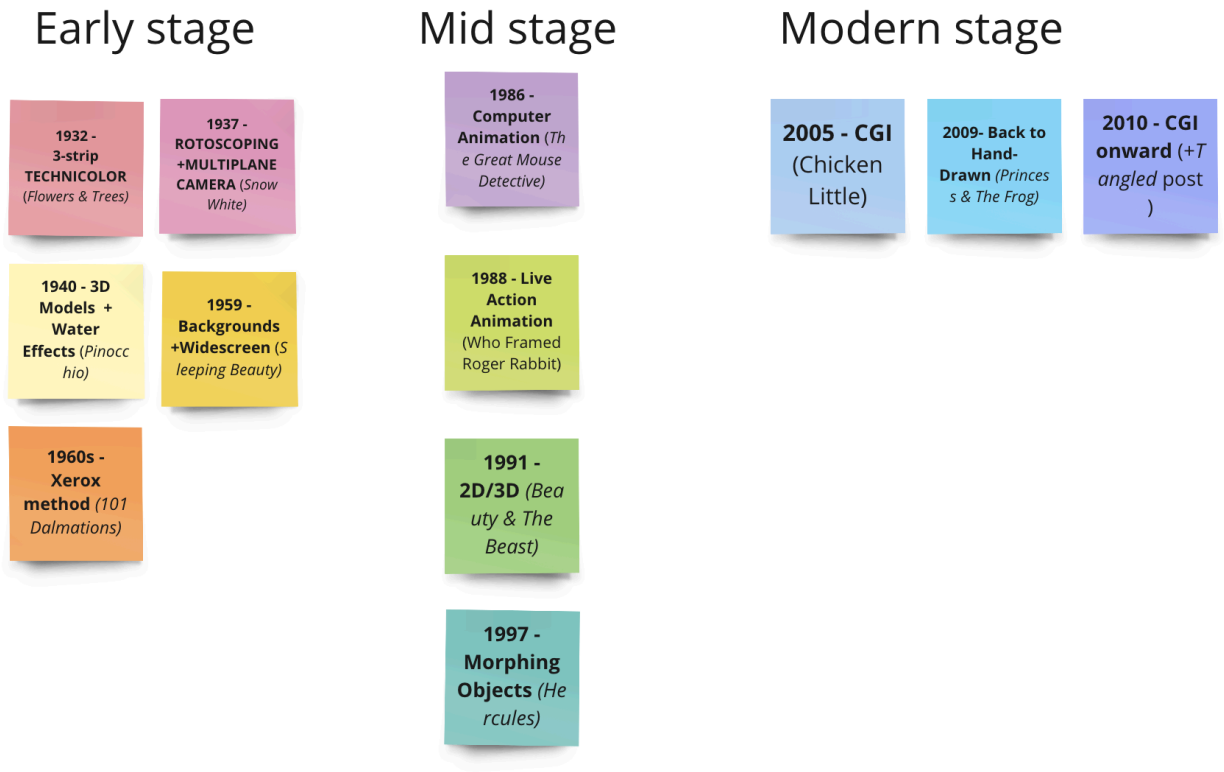
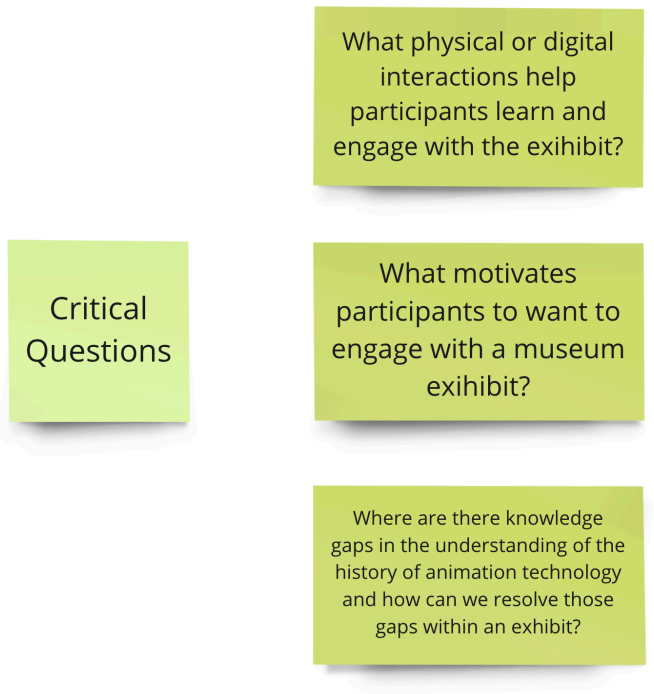


Figure 2: Our timeline of key Disney films and the technologies used to create them throughout history.

Conducting Background Research

We started with conducting initial secondary research, focusing on three essential questions. We wanted to discover the following:

1) What **physical or digital interactions** help participants **learn and engage with the exhibit?**
2) What motivates participants to want to **engage with a museum exhibit**?
3) Where are there **knowledge gaps in the understanding of animation technology,** and how can we resolve those gaps within an exhibit?



Our three guiding critical questions to inform our design solutions.

6 Big Questions Researched: what motivates and engages users in exhibits?

Our team began our secondary research by first identifying our gaps of knowledge. We formulated our objectives into 6 big questions.

1. **<u>What makes a good museum? What would make someone want to visit one more than once or share the experience with someone?</u>**

   Insights -

   Having attractions that stimulate multiple senses, as many senses as possible, makes museum exhibits memorable and fun for everyone regardless of age or level of prior knowledge.

2. **<u>How can a museum be designed to be entertaining and informative to ALL ages?</u>**

   Insights -

   - Becoming more photo+tech friendly. Allowing people to take photography and share on digital platforms.
   - Allowing people to disseminate photos of museum content.
   - Including museum cafes/bars or some sort of area of socialization. This increases retention, socialization, patreon participation, and all-age involvement.

- Adding more evening hours to attract more young adults and millennial aged visitors.
- Offer premium guided tours (interactive, engaging, meaningful experience)
- Had some sort of crowd control to "make it easier for people to process through museums by redesigning and maximizing viewing spaces in both permanent and temporary exhibitions."
    - Create a continuous, seamless mobility chain.
- Utilize a variety of mediums.

3. **<u>What physical or digital interactions help participants learn and engage with an exhibit?</u>**

    Insights -

    - Interactive storytelling through...
        - Mobile device interactivity
        - Conversational interfaces
        - Visualization of authored stories
        - Gamification
        - Allowing and invoking multiple interactions
        - Allowing guests to leave a physical trace

4. **<u>What motivated participants to want to engage with a museum exhibit?</u>**

    Insights -

    - Learning something new leisurely
    - Entertainment
    - A general interest in art
    - The novelty of a new experience

5. **<u>What are the motivations of museum goers?</u>**

    Insights -

    Entertainment, Instagram worthy spots, to please family, learning goals, and curiosity

6. **<u>How can we help people express themselves creatively? In other words, how can our exhibit be an outlet for creative expression?</u>**

    Insights -

    Having interesting and unique things in your exhibits will foster people's creativity and not restrict them to doing one thing in your exhibit. Letting the

user have the freedom to explore while unknowingly making them follow a set path.

Comparative Analysis

Goals

To understand what other successful and rather popular animation-focused exhibitions are doing to engage with visitors and to create a memorable experience. Specifically, learn about what competing exhibitions' touchpoints are and how they sectioned off and organized their space.

Process

We decided to search for competitors that shined light on a specific animation studio that catered to both technical and non-technical educated visitors. Because Disney is such a large and popular franchise, we aimed to look for exhibitions of similarly large animation studios. We found the following competitors:

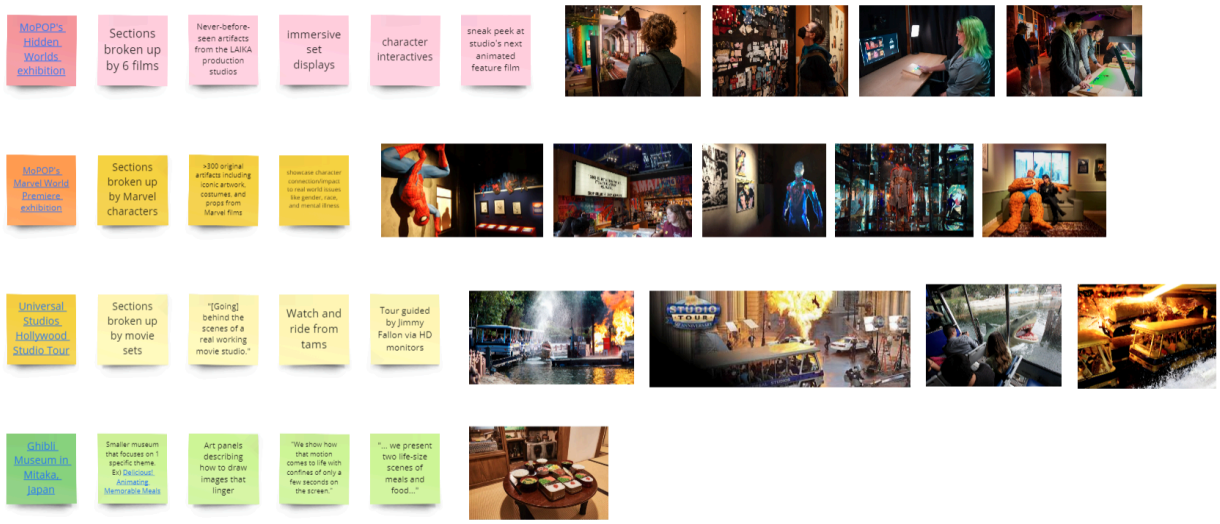
- MoPOP's Hidden Worlds exhibition
- MoPOP's Marvel World Premiere exhibition
- Universal Studios Hollywood Studio Tour
- Ghibli Museum in Mitaka, Japan

The factors we chose to focus on and to use as competing variables were:

- How the exhibition was sectioned.
- How the exhibition identified themselves as unique.
- What their touchpoints are.

We also took the time to pull some images from the internet of the exhibitions to have visual supplements.

Insights



A competitive analysis conducted on four different exhibitions that focus on animation.

MoPop's Hidden Worlds exhibition

How was the exhibition sectioned?

Sections are broken up by films. There were 6 sections and 6 films explored in the entire exhibition.

How does the exhibition claim to be unique?

- Has never before seen artifacts from the production studio.
- Has a sneak peak of the studio's next animated film.

What are their touchpoints?

- Immersive set displays
- Character interactives

MoPop's Marvel World Premiere exhibition

How was the exhibition sectioned?

Sections are broken up by Marvel characters.

How does the exhibition claim to be unique? What are their touchpoints?

- More than 300 original artifacts including iconic artwork, costumes, and props from Marvel films

- Showcase character connection and impacts to real world issues such as gender, race, and mental illness

Universal Studios Hollywood Studio Tour

How was the exhibition sectioned?

Sections are broken up by movie set.

How does the exhibition claim to be unique? What are their touchpoints?

- Going behind the scenes of a real working movie studio.

What are their touchpoints?

- Watching movie sets and acting from tams
- Tour guide experience with Jimmy Fallon via HD monitors

Ghibli Museum in Mitaka, Japan

How was the exhibition sectioned?

Sections are broken up by movie.

How does the exhibition claim to be unique? What are their touchpoints?

- Focuses solely on animated food.

What are their touchpoints?

- Art panels describing how images were drawn.
- Have life size props of scene of meals and food
- Show animation process through video

Finding user wants and needs in an exhibit

User survey

Goals

To gauge interest in touchpoint activities and to narrow down our list of touchpoints based on popularity.

Process

In order to truly have our exhibition visitors have a good understanding and involvement in each of the animation eras, we decided to have 1 touchpoint for each of the three disney animation eras: early stage, mid stage, and late stage.

Our team ideated on a list of possible, feasible activities for each of the three eras. We then created a google forms, asking survey participants the following:

- Their age (demographic check point)
- Their motivations in visiting a museum
- Their preference between two touchpoint activities in each of the 3 animation stages
- And a long question asking them to describe their thoughts, feelings, and reasoning behind their chosen preferences.

Insights

Figure 3: the motivations found behind user's desires to visit a film museum.

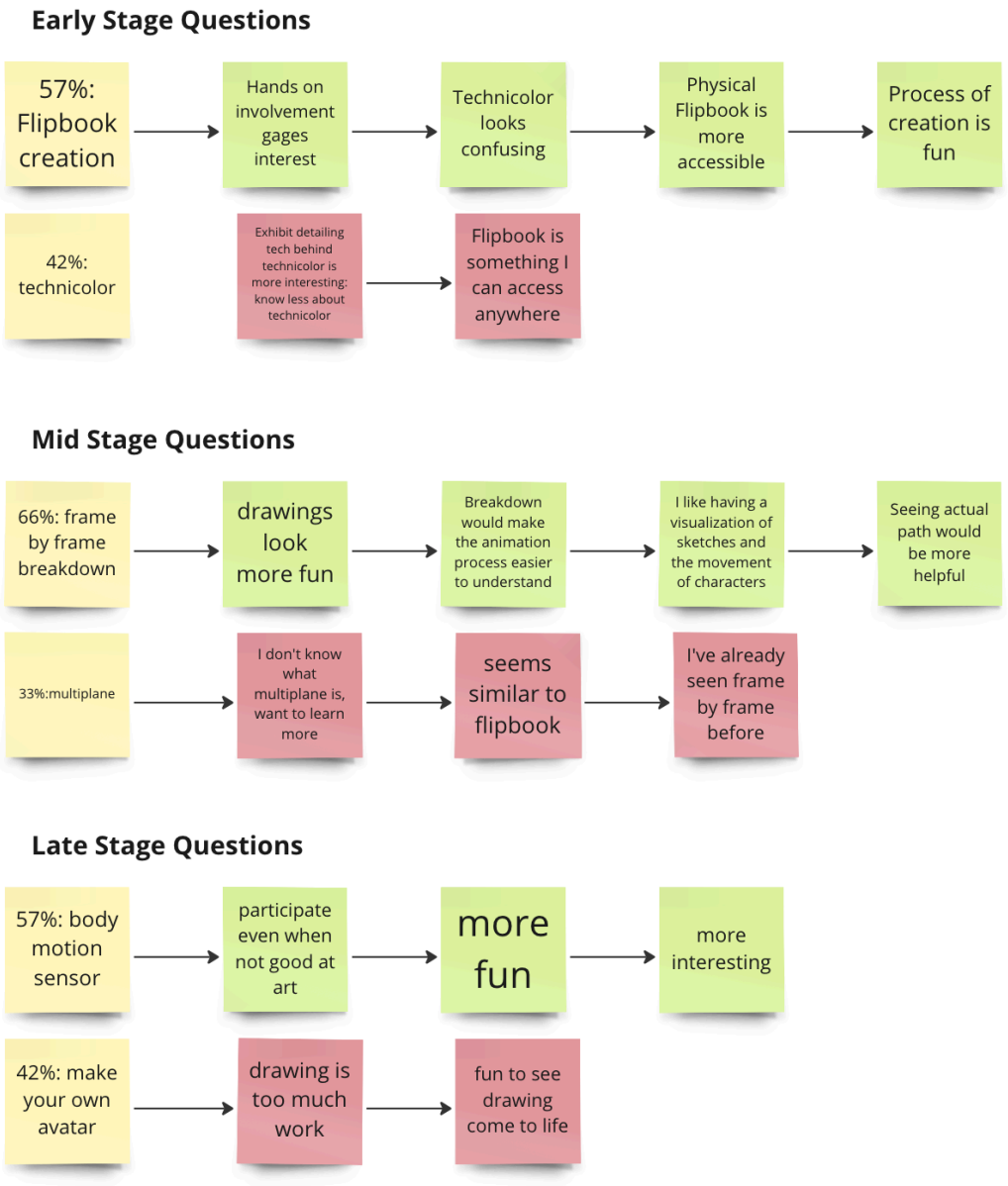


Figure 4: our results found from the early, mid, and late stage survey questions.

We found that the activities with higher interest were:

- Flip book
- Frame by frame
- Body motion sensor

We also learned that people were largely more interested in things that seemed fun and things that didn't intimidate them with a large learning curve. Their motivations also lined up with our previous findings from our secondary research in that they were motivated by learning, aesthetics, and socialization.

Why did we do a survey instead of other research methods?

We wanted a greater variety of data. With the timeline of our project and our team availability, we felt that we would get more data quicker if we were to do a survey. We also understood that we could run into risk of missing out on deeper insights by only sending out a survey. In an attempt to still get deeper insight and participant rationale in our survey, we decided to include long answer questions, asking for participants to describe their feelings, thoughts, and reasons behind their choices.

Executing a Cultural Probe

For this project, we were additionally tasked with conducting a cultural probe; this was assigned to us to gather additional research where primary and/or secondary research couldn't fill in the gaps. For our cultural probe we wanted to focus on our **users' existing knowledge and emotions** that were relevant to our proposed exhibit.

Goals

1. Understand the gaps in knowledge about animation technologies and history.
2. Explore user motivations behind attending a museum exhibit and what motivates them to want to engage with an exhibit's touchpoints.
3. Identify how a museum exhibit can serve as a creative outlet for museumgoers.

Probe V1

Our probe was originally going to be a sitdown movie watching experience, and we were going to have users screenshot moments in the movie when they felt a certain emotion, but due to disney copyright laws, we had to shift into a collage of images where the user would go through and "rate" each slide. For version one of our probe, we focused on the art style used in each stage of Disney's animation history and how that affected our users' mental state.

