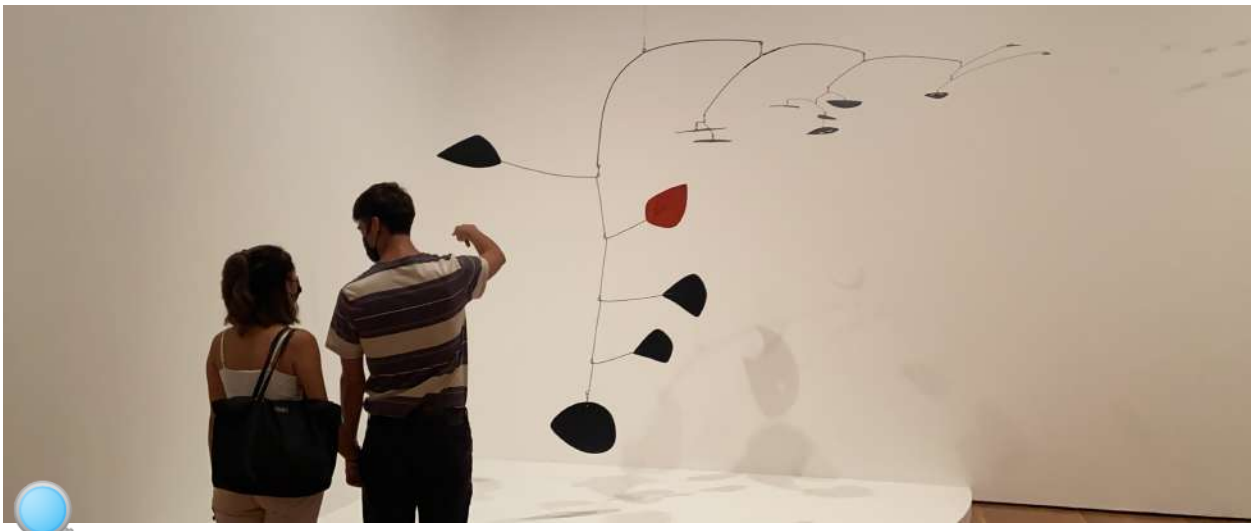

R2: User Needs and Design Implications

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Problem Statement

Help individual visitors (aged between 18-34 years) without relevant art background to be more engaged in their visiting experience at the High Museum of Art during the COVID-19 pandemic

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Introduction

Topic Space

The objective of our project is to make the viewing experience more engaging for our target user, namely individual visitors aged between 18-34 years old who do not have the relevant background. We recognize that there is a variety of ways to make the viewing experience more engaging, but we try to narrow the topic space down by selecting those solutions that serve our target user the best. With this in mind, we employed various methods to explore the topic space. This includes survey, interview, contextual inquiry, and comparative analysis. This will be elaborated in the Method Justification section.

Through our research, we figured that visitors come to the museum for different purposes including viewing the artwork, relaxation/meditation, education, and socialization. Visitors coming with different goals would have different needs during their visit. In other words, they focus on different aspects of a museum visit. For example, those who come for the artwork would pay attention to the visual qualities as well as the art-related information, while those who come for socialization are interested in exploring museum activities. The group thus tries to recognize these needs and aims to address them in our system.

Amongst these needs, we figured that most users express a large interest, need, and reliance on the information provided by the museum, while the currently provided resources of information in the museum are inadequate to satisfy the users. We thus primarily center around how to provide users with good information sources to help them enjoy their visit. In addition, we recognize that much express interest and desire to have interactions in museums. This informs us to introduce interactive elements into our system to make the visiting experience more engaging. Aside from this, we also discovered that users express needs in collecting certain parts of their visit for future references and socialization. Therefore, it is important for our system to help users keep records of their museum trips to serve such needs. This will be elaborated in the Discussion of Research Findings section. The three needs and pain points mentioned above will be the concrete issues we wish to address within our topic space.

Target User

Our target users are individual visitors aged between 18-34 years old, and who do not have the relevant background.