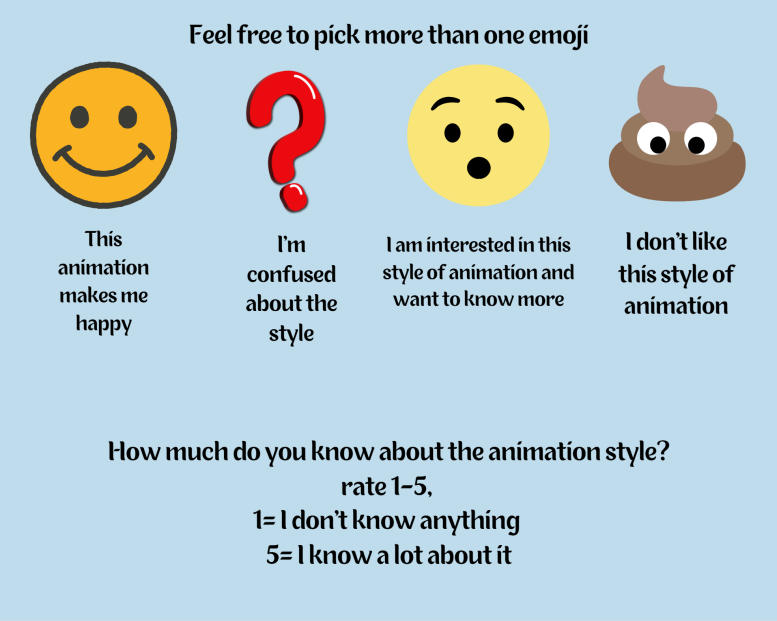


Figure 5: First slide showing to the user how to rate each collage

Figure 6: Example of a collage, showing shots from the corresponding movie and what technology used and a picture of that technology

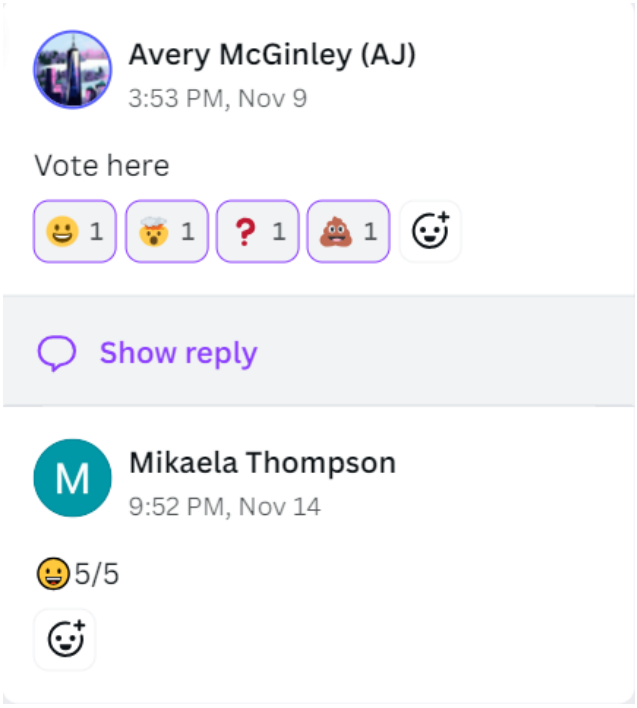


Figure 7: Example of a response from a user in our cultural probe

Following our mid-point desk critique for our project we realized that our probe didn't give us the data we truly needed to make an exhibit about animation history, so we decided to shift our probe into a version that would give us more relevant data.

Probe V2: Following desk critique

For version two of our probe, the process would work the same way with the user looking at slides of collages of pictures and rating them, but for this version, we added an additional three questions to be answered on each slide. We changed the collage pictures to fit more to what data we were trying to gather. Version two focused on **gathering guests' interest in the technology and the qualitative data related** to each technology.

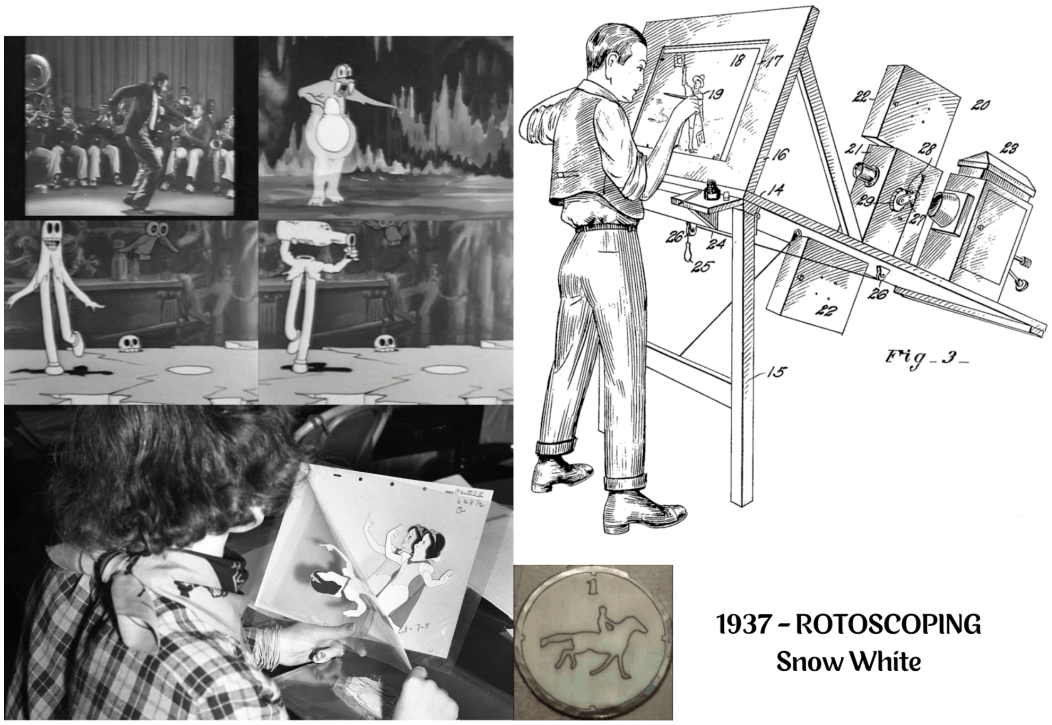


Figure 8: Example of a collage slide in version two of our cultural probe

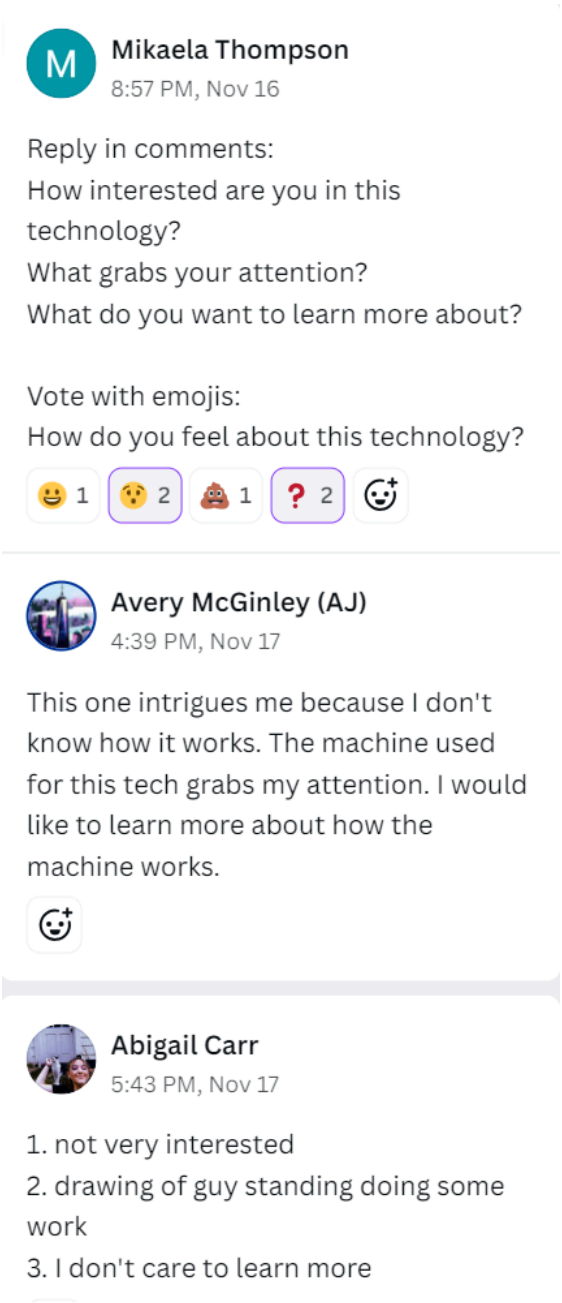


Figure 9: Example of the responses given on a collage slide

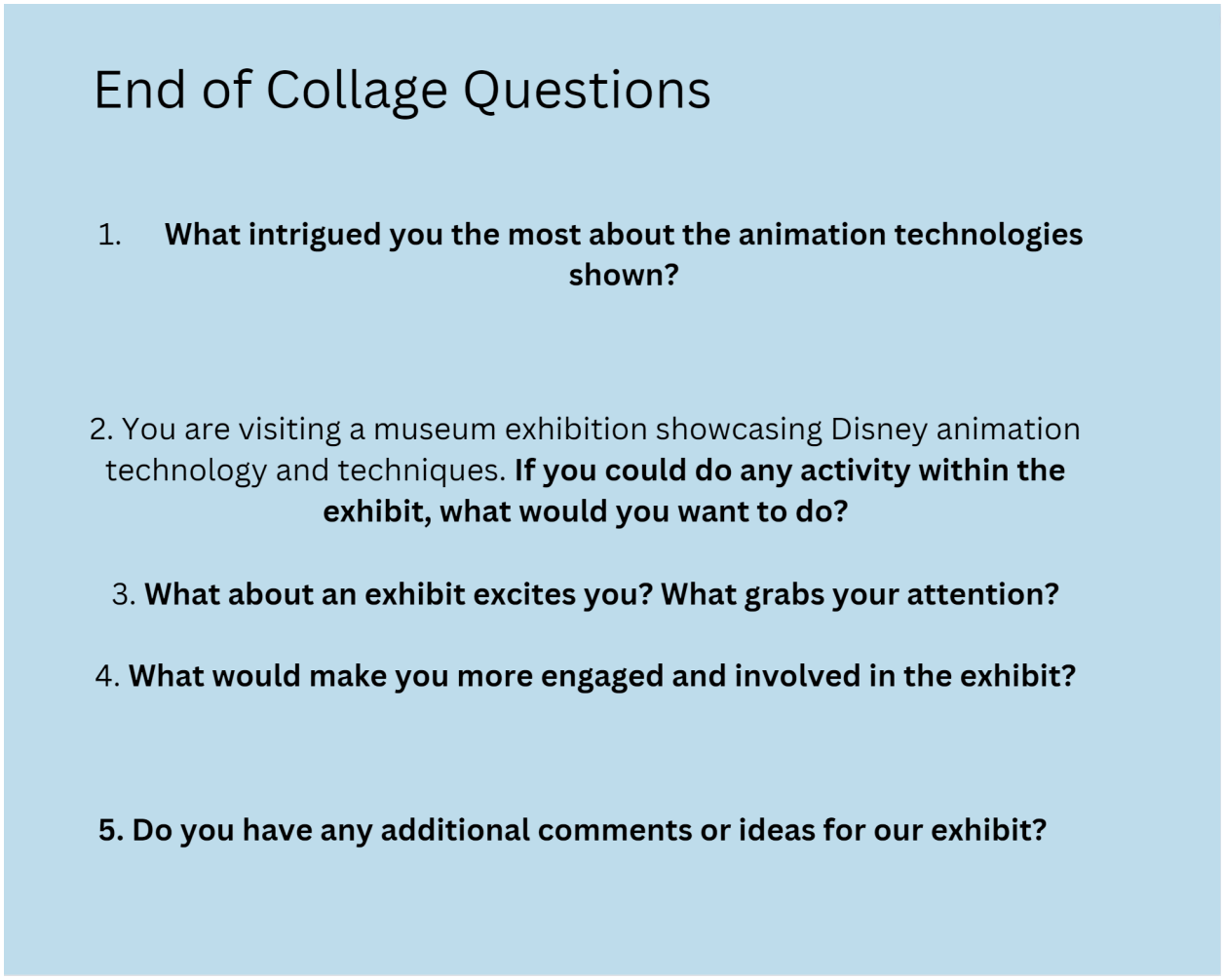


Figure 10: We also added end of the collage questions to gage touchpoint interest and gather more data on how we could engage our users more

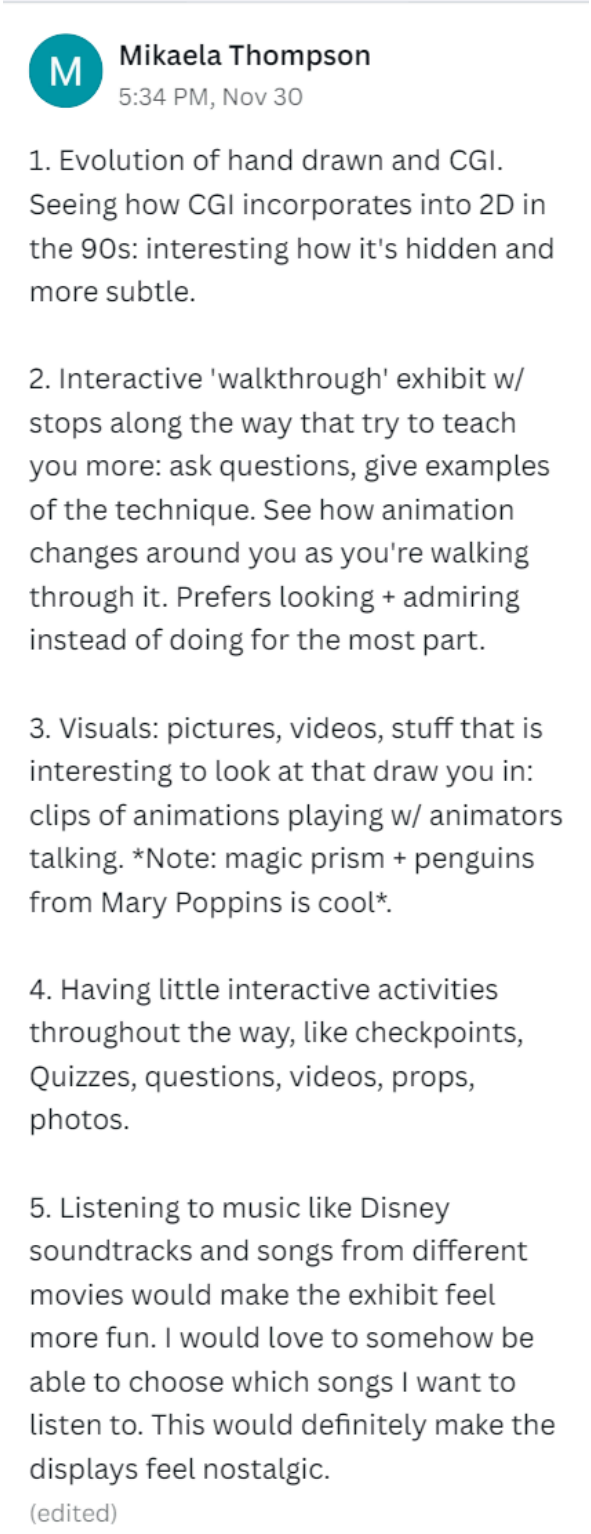


Figure 11: Example of the response to the end of the collage questions

This version was a better probe because we got **insights and data on the actual technology which is what our exhibit was centered around and we now had a plan to finalize our touchpoints** based on the end questions. Some significant insights we got were user-generated ideas for touchpoints like an interactive walkthrough, interactive checkpoints, videos, props, and photos. We also found out **which technologies users had limited to no knowledge which led to the structure or layout** of our museum, highlighting the most confusing or unknown technologies.

Narrowing down exhibit touchpoints

Solidifying 3 key touchpoints

For the exhibit touchpoints we wanted users to explore Disney **animation technology from different points in time** while still keeping the exhibit engaging and motivating users to participate in the various activities. Since we split the different animation technologies into three stages of animation history: early, middle, and modern, it was perfect to have one main interactive touchpoint in each stage.

We brainstormed what touchpoints we wanted to have for the stages based on our cultural probe and survey findings. We came up with a couple of ideas and voted to narrow our touchpoints down with the user survey. From the survey, we found that our users preferred an animation flipbook activity for the early stage with a majority of **57%** of users surveyed. Additionally, **66%** preferred a frame-by-frame breakdown of the animation process over the multiplane camera in the middle stage, and **57%** favored an interactive body motion capture walkthrough over creating their own character in the modern stage.
Therefore, we decided on these three touchpoints to focus on for the interactive portions of our exhibit:

1. **flipbook creation**
2. **a frame by frame 'wheel' showing an animated scene**
3. **an interactive body motion capture display**

Sketching the User Flow

For the first version of our user flow, we again divided the exhibit into three main sections: **early, mid, and late stage**. Each stage represents the period of animation technology to showcase how the technology has progressed over time, as well as how it was used during the period.

Each stage has two portions:

1) **An 'education' section:** this, through a video, display, or other form of information, teaches the guest about the period of technology.
2) **An interactive activity section:** the guest then gets to try one of the technologies mentioned themselves through an interactive activity such as drawing.

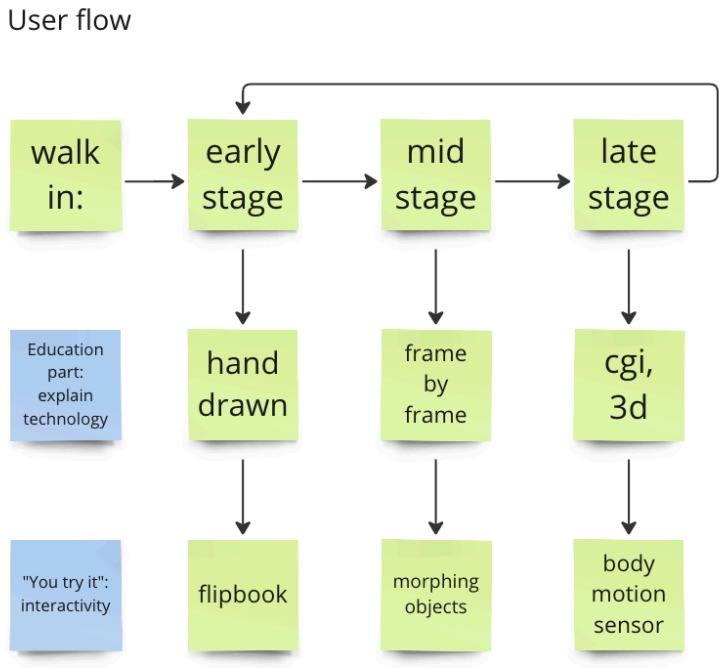


Figure 12: Initial proposed user flow.

Initial Sketching of Touchpoints

Create your own Flipbook

For the early stage we decided on a **flip book making station** to teach users hands on how a hand drawn frame by frame animation was created in the earlier period of animation technology.

Here users will have the opportunity to learn how animators would make movies by hand drawing frames and combining and speeding up the frames to create a scene. Users will have flip books, paper that is connected on one side, and pens to draw their own flip book. They can draw a short animation and once they are done they can use their thumb to make the paper flip through quickly.

They can see their animation just like the use of celluloid sheets in the earlier stages of Disney animation (shown right). Using simple pen and paper, as well providing premade characters to trace makes the task less taxing and more accessible for our user group without requiring too high of a skillset.

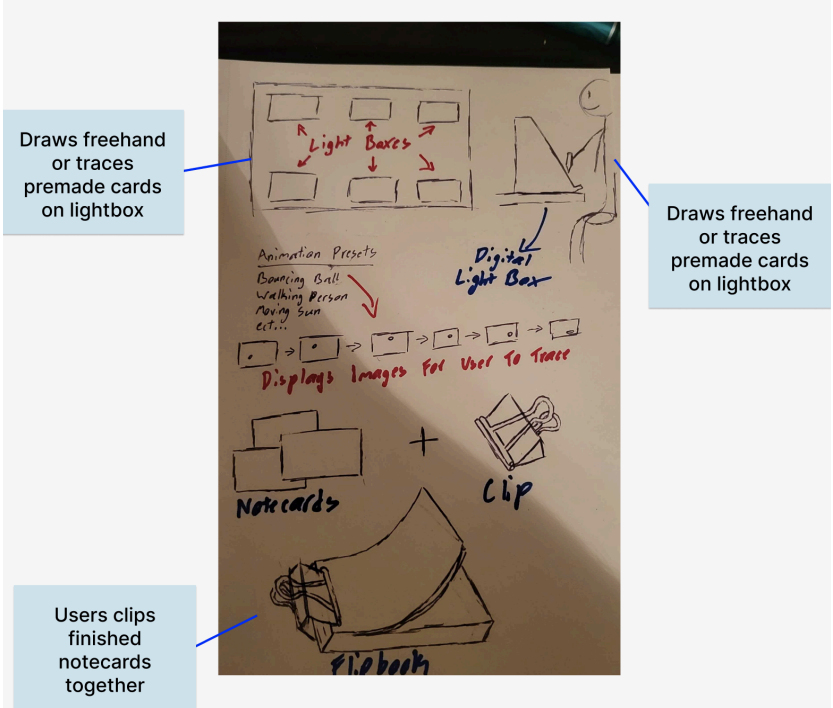
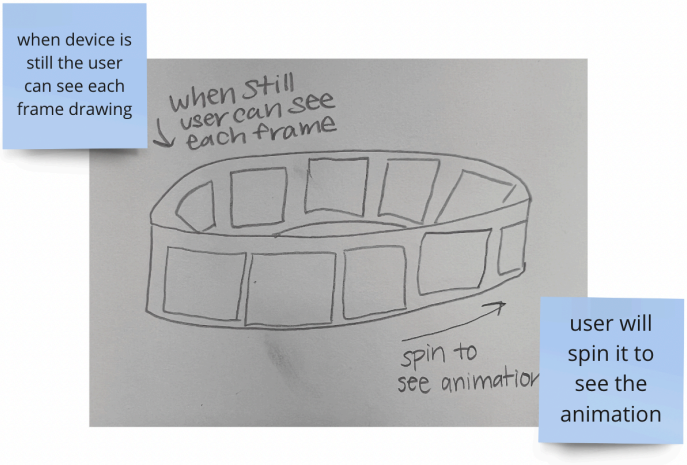


Figure 13: the flipbook touchpoint, using a light box

Frame by Frame spinning device

In the middle stage the touchpoint is a **frame by frame rotating device**. The user will learn about how in the middle stage animators would use computer graphics to make frames and speed them up to make more complex, colored movies. The touchpoint will be a physical round device that will only spin if a user spins it. Users will see each still frame and when they spin the device they can see a moving animation.



This was chosen to reflect the more complex hand-drawn animation techniques as well as the common integration of celluloid sheets with 3D CGI backgrounds, such as in the film Beauty and the Beast. A breakdown of the entire animation process with the technology at the time would also be displayed in a **video walkthrough** after this touchpoint.

Figure 14: frame-by-frame rotating device touchpoint sketch

Body Motion Capture Walkthrough

Lastly, for the modern stage we ideated upon a few ideas. One idea was that users could create their own avatar, but we ultimately, based on feedback, decided to have a body motion sensor interactive touchpoint.

This feedback consisted of concerns found with the **complexity of creating an animated character** based off of our user survey data. Putting in the cognitive effort to animate a character in an interactive activity was not preferred by users. The body motion sensor was expressed as the easier, more simple touchpoint, which would do the work for them by already displaying the animated avatar and teaching the mapping between motion capture actors and the animated characters. While some users favored learning about how an animated character is created in the modern age, the **majority (57%) favored the least effortful option**- the body motion capture display.

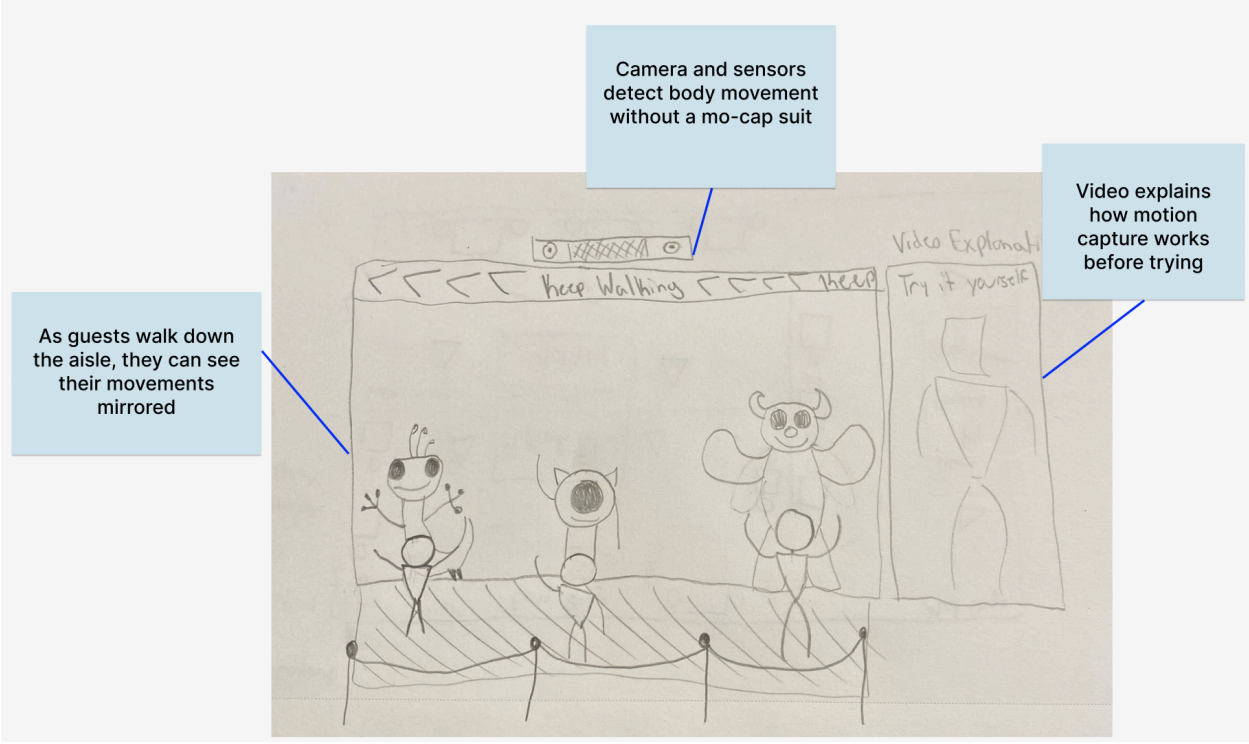


Figure 15 : Body Motion Sensor sketch 1

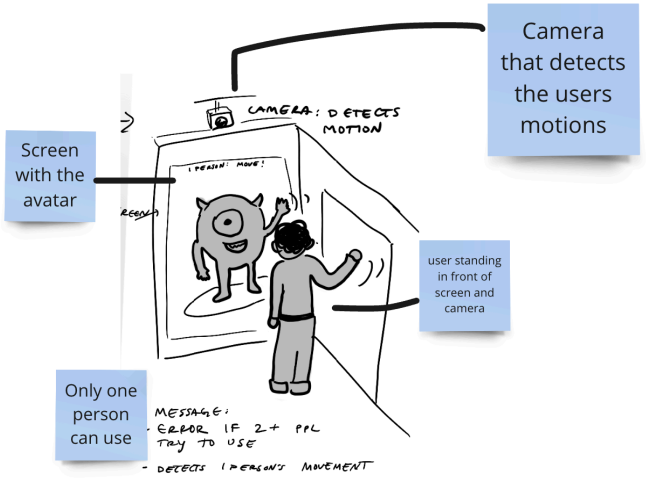


Figure 16: Body Motion Sensor Sketch 2

With the second idea, users can move in front of a sensor and see their movements being mirrored by an animated avatar on a screen. This goes along with the technology they learn about in the modern stage with the invention of CGI (computer-generated imaging).

Concept Testing

We then conducted concept testing of three of our initial touchpoint ideas: **the flipbook creation**, **frame by frame wheel,** and the **interactive motion capture walkthrough**. We

presented our sketches for each of the touchpoints in varying order, asking questions to learn more about our users preferences and interests for the exhibit layout.

Purpose & Goals

1. Identify opportunities for improvement upon our final touchpoints.
2. Discover user preferences for different touchpoint ideas.
3. Identify which features of a museum exhibit enhance guest engagement and participation.

Testing Protocol

1. Present a scenario to get the user in the correct headspace.
2. Present the 3 concepts in different order (A: Flipbook B: Frame by Frame C: Motion capture):
3. ABC, CAB, BCA, CBA
4. Ask testing questions: each of the main questions are to be repeated for the touchpoints presented, with the final two saved for last.

Insights Found

- **Providing examples:** Showcasing examples of how technology works first then supplementing guests' learning with an interactive activity was found to boost user interest and engagement. This is what led us to solidify our designs that contain both educational and hands-on activities in three different rooms for our user flow, which is explained later in this document.
- **Hands-on learning:** Our users expressed liking hands-on activities the most. We found that providing a way for users to try using the technology themselves boosts their engagement and excitement with the exhibit, which is why we decided to design for one hands-on, interactive touchpoint for each stage of animation history within our exhibit.
- **Offering multiple levels of difficulty:** Users found the frame by frame wheel demonstration and the flipbook to be the most engaging, but also wanted different levels of difficulty for each, such as beginner, intermediate, and advanced examples of different animated scenes with each technology. Due to time constraints, we decided to take this suggestion into consideration for the next steps of this project and focus on the previous two insights.

Building the Final Exhibit

Refined Sketching

Following our concept testing, we integrated our participant's suggestions found into our new sketches. We changed the original exhibit flow from three sections to **three individual rooms with different educational displays** and a single **interactive activity** (create your own flipbook, frame by frame wheel, and the motion capture walkthrough) in the center of the rooms (below). Additionally, since users found that learning about how the technology works first boosts their interest in participating in a hands-on touchpoint, we designed the flow to contain four different educational displays where users 'learn' first and then can 'try it out' themselves with our touch points (below).

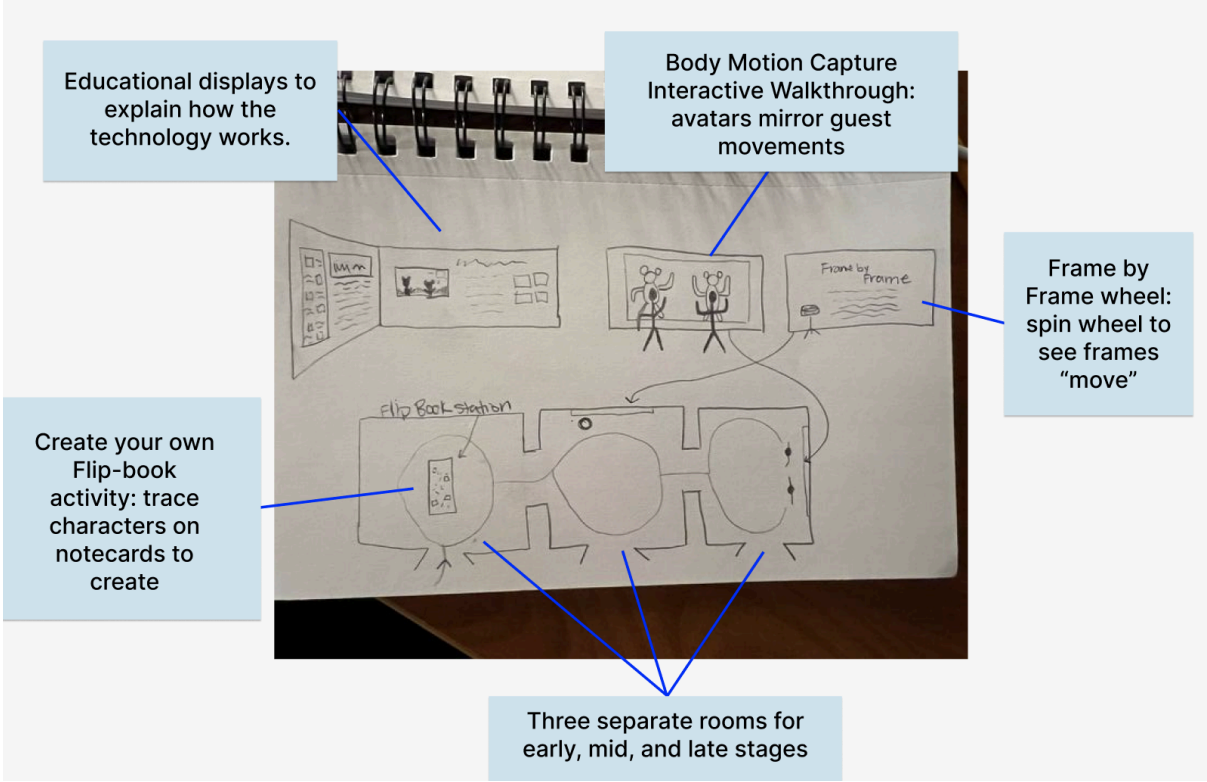


Figure 17: Revised sketch of the exhibit layout and touchpoints at each stage.

Since we found from concept testing that users liked having **hands-on activities** and from our cultural probe that sounds can help create a more immersive experience, we changed the flow to **three separate rooms** for each stage, including a **music jukebox**. Making separate rooms would help encapsulate the sound to a single room and avoid overstimulation. Providing guests

with the option to play Disney music from the movies created in that specific time period would make guests feel more **excited and nostalgic** about the exhibit.

Chosen Web Experience

For our web experience, we decided to create a **digital music jukebox** that would play different Disney songs from the animated films created at each stage. To construct the jukebox, we decided to integrate two APIs: the YouTube Data API and iFrame Player API, as these would allow us to best create a music player that users can play, pause, and skip songs from the different Disney movie soundtracks.

Constraints Faced

We originally wanted to implement Spotify's API to avoid copyright issues with embedded YouTube videos, but found the Spotify API to be too difficult to implement with its complex user authentication system. This put a constraint on our solution to only use cover songs instead of the original Disney tracks, however we were still able to create a similar nostalgic effect with the covers.

How does this enhance our exhibit?

As mentioned previously our idea is that the music jukebox would create a **stronger sense of nostalgia in museum guests and boost their interest** in the exhibit by providing them with the freedom to choose their favorite Disney songs from each period in history. Additionally, users expressed in our cultural probe that listening to the different soundtracks would **draw their attention** towards the exhibit touchpoints and create a more immersive experience. By allowing users to personally choose which songs to play, guests can feel a larger sense of **nostalgia** and **excitement** associated with the different stages of Disney animation.