We center on individual visitors because we want to help those who view artworks on their own gain a more enjoyable visiting experience. Based on our research, people who view art with companions tend to have different purposes of visit as well as more information sources to consult. In other words, individual visitors have less accessibility to art-related information, as well as less guidance during their visit. Our system intends to make their visiting experience more enjoyable by bringing them more accessibility in different aspects of museum visiting.

We chose the age range 18-34 because most individual visitors are centered around this age group, and that people within this age range are more likely to use digital devices in museums. Based on our observation, those below this age range tend to visit with their families, while those above this age range are likely to come with partners. In addition, people aged 18-34 are more likely to be using digital devices in museums to assist their visits. They also use digital devices for different purposes in comparison to children and seniors. Nevertheless, we intended our system to be also usable for people not within this age range, and for people with all levels of background knowledge in the art.

We focus on serving visitors without a relevant art background because this group meets extra difficulties in enjoying their museum visit. One of our interviewees, who would not identify herself as an expert in art, pointed out that she has difficulties understanding the artworks even with the wall labels since labels in art museums are not designed for novices. She recognized that many of the labels require a certain degree of art background to understand, and that the failure to meet such standards makes her unable to understand many artworks. It is thus important to recognize that accessibility to informative texts and audio guides in museums does not equal accessibility to understanding art and feeling engaged during a museum visit. Our system thus aims to explore these pain points that prevent our target users from feeling engaged when visiting the High Museum of Art, and to resolve them through user-centered research and design.

Behavior of Interest

Our behavior of interest is to help our target user feel more engaged when visiting the High Museum of Art. The enhancement of engagement can be reached through various means: improving the navigation, make art-related information more easily accessible, etc. Through our user-centered research, the group is in the process of identifying ways to boost engagement and brainstorming about how to combine these approaches into one system.

Stakeholders

Our stakeholders are the High museum's investors, board members, business team, partners, and staff. Our system is built specifically based on the condition of the High museum, and would help High museum visitors to improve on their visiting experiences. Such a system will help the High museum to attract more visitors and enrich its current museum practice. This fits the interest of several parties related to the High museum, including its investors, board members, business team, partners, and staff are our stakeholders.

Context of Use and Market Situation

Our system intends to be used during the in-person museum visit. In other words, it is not a substitute for a physical trip to the High museum, but is rather an assistive tool that helps visitors better engage in their visiting experience. Some current systems in art museums include the audio guides in the Isabella Stewart Gardner Museum and the iPad workstation in the MAGNES Collection of Jewish Art and Life. Systems that help improve the user experience in places aside from the art museum include the Penguin Navi App designed for the Sunshine Aquarium. The group researched a wide range of practices that can be used to improve the visiting experience. This will be elaborated on in the Comparative Analysis section.

Significance of the Problem

By investigating ways to make the visiting experience more engaging, our project sparks questions surrounding the museum practice: why do people go to art museums? What can the museum provide its visitors with? Does the High museum make any underlying assumptions regarding the background of its visitors? Is the museum accessible to people from all backgrounds? How do visitors think about their experience in the High museum?

Through our user-centered research, we come to realize various problems that the High museum is currently facing. Many aspects of its practice could be improved: the wall labels, the navigation, etc. In addition, there are other tasks that the visitors need help with, such as keeping records of their visit and finding the best photo spots.

Our findings prompt that museum visitors are more than art viewers. People do not just come to the museum to appreciate artworks, but would use the space for various purposes. "What the museum is for" is decided by both the museum and the visitors instead of by the institution along. It is thus essential to investigate the museum experience from the visitor's perspective and to understand how they define the museum space.

This leads to a reinterpretation of the High Museum of Art. We attempt to understand this existing complex with a brand new vision, and to deconstruct the current definition of it. By doing so, we would be able to introduce a new understanding of the museum space. This further allows us to rethink the visiting experience and design it anew. A museum visit could be way more pleasant, enjoyable, and engaging; more than we have ever imagined.