Process

Initial Sketching

We first sketched the website to be one page with a top section for the video player and a bottom section for a display of each song in the playlist (below).

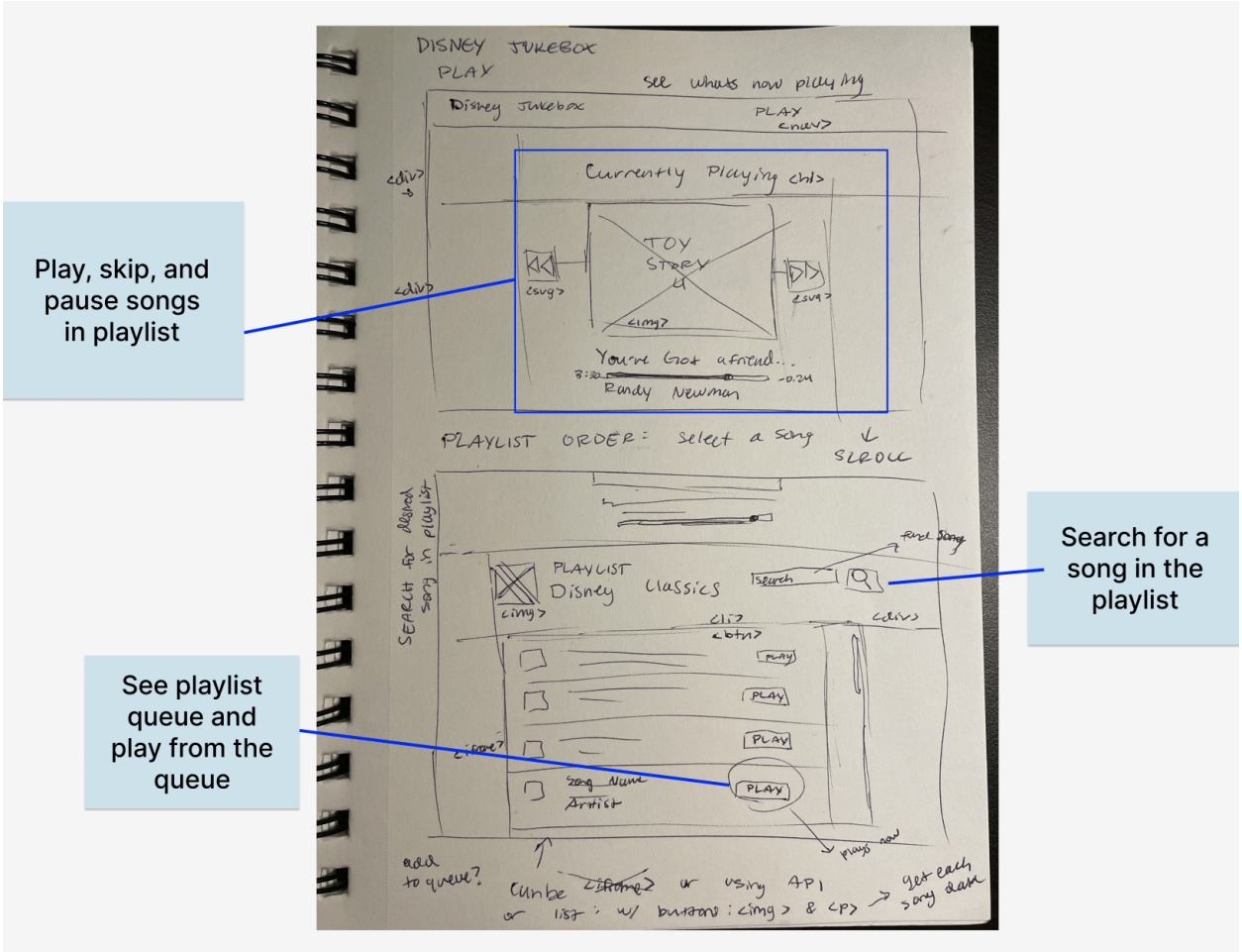
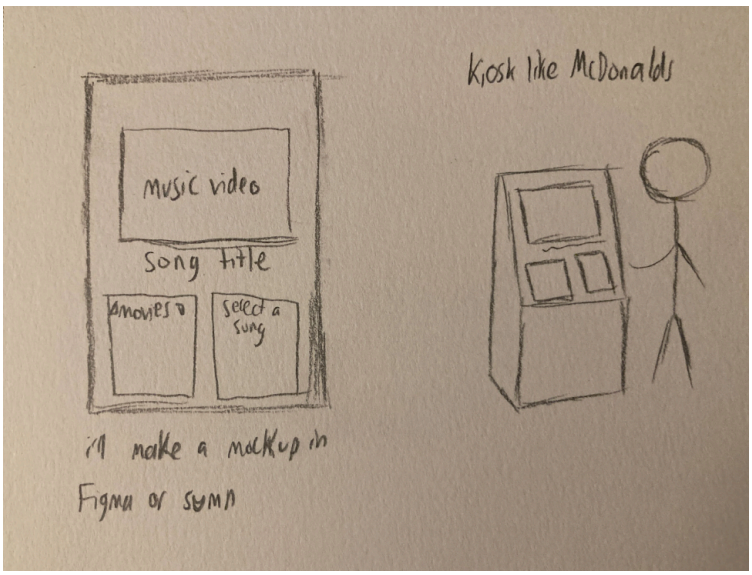


Figure 18: Initial sketch of the Disney jukebox music player screen, above.

The kiosk itself (below) would be in each room of the exhibit where users could play different songs from Disney movies made with certain animation technologies from that era.



We initially wanted users to be able to **add** and **remove** songs from the queue by clicking and dragging, but this was found to be **too challenging** to code at our team's current coding skill set and decided to only allow users to skip songs.

Figure 19: Initial sketch of the physical jukebox kiosk.

Coding the Structure & Styling

As a result, once we started coding the structure in **HTML** and the page styling in **CSS**, we changed the site's functionality to only allow for playing, skipping, and pausing songs. The list of songs also was changed to no longer represent an interactive queue but instead just display a list of each song in the playlist, along with a picture of the movie that the song is from. This was achieved by using **Bootstrap's** styling classes in HTML to create a cohesive, responsive site, as well as by adding our own custom IDs and classes for the song list.

Implementing the YouTube APIs with JavaScript

We decided to implement the **iFrame Player API** to embed a responsive video player where users can play, pause, and skip songs in each of our playlists for the early stage, mid, and late stage sections of the museum exhibit.

After implementing the iFrame player, we then used the **YouTube Data API** to list the songs in each playlist on the website. This was done by calling the API, retrieving the data, and then manipulating the HTML content of each song's title and artist to contain the API's data below the video player.

Final Result

Our final website consists of **three pages**, with each dedicated to a specific stage of animation history: **early, middle, and modern stages**. Users can navigate between each playlist on the three pages with the navigation bar (below). Each playlist consists of songs from different Disney animated films that were created during the time period.

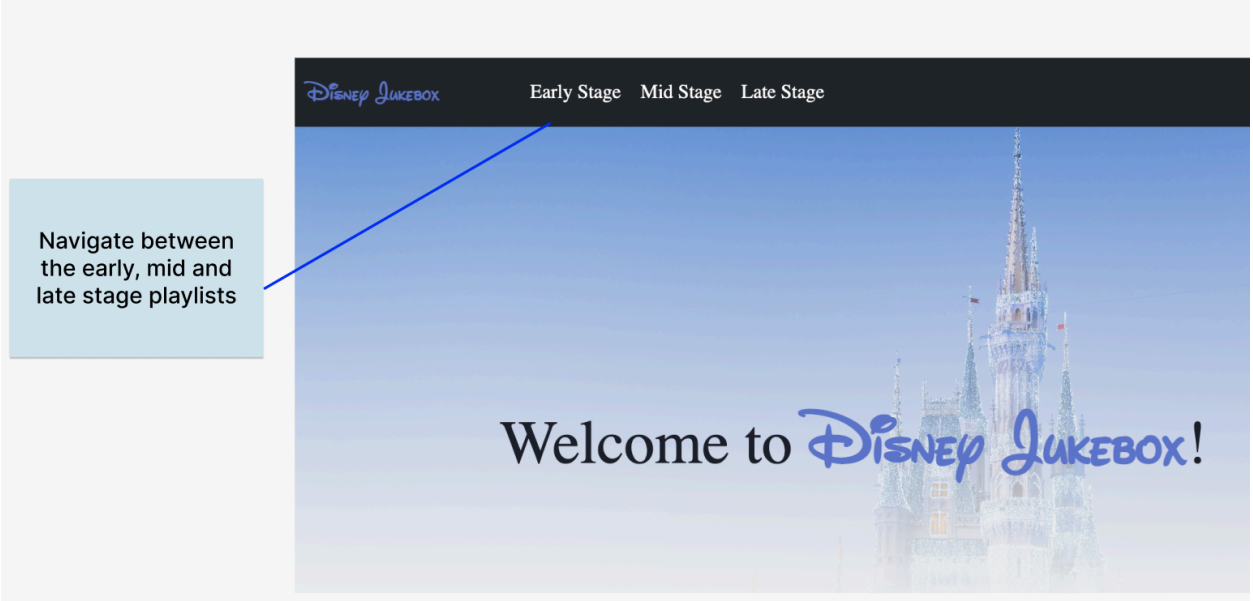


Figure 20: The jukebox navigation bar

Users can then scroll down to the **video player**. A brief explanation of the technologies used in the dedicated stage is displayed above the player. With the embedded YouTube player, users can play, skip, or pause the music as they please.

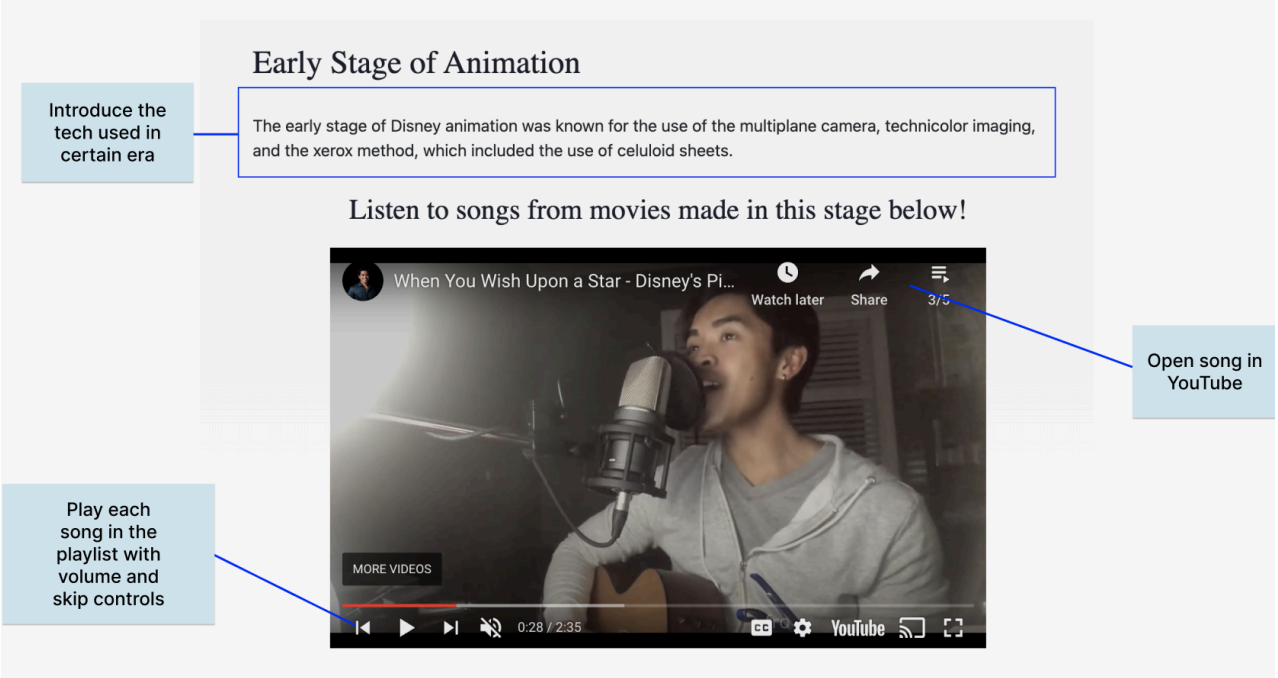


Figure 21: The YouTube video player, with user controls.

Finally, users can scroll down and view the playlist details, which is a list of each song in the playlist and an image of which movie the song is from. The data for the song titles and artists is retrieved from the YouTube Data API (below).

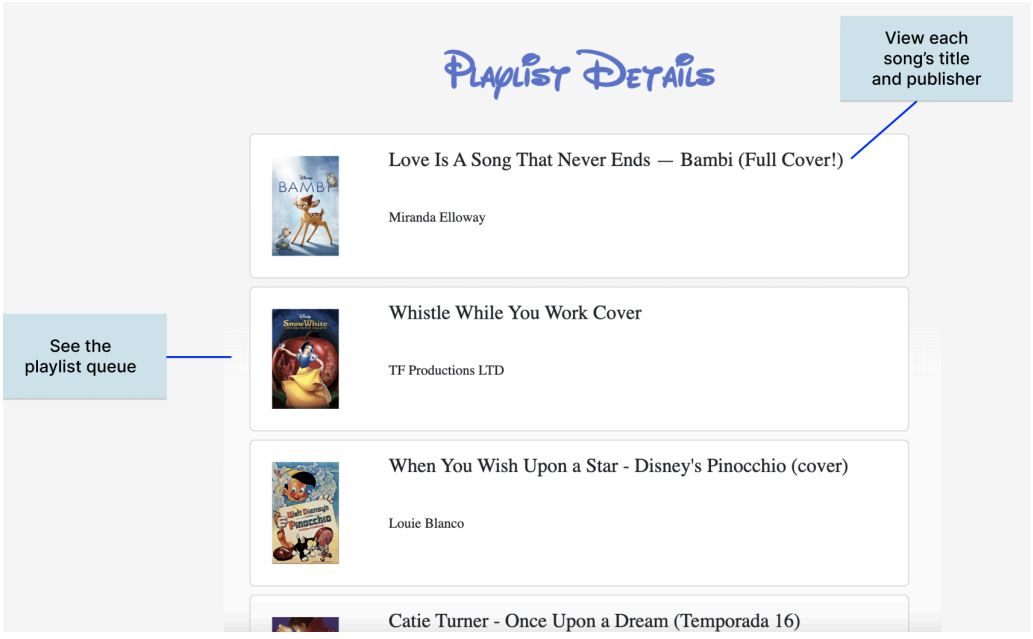


Figure 22: The playlist songs in order, with the cover artist listed.

Note that you can view the link to our final website here.

What do we want guests to take away from our exhibit?

For the final version of the exhibit, we highlighted the following key objectives for guests to learn:

1) **Understand the different time periods of animation history and the technologies associated with each period.**
    a) This is achieved through the **educational portions of the exhibit** content displayed on/along the walls of each room in the exhibit, including pictures, physical displays of the technology, information boards, posters, and a question and answer machine discussed earlier in the documentation.
    b) With the educational sections along the outer walls of the exhibit flow and the interactive touch points in the middle, users will be encouraged to learn about how the technology works first before trying it out.

2) **Understand how different animation technologies work and are used day to day by real animators at Walt Disney studios.**
    a) This is achieved through our three interactive touchpoints where users can try out the technology themselves and see a real world example of how each piece of technology (motion capture, frame by frame animation, and flip-books) works in real life.

Creating a 3D Mockup in Minecraft

Process

The actual process was very simple. First, we laid out the dimensions of the exhibit, each room was made of a **20x20** frame in Minecraft and each hallway was **4x7**. These dimensions were chosen because they provide enough room in each stage for all of the props, activities, and galleries. After the foundation was made, we moved on to creating each stage first starting with the early stage and then mid then modern.

To make the walkthrough more enjoyable when viewing, we added small easter eggs in our video with note blocks and fireworks. In Minecraft there is an option to add **musical note block**

which can be changed to different notes. We add those to create a small musical number in our video and at the end of the video there is a firework display which Disney is known for.

In every stage there is a **jukebox machine**, **AI generated question and answer application**, a **technology section, display section**, and an **interactive activity** (either the create your own flipbook, frame by frame wheel, or motion capture walkthrough). On the walls (while not in the actual walkthrough) is wallpaper that coordinates with each stage, i.e. the early stage will have early drawings, middle stage will have middle drawings, and modern stage will have modern drawings.

The AI Q&A screen was created to **boost a sense of curiosity** with the exhibit since we found from our secondary research that community discussion and Q&As can help increase engagement with an exhibit. Additionally, having the displays and information on the walls helps **educate users first on the technology used** in that time period, which they mentioned in our cultural probe would make them more likely to interact with our three touch points if they knew how the technology worked beforehand.

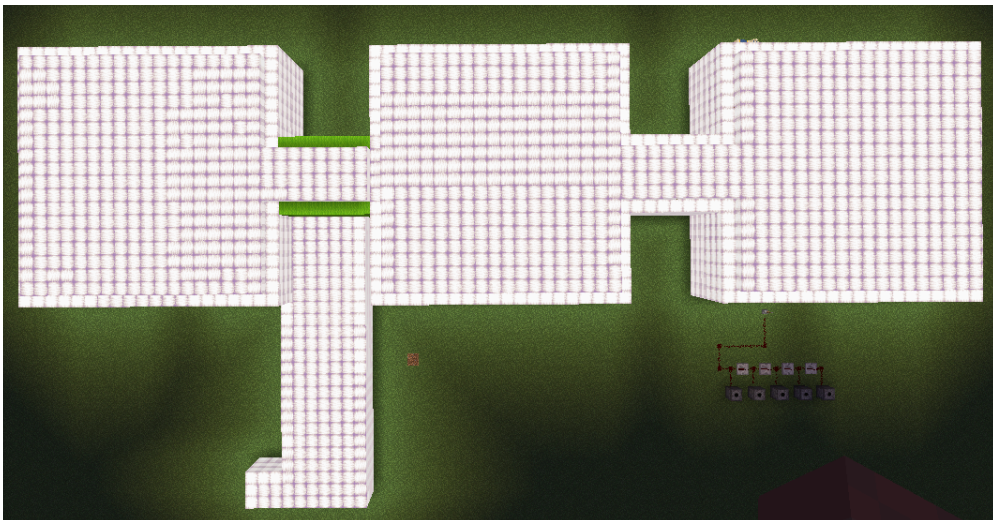


Figure 23: Bird's eye view of the whole exhibit, early, middle, modern (left to right)

Figure 24: The touchpoint or activity is in the middle of each stage and gives the user multiple entrances so that it encourages interaction

Figure 25: Welcome section in each stage, the middle stage is pictured above, the jukebox machine is in every stage as well

Figure 26: A technology section is in every stage, the modern stage is pictured above. This section would have displays of the actual technological devices used along with an explanation.

Rationale

Another addition to our final deliverables for this project was a walkthrough of our exhibit. Our team decided that the best and easiest way to convey our final exhibit was to build a **3D model** in the software called **Minecraft**. We chose to use Minecraft was because there is a **small learning curve** to making a model and the software provided a lot of customization that we wanted in our final walkthrough. It was also thought that the **easy use of the software** would put less stress on the group members since only one person had to build the exhibit while the rest of the team's efforts could be spent elsewhere on additional testing, sketching, etc.

Final Solution

Video walkthrough

You can view our final exhibit walkthrough here: Day at the Museum Project 3 Remix

The walkthrough was chosen to be a video of our final layout in Minecraft instead of a physical mockup because our team believed we could convey the experience better if it was done through a video format. Below are additional screenshots of our walkthrough to convey the experience we want our users to have when they visit our exhibit.

Below are screens of the various touch points constructed in our Minecraft model:

Figure 27: Welcome section in every stage, right next the the jukebox

Figure 28: A jukebox is by all the welcome section of each stage in the exhibit

Figure 29: A video walkthrough of the technologies in each stage right next to the displays

Figure 30: The activity of each stage is in the middle with multiple entry points to minimize queue build up

Figure 31: A AI generated machine for users to ask questions

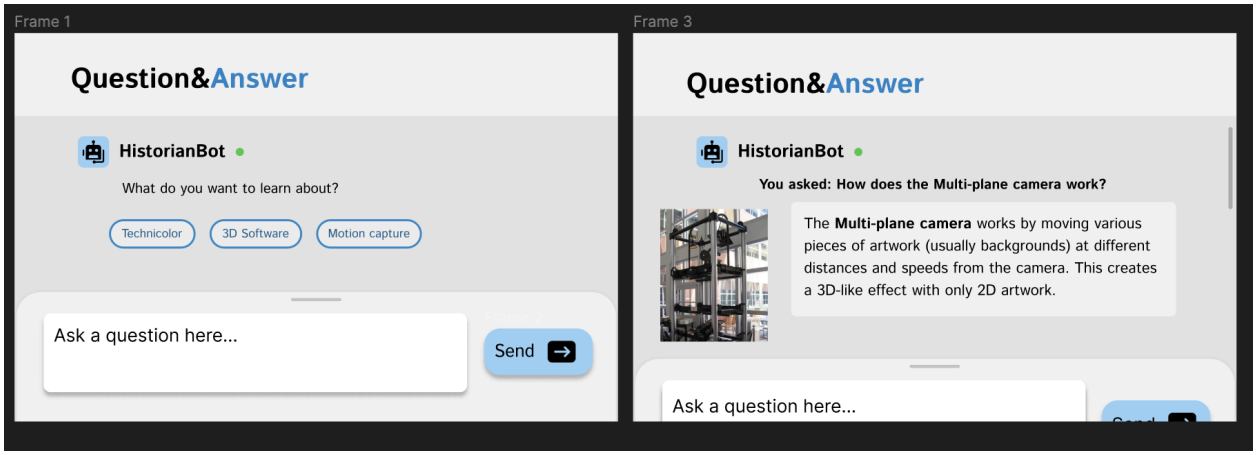


Figure 32: A screenshot of the UI for the AI Q&A machine. Users can ask a question themselves or select a generated prompt to learn more about a specific device or piece of technology.

Figure 33: An example of a technology display in a stage of our exhibit

Final exhibit flow

Our final flow follows a **three-room circuit** with each room dedicated to its own era in animation history. The idea behind our exhibit layout is to allow for history to be told in order while not forcing the museum goers to participate in any specific action. The rooms will be laid out in early animation, the developmental age / middle age, and finally the modern era.

With the circular flow, if the user doesn't enjoy the current room they can just move on to the next one. Each room is centered around **one of three main touchpoints** that we created for the project as defined earlier in the documentation. We will have different poster boards on the walls surrounding the touchpoint which will display information about the films created in that time period and the animation technology that was used. This information will act as an **educational aid** as many of our users preferred to learn about how the technology works first

before trying it out in the interactive touchpoint.

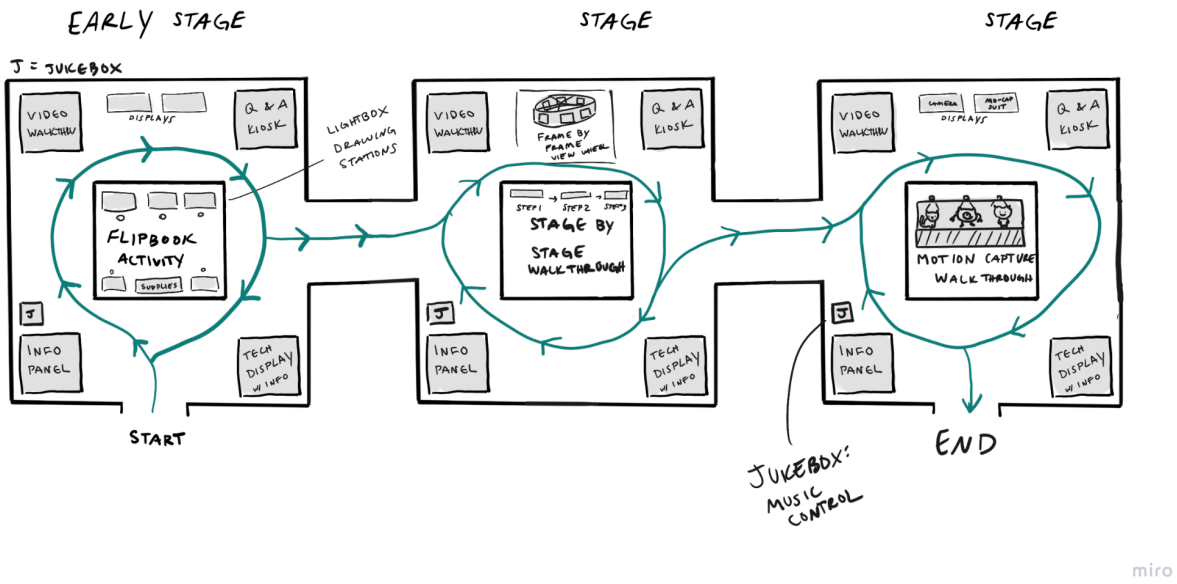


Figure 34: Finalized sketch of the iterated exhibit flow, above.

Rationale

From our secondary research on **"what makes a memorable museum exhibit"** we determined that the best exhibits **follow a path but don't force the users** to participate. We built this idea straight into our exhibit flow by giving the users the option to actively participate, watch, or even skip the touchpoints altogether. There is plenty of **educational information** posted on the walls of each room for participants to learn from without physically taking action. This idea is taken one step further by the inclusion of an immersive room for each of the three stages of animation.

Additionally, from our concept testing insights, we learned that users **preferred a circular flow**.This makes things easier as if the participant isn't interested in one room of animation history, then they can simply move on to a different era that they are interested in. Since users felt that creating a **sense of nostalgia** was important to gauge their interest in an exhibit, we designed each room to be accompanied by music and decor that come from a specific era of animation.

Reflection & Conclusion

Besides the pivot point we had with our cultural probe, our team didn't have any other bumps in the design process. However, we realized that our walkthrough **does not show every touchpoint exhibit** that we planned on including due to time constraints and our focus being on the three interactive activities. This is specifically with our educational touchpoints like our idea to have an AI generated Q&A kiosk as well as physical displays of the technology. We realize that if there was more time we could have done more to include all of our ideas for the exhibit.

Another constraint our team had was that **we didn't do any formal usability testing** with our final solution. While we did accomplish **concept testing** for our touchpoints, we ran out of time to test further with our prototypes. These time constraints came from needing to change our cultural probe and rerun through that which took up to a week to collect all of the data, then Thanksgiving break happened, which set our team back further.

Overall, this project was a good experience and learning opportunity to advance our research and design thinking skills. If we were given the opportunity to do this project over with the knowledge we have now, we would have **managed our time better** as well as divide the work more evenly when tackling the cultural probe and concept testing. We also would have **created a plan ahead of time** to keep track of the tasks that still need to be completed instead of creating due dates after each class. This would have given us an ample amount of time to tackle researching, designing, and testing instead of rushing to finish closer towards the deadline.

Next Steps

We would plan to **continue user testing and iteration** for our next steps. Given that the time to work on this project was limited with the semester coming to a close, we would have liked to conduct a cognitive walkthrough to test the usability of our final web experience as well as A/B testing with our final touch point sketches. After testing, we would plan on **revising our exhibit touch points** based on the insights found to make the connection between the Minecraft models of the touchpoints and our ideas behind them more clear.

Additional constraints found

Financial Concerns

Following the feedback received from our final presentation, we realized that there may be financial constraints with the flipbook touchpoint. Allowing users to take home the physical flipbook as a souvenir **may not be completely feasible financially** for the exhibit as some museum owners may not have the budget to supply new notecards, pens, etc. To overcome this, we plan on incorporating a **digital flipbook app** in our next steps, which would allow users to create and take home their souvenir in a digital format instead of needing to supply physical paper. We initially didn't go with the idea of a digital flipbook because we wanted to stay true to the time when this technique was used and do pen and paper.

Making the connection between Minecraft and the real world

Finally, we realize that **Minecraft does not accurately model real life**. Given that we can only choose between certain blocks and items in Minecraft to build with compared to other prototyping tools, we realize that our final exhibit model **may not capture our complete ideas** for what each room should look like, feel like, and how users will interact with it. As a result, we plan on iterating upon our Minecraft exhibit in our next steps to make it feel as close as possible to users expectations for each touch point within the context of a film museum.

Appendix

All sketches

1. Figure 1: Initial sketch of the late-modern stage room flow, before deciding on a circular flow.

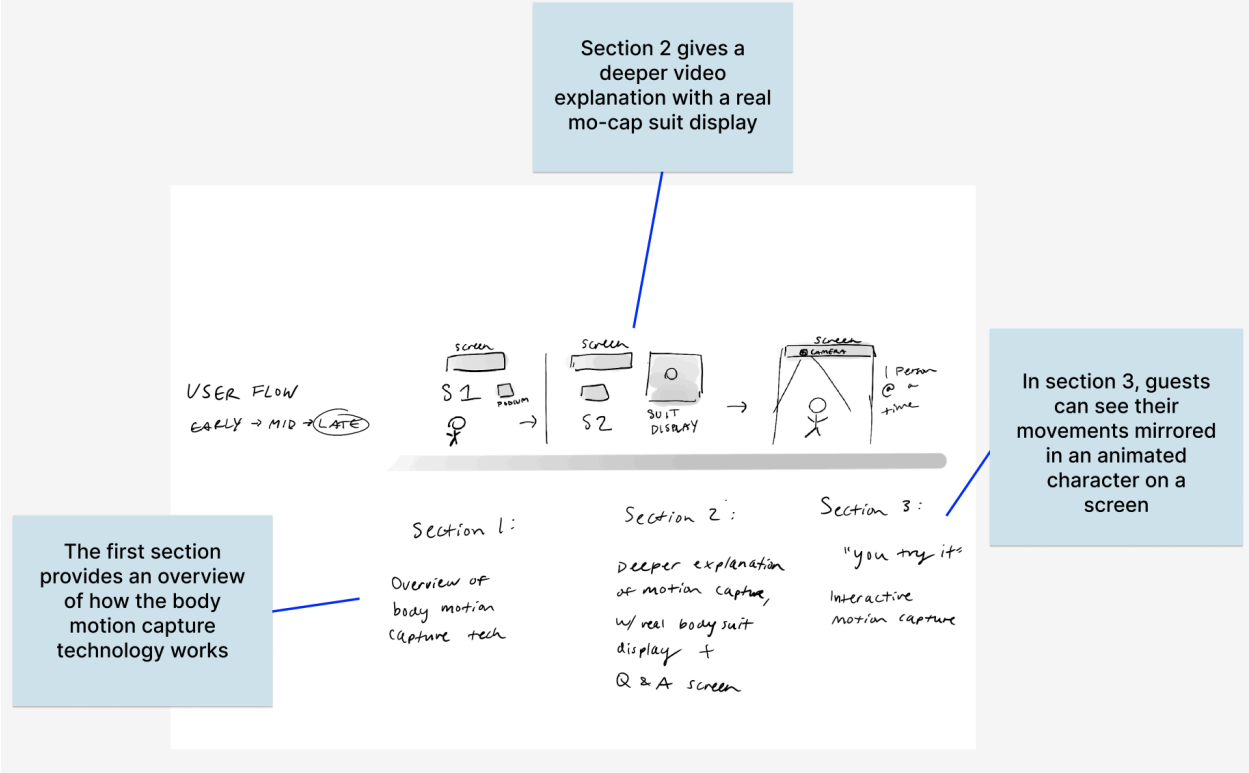


Figure 1 pictured above.

2. Figure 2: Initial sketch of the late-modern stage room flow, before deciding on a circular flow.

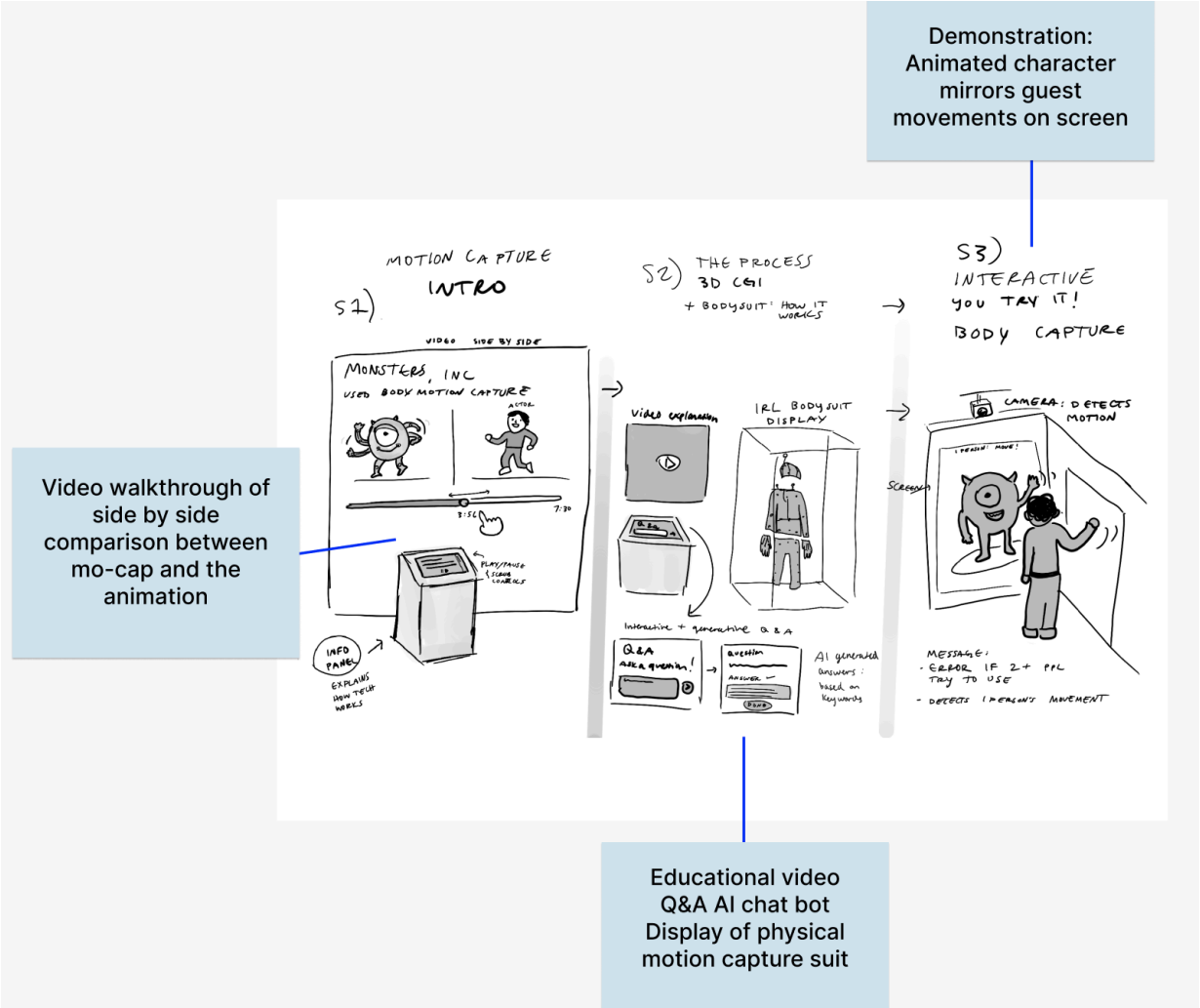


Figure 2 pictured above.