Background

History and Current Context

Trends and issues before the pandemic

The role of cultural exhibition spaces such as museums and art galleries has largely shifted from the traditional preservation of artifacts towards a more leisure-based experience, and this leisured lifestyle has triggered the need to combine the educational aspects of those spaces with entertainment elements (McIntyre, 2009). Traditional ways of exhibiting art for passive appreciation may no longer be the best solution for visitors to enjoy their visitation. 2017 Culture Track report also shows that 81% of visitors engage in cultural experiences to have fun, while 71% want to learn something new (Editorial & Kaplan, 2017). This finding further emphasizes demands for the incorporation of entertainment into a learning experience.

In addition, barriers such as unfamiliarity with cultural activity spaces could also prevent visitors from going to art museums, as people think art museums are “not for someone like me” (Editorial & Kaplan, 2017). Design to improve visitors’ perceived relevance to arts is necessary to increase their confidence in visiting the art spaces. One practice that has been found in museums is to embed designs to meet visitors’ social needs around their group visits, as ways to support their internal pursuit of personal happiness and meanings (McIntyre, 2009). The Worcester Art Museum, for example, hosts social events such as live drawing classes and sing-along storytelling to attract more visitors (Rozen, 2017). Another way to relate people to artwork is to offer storytelling that connects visitors with materials (Weller, 2015); visitors become more familiar and committed to artworks as they understand those arts through vivid stories. Similar solutions aiming to alleviate the unwelcomeness that intimates visitors should be considered, in order to make arts more accessible to all types of visitors.

Trends and issues after the pandemic

The demand for attracting visitors and offering engaging experiences has been growing during the pandemic. Many museums are facing risks of being closed permanently due to the pandemic crisis: museums need more visitors to support their operations and maintenance after a long time of closure, but restrictions due to the health concern have limited resources and experiences that museums can provide to the visitors (Kravinsky, 2021). Many art museums have started to focus on their digital offerings such as online exhibits and video chats with curators (Spola, 2020), which allow visitors to learn about artworks remotely. Limitations for such practice are the lack of detailed observations and social interactions from in-person visits.

Besides the efforts trying to let visitors visit art at home, practices on enhancing visitors' experiences during their physical visitations inside the art museums have also emerged with the help of new technologies. QR codes are used to provide audio guides and more detailed descriptions for artworks in the High Museum of Art, as a substitute for in-person guides during the pandemic. Latvian National Museum of Art also embeds AR features into artworks, which let visitors scan arts with their app to access detailed descriptions from AR pins (LNMM - Mobile app, n.d.). The use of new technologies seems intriguing, but further research is needed to investigate their limitations and effectiveness. We will discuss more competitors' practices in the Comparative Analysis Method section in this report.

For our project, solutions that engaging visitors with contactless experiences during their museum visits are what we want to focus on. The effort is motivated by three factors: educating visitors with leisure-based interaction, familiarizing visitors with arts and art spaces, and maximizing the accessibility of museum resources under pandemic restrictions.

Future Integrations

Based on the 2017 Culture Track report, 81% of cultural space respondents prefer to have digital integrations during their visits to art and design museums, with 38% of them believe digital integrations "gives me tools to access more detailed information" (Editorial & Kaplan, 2017). This implies a huge potential for art museums to integrate digital technologies into the whole visit experience for more engagement and more accessible information to visitors.

For our project, we considered incorporating mixed media, augmented reality (AR) and virtual spaces into our design solutions. Mixed media, such as video and audio, allows us to offer art information in contactless ways, as people are concerned about health issues during the pandemic. Those media also gives visitors different options to learn about arts, as individuals may prefer learning through visual or audio presentations over text. It's also more accessible for people with physical impairments.

AR and virtual space offer great ways to connect visitors to the art space with immersive and interactive experiences. AR drives visitors to access information through interactions with arts and spaces that trigger AR feedbacks, transforming the passive appreciation process into the active exploring experience. AR and virtual space also offer opportunities for us to tell stories more vividly in a real-world setting, such as the disaster scene displayed through AR in the 9/11 Memorial Museum (Weller, 2015). Virtual space is also a good option for visitors to interact with each other without necessarily having physical contact. Ideas could be exchanged and stored in virtual spaces, which become part of the museums' resources to attract future visitors. AR and virtual space can connect visitors across space and time, making their visits more interactive and entertaining.