3. Figure 3: Disney music jukebox player and song queue sketch.

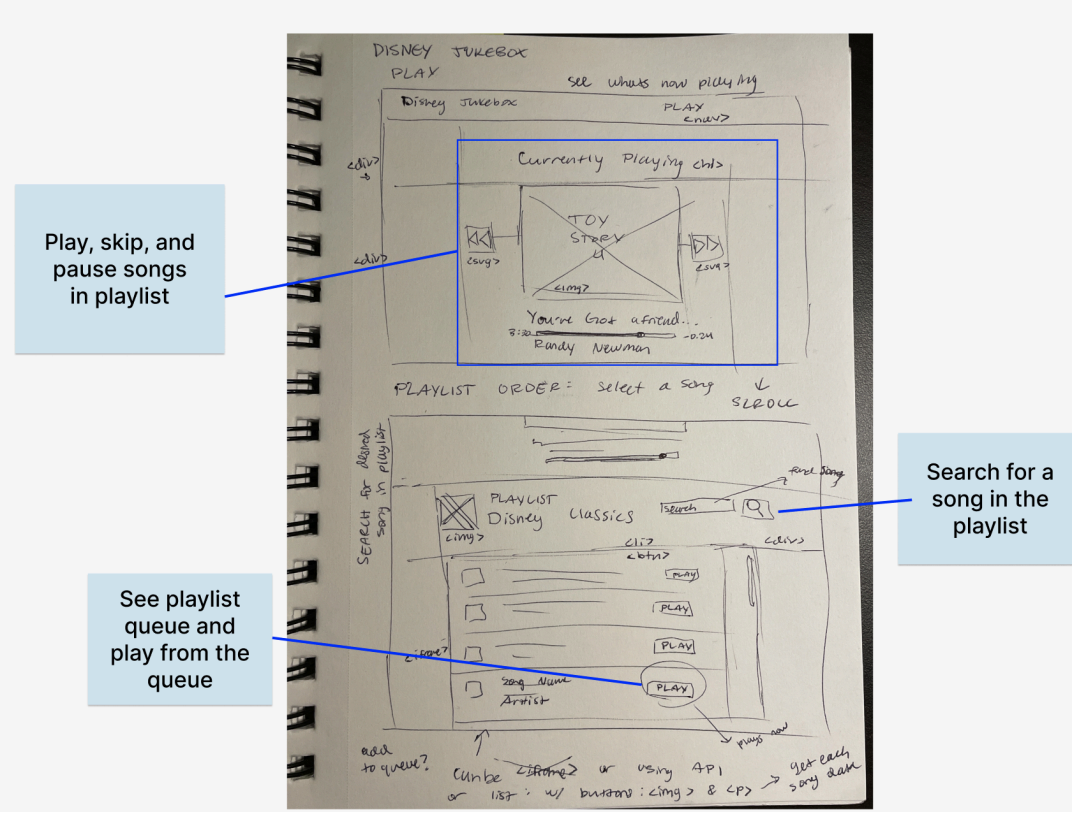


Figure 3 pictured above.

4. Figure 4: Sketch of the body motion capture walkthrough touch point.

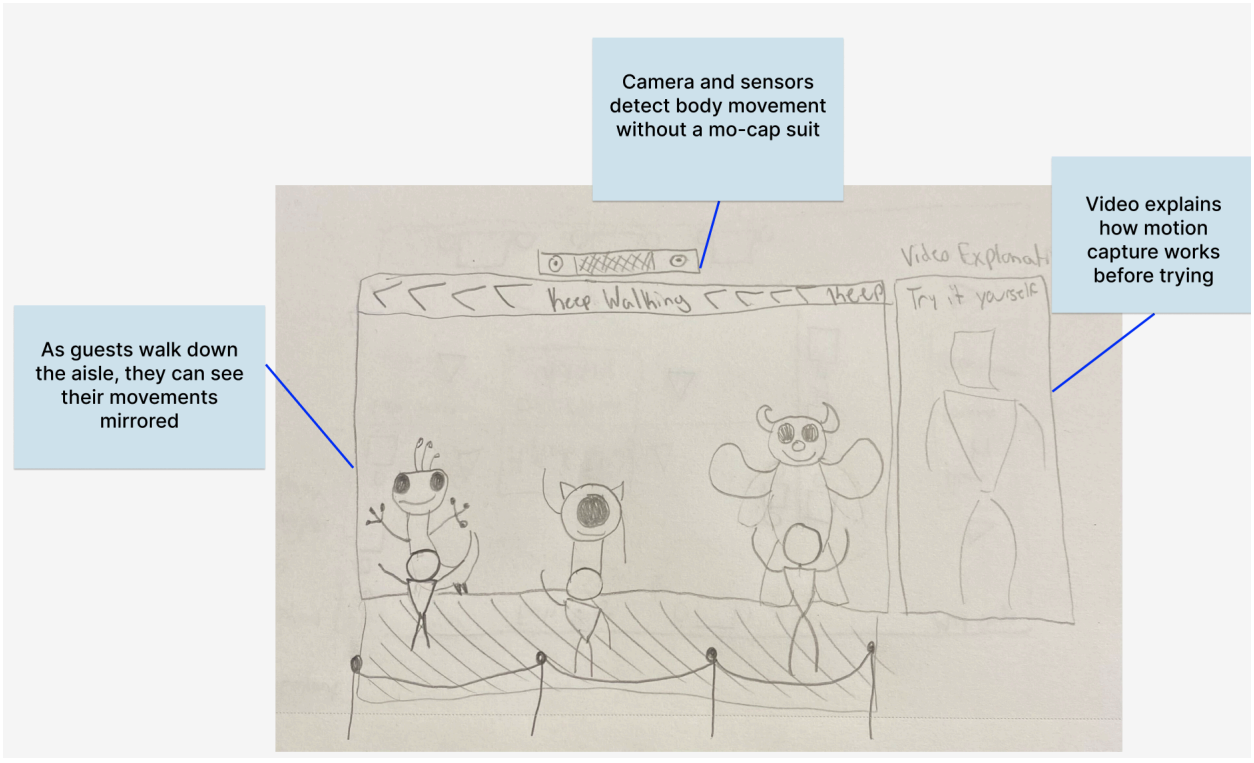


Figure 4 pictured above.

5. Figure 5: Sketch of the initial user flow for the exhibit in sections.

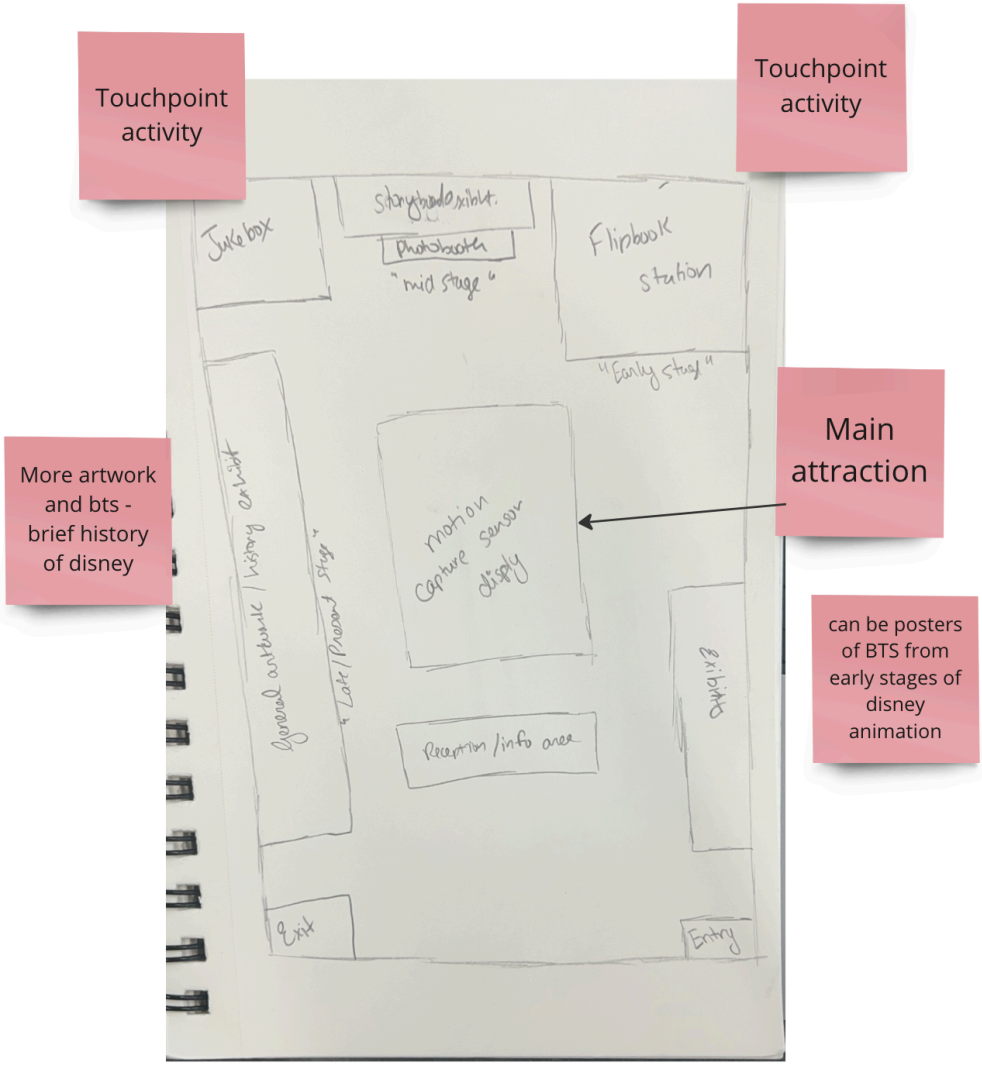


Figure 5 pictured above.

6. Figure 6: Sketch of the second iterated exhibit flow.

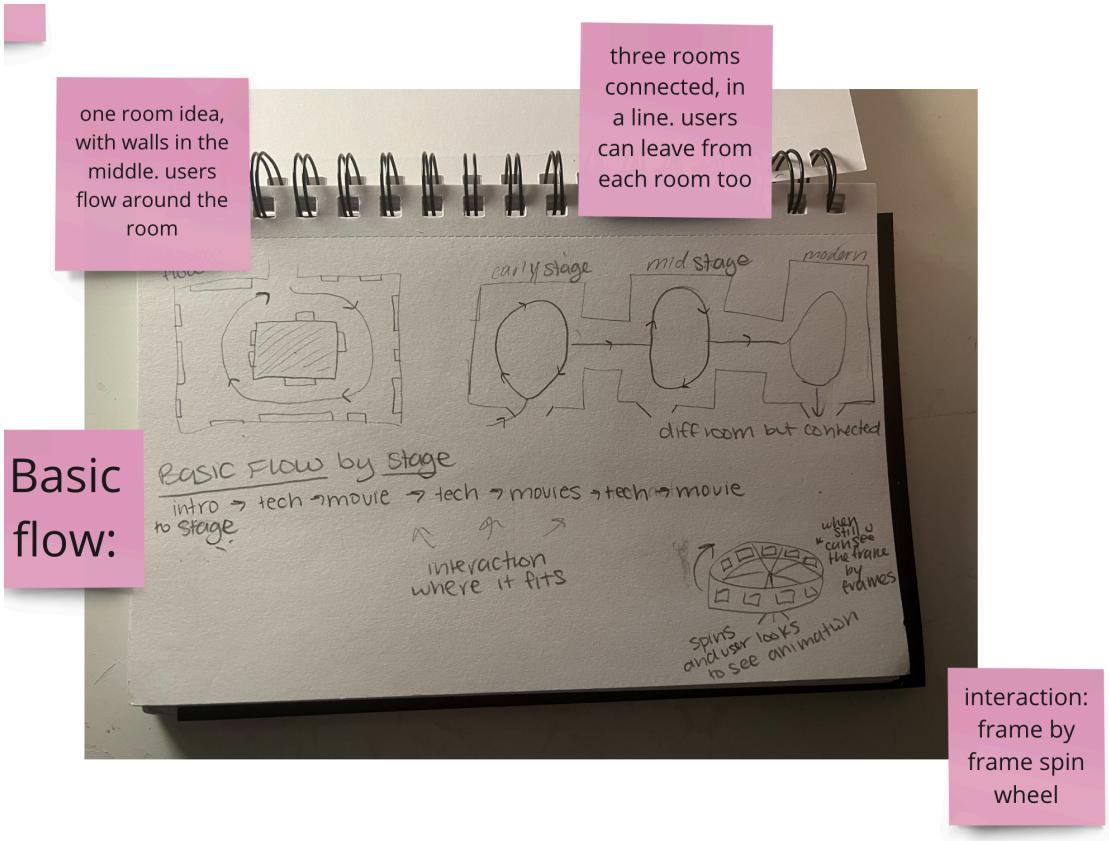
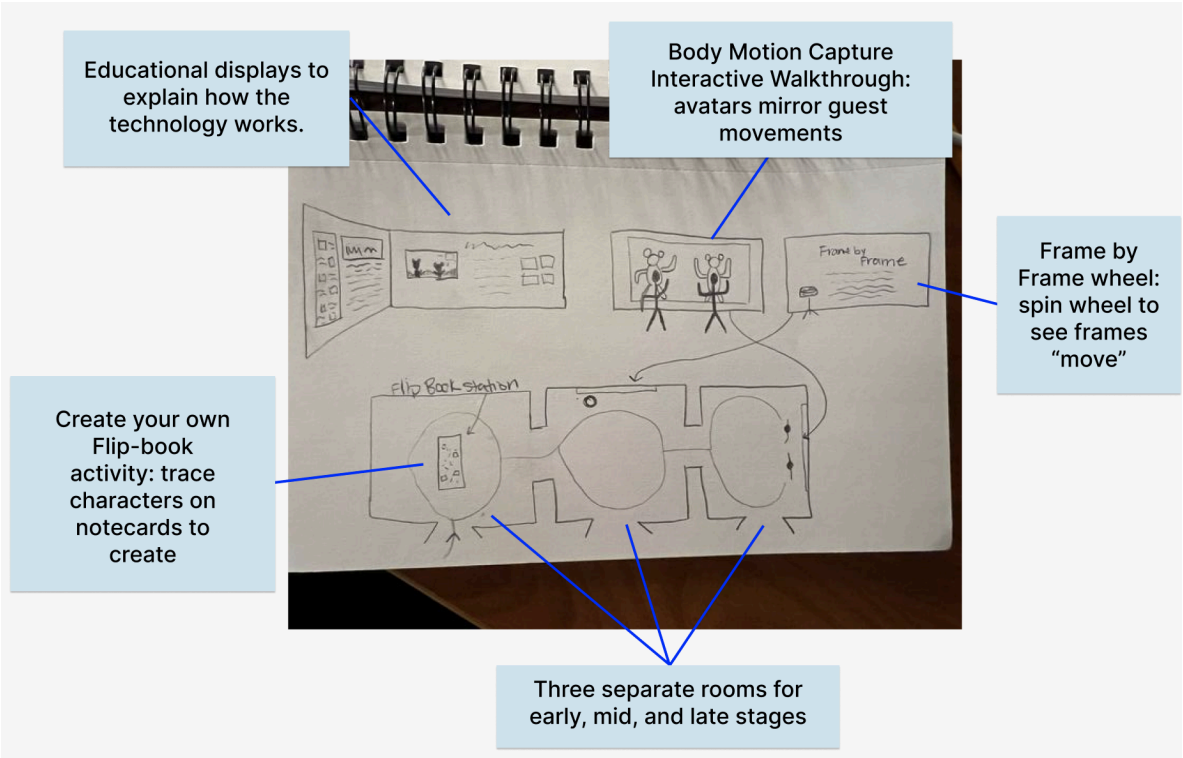


Figure 6 pictured above.

7. Figure 7: Sketch of the third and finalized user flow, with a cycle pattern.



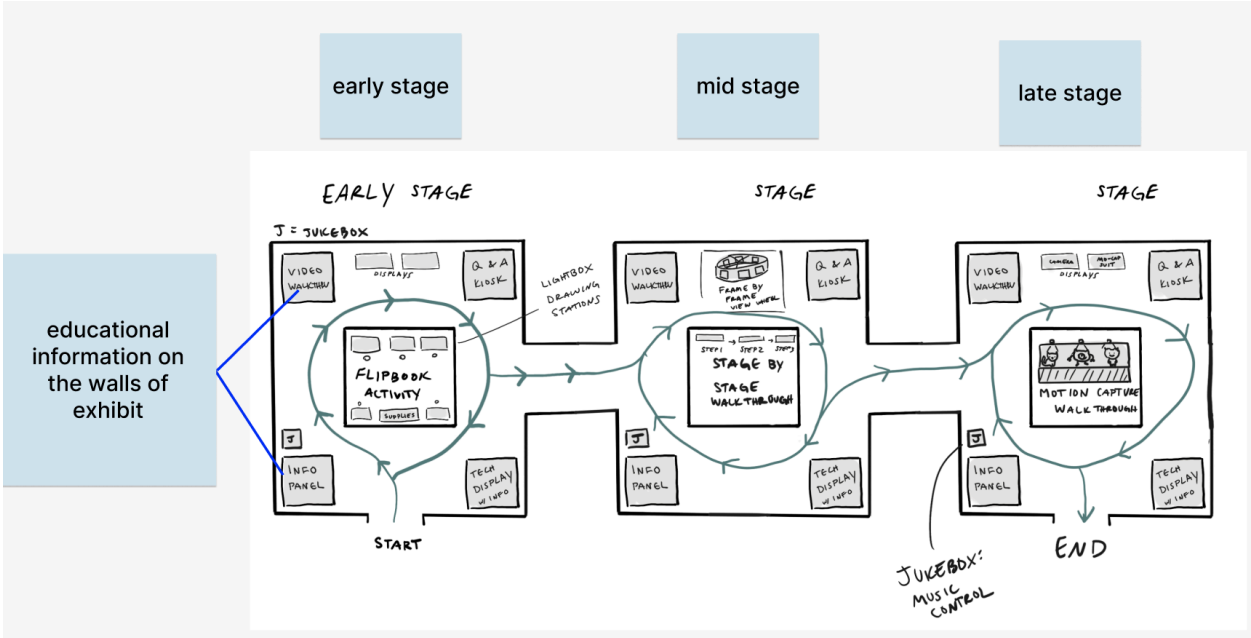


Figure 7 pictured above.

8. Figure 8: Sketch of the create your own flipbook activity touchpoint.

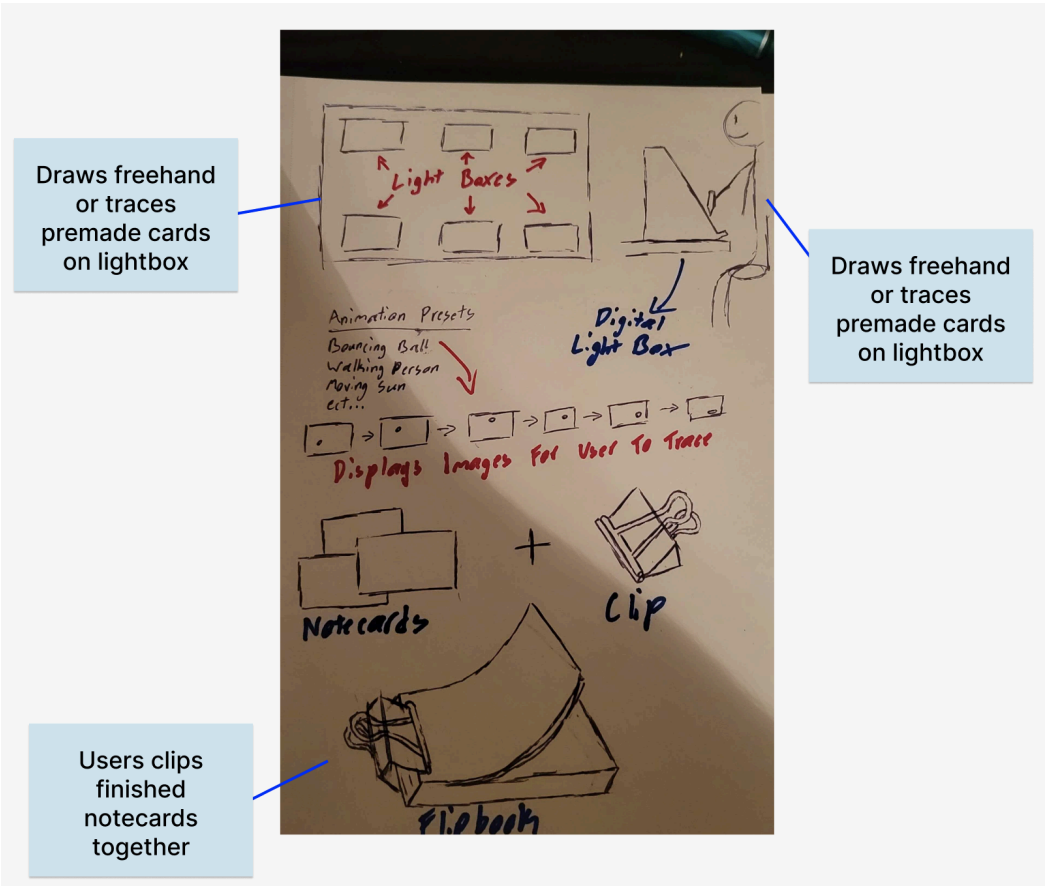


Figure 8 pictured left.

9. Figure 9: Sketch of the create your own flipbook activity touchpoint.

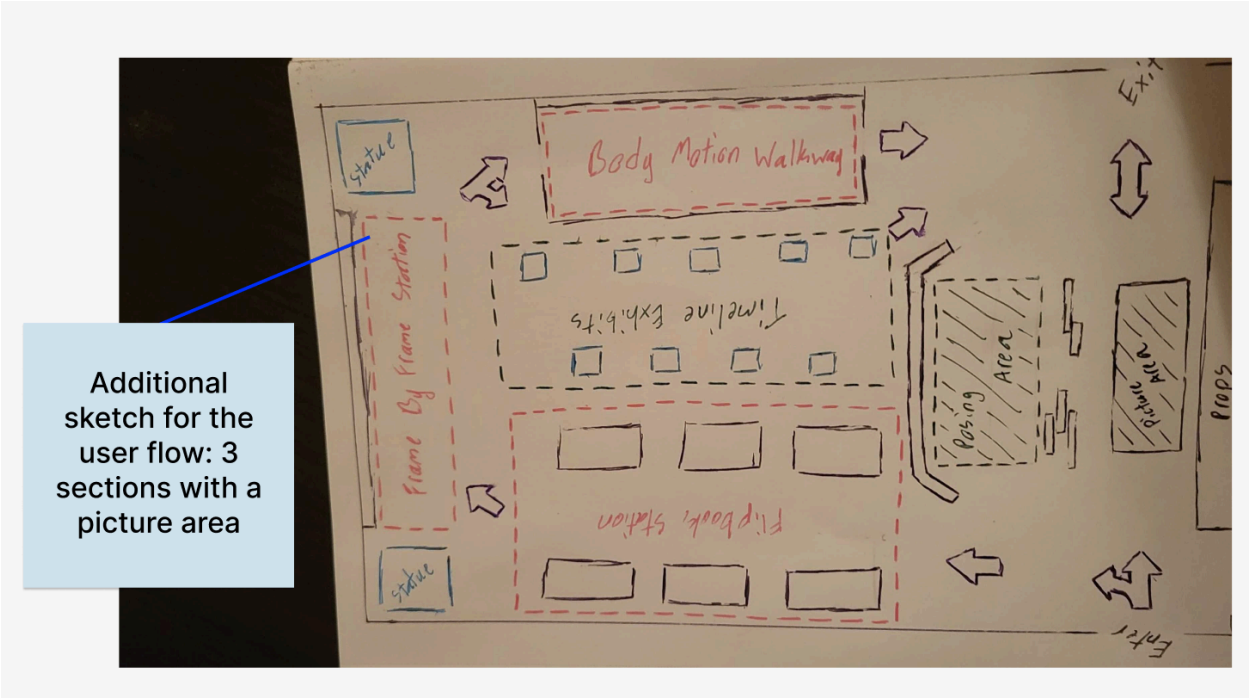


Figure 9 pictured above.

All prototypes

1. Figure 10: Disney Jukebox high-fidelity music player and working player controls.

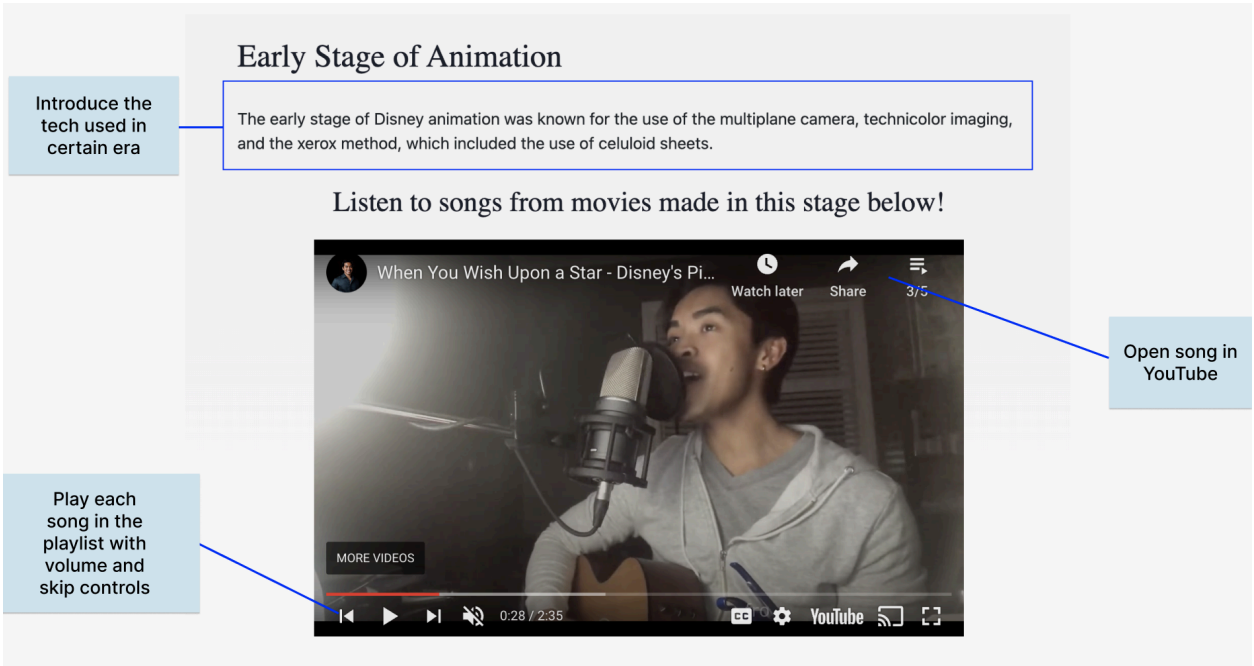


Figure 10 pictured above.

1. Figure 11: Disney Jukebox song queue list, below.

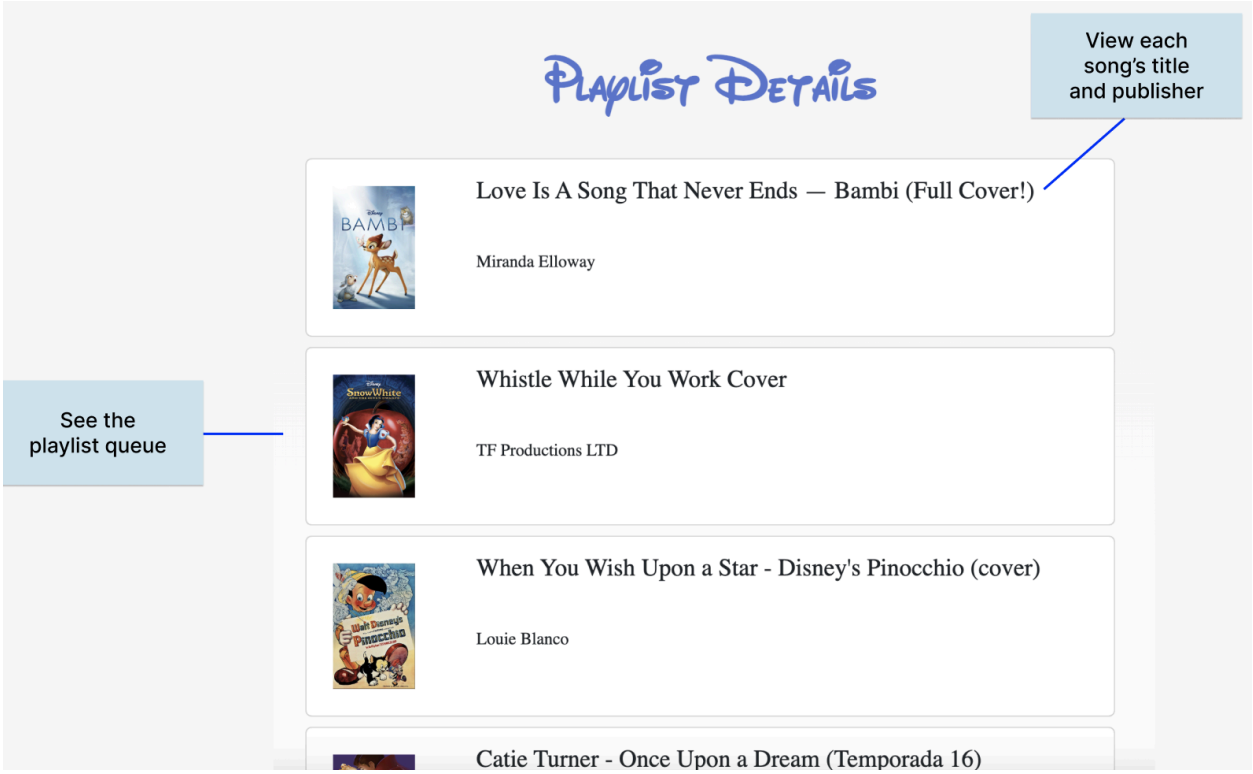


Figure 11 pictured above.

2. Figure 11: navigation bar for each playlist on the Jukebox.

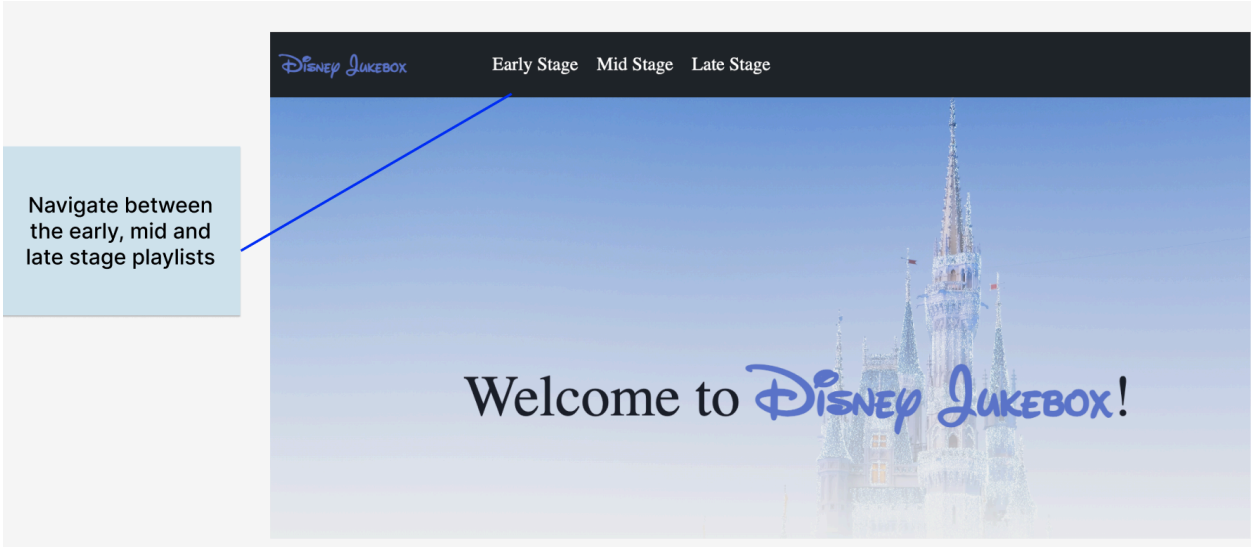


Figure 12 pictured above.

3. Figure 13: Birds eye view of the museum exhibit in Minecraft.

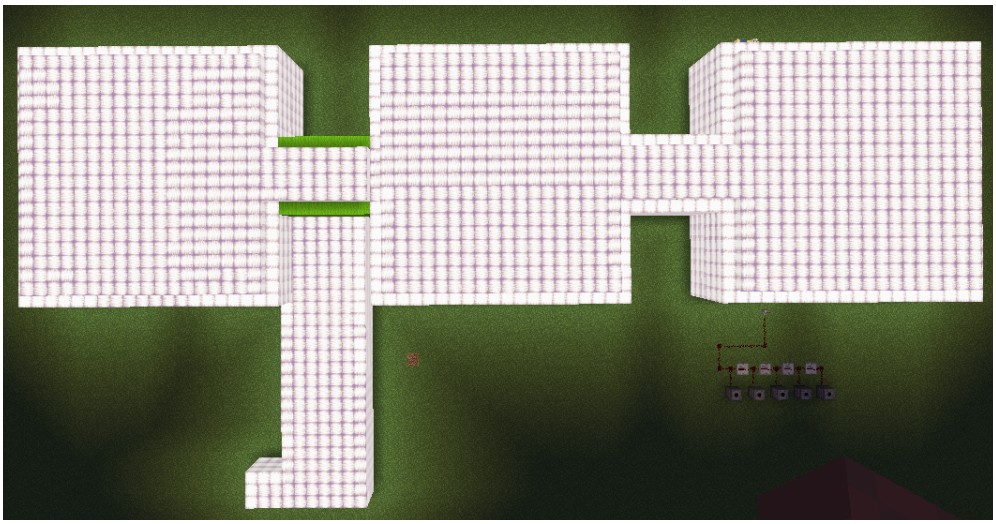


Figure 13: Bird's eye view of the whole exhibit, early, middle, modern (left to right)

4. Figure 14: The exhibit entrance in Minecraft, with educational sections around the walls and an interactive touchpoint in the middle of each room.

Figure 14: Entrance view of our exhibit, user fist walks into the early stage which is pictured above.

5. Figure 15: The welcome section of the exhibit in Minecraft.

Figure 15: Welcome section in each stage, the middle stage is pictured above, the jukebox machine is in every stage as well

6. Figure 16: The physical display of technology devices (such as a motion capture suit or multiplane camera) displayed in Minecraft.

Figure 16: A technology section is in every stage, the modern stage is pictured above. This section would have displays of the actual technological devices used along with an explanation.

7. Figure 17: the Q&A AI generated bot, shown below.

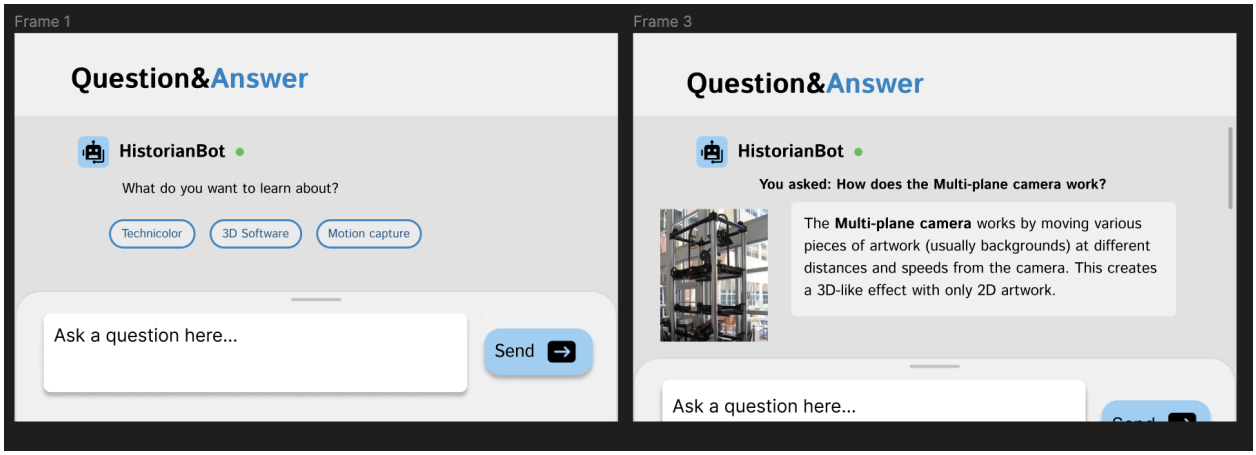


Figure 17 shown above. Users can ask questions or click on a prompt to learn about the different animation technology used.

All secondary research

Desk Research

1. **What makes a good museum? What would make someone want to visit more than once or share the experience with someone?**
    - **a.** Source 1: https://www.youtube.com/watch?v=2ZgdhmykBWQ
    - **b.** Source 2: https://www.youtube.com/watch?v=m1-r7CR6FsI
    - **c.** Source 3: https://insights.som.yale.edu/insights/what-makes-museum-successful
        - **i.** Having attractions that stimulate multiple senses makes museum exhibits memorable and fun for everyone
2. **How can a museum be designed to be entertaining and informative to ALL ages?**
    - a. Source 1: “5 Ways to make museums fun in the digital age”: https://www.linkedin.com/pulse/5-ways-make-museums-fun-digital-age-griffin-lichtenson
        - i. Becoming more photo+tech friendly
        - ii. Allowing people to disseminate photos of museum content
        - iii. Including museum cafes/bars
        - iv. Increases retention, socialization, patreon participation, and all-age involvement
        - v. Add more evening hours. (attracts young adults, millennial age visitors)
        - vi. Offer premium guided tours (interactive, engaging, meaningful experience)

vii. Crowd control: "… make it easier for people to process through museums by redesigning and maximizing viewing spaces in both permanent and temporary exhibitions"

b. Source 2: "An Architect's Guide to Museum Planning": https://architizer.com/blog/practice/details/architects-guide-museum-planning/
   i. Utilize a variety of mediums
   ii. Graphic display, video & sound, theater, video, static objects, tactile objects, interactive computer, animatronics, reconstruction, working environments

c. Source 3: "How to guarantee seamless mobility chain to users with disabilities": https://www.inclusivecitymaker.com/how-guarantee-seamless-mobility-chain-users-disabilities/
   i. Creating a continuous, seamless mobility chain
   ii. How people get to the museum
   iii. Coming up with building and locating the main entrance
   iv. Locating adapted paths to reach exhibition sections
   v. Using horizontal and vertical circulations
   vi. Locating adopted path to leave and exit building

3. What physical or digital interactions help participants learn and engage with an exhibit?

a. Source 1: "Museum Experience Design: A Modern Storytelling Methodology": https://www.tandfonline.com/doi/abs/10.1080/14606925.2017.1352900
   i. Interactive storytelling
   ii. Involve use of mobile devices for interactivity
   iii. **Mobile application**s to allow for "more active conversation" between guests and the exhibit
   iv. **Conversational Interfaces:** applications for guests, using Machine Learning/AI to answer guest questions and provide needed information about exhibit
   v. Generative & Retrieval-based responses
   vi. **Visualization** of authored stories: short movies or interactive experiences in physical, digital, or hybrid form
   vii. Specification of interactive experiences: turn historical information into **games** for guests
   viii. Keep exhibit open to multiple interpretations: allows guests to interpret info they are learning through their own experiences + identities
   ix. Guests can leave **physical 'trace'**: physically interact w/ touchpoints boosts engagement

b. Source 2: Mobile application guides: https://theses.hal.science/tel-00526141/
   i. Mobile guides, along w/ use of AR or VR, can enhance the museum experience; must caution on level of immersion
   ii. These combine traditional museum interaction guides - ways in which guests interpret exhibit information- (text, audio guides, guided tours, hands-on activities, multimedia installations, videos, evaluation "tools", websites) with museum information technology (databases, digital audio guides and publications, ticketing, and interactive "installations")

   c. Source 3: Participating in Online Museum Communities: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7829297/ Online museum participation and discussion:
      i. **Online forum discussion** on exhibits enhances guest engagement
      ii. Exhibits that promote a "flow state" where one is fully engaged and attentive to the information being learned/activity being done better engage guests
      iii. Social media combined with online discussions and physical experiences can help connect visitors with museum exhibits and extend knowledge

4. **What motivates participants to want to engage with a museum exhibit?**
   a. Source 1: Art Gallery Visitors Motivations: https://www.redalyc.org/journal/6797/679774387002/html/
      i. Learn something new
      ii. Be entertained
      iii. General interest in art
      iv. Novelty for a new experience

5. **What are the motivations of museum-goers? (Example: is it more for entertainment, social pressure (if they're going with others), or education?)**
   a. Source 1: "Why Do People Visit Art Museums? Examining Visitor Motivations and Visit Outcomes" by Katherine N. Cotter University of Pennsylvania Anna Fekete University of Vienna Paul. J. Silvia University of North Carolina at Greensboro
   b. Entertained, Instagram worthy spots, to please family, learning goals, and curiosity
   c. Five visitor identities: Explorers, Facilitators, Professionals/Hobbyists, Experience seekers, and Spiritual pilgrims/Rechargers
   d. Four outcomes were positively correlated with visit satisfaction—satisfying curiosity, satisfying a professional interest, feeling relaxed, and having a spiritual experience
   e. Convenience
6. **How can we help people express themselves creatively? In other words, how can our exhibit be an outlet for creative expression?**
   a. Source 1: Creativity and Museums: https://museumnotes.blogspot.com/2013/03/creativity-and-museums.html#:~:text=Museum%20experiences%20allow%20learners%20to,the%20work%20of%20creative%20people.
   b. Source 2: "Top 5 museums where [they] exploit your creativity": https://www.youtube.com/watch?v=RJXmRuExPUI
   c. Source 3: "Museum enchanted: attracting audiences through creativity": https://www.youtube.com/watch?v=HvL0XsLSu9A
   d. Having interesting and unique things in your exhibits will foster people's creativity and not restrict them to doing one thing in your exhibit. Letting the user have the freedom to explore while unknowingly making them follow a set path.

Testing and Evaluation

Concept Testing Protocol

Screening Questions

1. Name
2. Age
3. How interested are you in Disney animation techniques?
    a. Not interested at all
    b. Somewhat interested
    c. Very interested

Main Questions

1. How important is having interactive, hands-on activities in a museum exhibit?
    d. Very important
    e. Somewhat important
    f. Not important
2. Imagine you are a guest at a film museum, and you walk into an exhibit about the technology used in Disney animation studios. How appealing would this activity be? (create your own flipbook, frame by frame demonstration, body motion capture walkthrough)
    a. Very appealing
    b. Somewhat appealing
    c. Not appealing at all

3. If you were given a video lesson on how Disney used these touchpoints, would it lead to you "trying it out yourself," why or why not?

4. To what extent do you like or dislike this exhibit touchpoint idea?
    a. I strongly like this
    b. I somewhat like this
    c. Neutral
    d. I somewhat dislike this
    e. I strongly dislike this

5. Picture yourself walking through the animation exhibit at a film museum. What external factors (long vs. short queue line, lights, sounds, hands-on involvement, videos, etc.) would intrigue you into interacting with the activities in the exhibit?

6. Imagine that you are again walking through the exhibit experience. If you could change one thing about the exhibit activities presented, what would you change?

All concept testing data

You can view all of our concept testing data here.

Participant #1

Screening

1. Denison
2. 19
3. How interested are you in Disney animation techniques?
    a. Not interested at all
    b. Somewhat interested
    c. Very interested

Protocol

1. Present scenario to get the user in the correct headspace.
    a. Film Museum
    b. Disney Exhibit
2. Present the 3 concepts in different order:
    a. ABC, CAB, BCA, CBA
3. Each of the main questions are to be repeated for each touchpoint presented.

Main Questions

1. How important is having interactive, hands-on activities in a museum exhibit?
    a. Very important
    b. Somewhat important
    c. Not important
        i. I would say so, it helps doing things than just staring at it: hands on helps a lot.
2. Imagine you are a guest at a film museum, and you walk into an exhibit about the technology used in Disney animation studios. How appealing would this activity be?

(create your own flipbook, frame by frame demonstration, body motion capture walkthrough)

a. Very appealing
b. Somewhat appealing
c. Not appealing at all
    i. After the first time i wouldn't want to do it
    ii. The circular flow would help captivate me

3. If you were given a video lesson on how Disney used these technology, would it lead to you "trying it out yourself," why or why not?
    a. Yes - it looks fun to try

4. To what extent do you like or dislike this exhibit idea? (MoCap)
    a. I strongly like this
    b. I somewhat like this
    c. Neutral
    d. I somewhat dislike this
    e. I strongly dislike this
        i. It is fun, and people that are younger would want to try it more. It would be more fun to hop in an actual mo cap suit for me but I think it is appealing.

5. Imagine you are a guest at a film museum, and you walk into an exhibit about the technology used in Disney animation studios. How appealing would this activity be? (create your own flipbook, frame by frame demonstration, body motion capture walkthrough)
    a. Very appealing
    b. Somewhat appealing
    c. Not appealing at all
        i. If you had multiple it would be nice, then you can have different examples to show different frame amounts (12 v. 24)

6. If you were given a video lesson on how Disney used these touchpoints, would it lead to you "trying it out yourself," why or why not?
    a. I would, having a video would draw the museum goer in and it would help them understand how the tech works first and make them more likely to try it since they want to see how it works themselves, see how frames meld together to become seamless film.

7. To what extent do you like or dislike this exhibit touchpoint idea? (FramebyF)

a. I strongly like this
b. I somewhat like this
c. Neutral
d. I somewhat dislike this
e. I strongly dislike this

8. Imagine you are a guest at a film museum, and you walk into an exhibit about the technology used in Disney animation studios. How appealing would this activity be? (create your own flipbook, frame by frame demonstration, body motion capture walkthrough) (Flipbook)

a. Very appealing
b. Somewhat appealing
c. Not appealing at all
    i. Wants to take this home
    ii. Likes being able to trace: reduces effort + anxiety around drawing skills
    iii. Its nice to have souvenir to take with you
    iv. Seems fun

9. If you were given a video lesson on how Disney used these touchpoints, would it lead to you "trying it out yourself," why or why not?

a. Yes, as long as it isn't TOO technical with the drawing skills. Don't want the task to be intimidating for younger teens and people who don't like drawing

10. To what extent do you like or dislike this exhibit touchpoint idea? (Mo-cap)

a. I strongly like this
b. I somewhat like this
c. Neutral
d. I somewhat dislike this
e. I strongly dislike this

11. Imagine that you are again walking through the exhibit experience. If you could change one thing about the exhibit activities presented, what would you change?

a. I would like to see different levels and stations for beginner (all prompts and tracing - bouncing ball), intermediate (template w/ a person), and advanced (expert doing the person freehand)

12. Picture yourself walking through the animation exhibit at a film museum. What external factors (long vs. short queue line, lights, sounds, hands-on involvement, videos, etc.) would intrigue you into interacting with the activities in the exhibit?

a. Videos
b. Short line: not gonna wait for it
c. Long line: it looks popular, maybe i should try because other people ike it
d. Lights: important in general but not bright fluorescent light
e. Small amounts of supplemental light: makes it feel cozier and more welcoming.

Participant #2

Screening

2. Abby
3. 21
4. How interested are you in Disney animation techniques?
    a. Not interested at all
    b. Somewhat interested
    c. Very interested

Protocol

4. Present scenario to get the user in the correct headspace.
    a. Film Museum
    b. Disney Exhibit
5. Present the 3 concepts in different order (A: Flipbook B: Frame by Frame C: Motion capture):
    a. ABC, CAB, BCA, CBA
6. Each of the main questions are to be repeated for each touchpoint presented.

Main Questions

4. How important is having interactive, hands-on activities in a museum exhibit?
    a. Very important
    b. Somewhat important
    c. Not important

5. Imagine you are a guest at a film museum, and you walk into an exhibit about the technology used in Disney animation studios. How appealing would this activity be? (create your own flipbook, frame-by-frame demonstration, and body motion capture walkthrough)
    a. Very appealing
    b. Somewhat appealing
    c. Not appealing at all

6. If you were given a video lesson on how Disney used these touchpoints, would it lead to you "trying it out yourself," why or why not?
   a. Somewhat interested, depending on the touchpoint personal preference on engaging with the activity, actual artistic touchpoints are more appealing, like flipbook and the frame by frame

7. To what extent do you like or dislike this exhibit touchpoint idea? - Flipbook
   a. I strongly dislike this
   b. I somewhat dislike this
   c. Neutral
   d. I somewhat like this
   e. I strongly like this

8. To what extent do you like or dislike this exhibit touchpoint idea? - FbyF
   a. I strongly dislike this
   b. I somewhat dislike this
   c. Neutral
   d. I somewhat like this
   e. I strongly like this

9. To what extent do you like or dislike this exhibit touchpoint idea? - Body Motion
   a. I strongly dislike this
   b. I somewhat dislike this
   c. Neutral
   d. I somewhat like this
   e. I strongly like this

10. Picture yourself walking through the animation exhibit at a film museum. What external factors (long vs. short queue line, lights, sounds, hands-on involvement, videos, etc.) would intrigue you into interacting with the activities in the exhibit?
- Hands on, don't want to wait in line, having a lot of hand on, No patience to wait in line for a small activity

11. Imagine that you are again walking through the exhibit experience. If you could change one thing about the exhibit activities presented, what would you change?

- Change how much information is presented; don't make it long and wordy, not page and page of information; prioritize the hands-on experience instead of the learning aspect

Participant #3

Screening

1. Josh D'Souza
2. 22
3. How interested are you in Disney animation techniques?
    a. Not interested at all
    b. Somewhat interested
    c. Very interested

Protocol

1. Present scenario to get the user in the correct headspace.
2. Present the 3 concepts in different order:
    a. ABC, CAB, BCA, CBA
3. Each of the main questions are to be repeated for each touchpoint presented.

Main Questions

1. How important is having interactive, hands-on activities in a museum exhibit?
    a. Very important
    b. Somewhat important
    c. Not important

2. Imagine you are a guest at a film museum, and you walk into an exhibit about the technology used in Disney animation studios. How appealing would this activity be? (create your own flipbook, frame-by-frame demonstration, and body motion capture walkthrough)
    a. Very appealing
    b. Somewhat appealing
    c. Not appealing at all

3. If you were given a video lesson on how Disney used these touchpoints, would it lead to you "trying it out yourself," why or why not?
    a. Not really, something that he has not thought about while watching Disney movies. Not super knowledgeable about animation techniques.

To what extent do you like or dislike this exhibit touchpoint idea?

a. I strongly dislike this
b. I somewhat dislike this
c. Neutral
d. I somewhat like this
e. I strongly like this

Picture yourself walking through the animation exhibit at a film museum. What external factors (long vs. short queue line, lights, sounds, hands-on involvement, videos, etc.) would intrigue you into interacting with the activities in the exhibit?

a. Would have the most fun with the motion sensor activity, more inclined to go to the museum for this. If the flipbook station is too busy it would most likely not do it. Have some insensitivity to stick around the long line. Not too interested in the frame-by-frame animation stage.

Imagine that you are again walking through the exhibit experience. If you could change one thing about the exhibit activities presented, what would you change?

a. The layout seems a bit congested, I would like to see the info panel at the beginning of the room right as you enter.

All survey data

You can view all of our survey data here.

All cultural probe data

Note: you can view our cultural probe data here.