Those technologies allow art museums to offer contactless visiting experiences that are informative and interactive, in ways that visitors can learn more about art museums with fun.

Context and User Needs Research

Method 1: Survey

I. Introduction

A survey is a research method to collect information. In comparison to other methods such as interviews and contextual inquiry, the survey helps us “gather information from a large sample in a relatively short period of time” (Baxter et al., 2015, p.266). It involves designing questions to compile the survey, and then distributing the survey through multiple platforms in order to get more people answering it. Our group designed a survey centering around the visiting experience of prior High museum visitors, sent it out via several platforms, and collected 40 answers in total.

II. Information Goals

The goal of using surveys is to broadly understand our target population’s visiting experience in the High Museum of Art.

First, we wanted to know how and why they visited the High museum. Did they visit with companions? What is the driving force behind their visit? Such background information helps us identify how people with different purposes would differ in their preferences during the visit.

Second, we wanted to know how they performed during their visit. What information interests them the most? How did they access that information? How did they use their mobile phone during the visit? This helps us to understand the current visitor behavior in the High museum.

Third, we are interested in their feelings about the visit. Are they satisfied with their visit? Why? What is good about the High museum? What can be improved? What did they learn from their visit? This helps us to understand the reason behind their behaviors. This also helps us to identify user’s pain points and figure out opportunities that our system could fulfill (Baxter et al., 2015, p.266).

III. Method Justification

Strengths

Reach more target user population in short time span

In comparison to interviews and contextual inquiries that focus on researching individual users, surveys may access more users at a time. Ever since the survey is constructed, it can be quickly distributed via multiple platforms to access more users. It takes less time to have a user answer a survey than to have one go through an interview. Therefore, it is easier to get respondents to surveys than to recruit interviewees. The survey thus helps us to better reach our target user population.

Get quantitative data

Since most questions in surveys are either single or multiple choice questions instead of open-ended ones, we are able to collect quantitative data. We can thus calculate metrics such as the maximum, minimum, mean, median, and standard deviation for certain questions. This helps us to better understand our users and their needs.

Uniform question and presentation

When answering surveys, all respondents go through a standardized format of questions. Unlike semi-structured interviews and contextual inquiries, where the process is not fully standardized and repeatable, surveys offer uniform questions and thereby a uniform presentation of data.

Anonymity and confidentiality

It is easier to promise anonymity and confidentiality in surveys as we do not ask users for identifiable information. We also do not meet with our respondents in person, so we have no idea who they are. In

addition, since we are trying to access a larger sample instead of individual respondents through the survey, we do not focus on analyzing the situation of one specific user. This again helps comprise better anonymity and confidentiality, and makes respondents feel more comfortable answering questions.

Limitations

Selection bias

We face selection bias for our data collection as respondents of our survey might be limited to a certain group of museum visitors. Since all group members are GT students, it is easier for us to get answers from the student population. However, college students only comprise a section of our target user, namely individual visitors between 18-34 years old. Therefore, our data might be biased towards this population and we need to keep in mind such a limitation as we are analyzing our data.

Cannot confirm finding with users

Since the survey is strictly formatted and that group members do not have direct contact with respondents, we could not confirm any research findings with our users. In an interview, we can check with our interviewees if we understand their responses correctly, but we could not do that for a survey. Therefore, we cannot make sure that we correctly understand the implications behind the answers in a survey.

Reliability issue

We also cannot confirm how well a question measures what it is supposed to measure. In other words, we do not know if our respondents understand the question the same as we did.

Impersonal form of asking questions

Survey is an impersonal form of asking questions, meaning that we do not get to see our respondents when they fill out the questionnaire. Therefore, we could not benefit from information such as the body language or physical behaviors of the respondents. In an interview, we would be able to observe the interviewee while listening to their answers. Such observations offer us a better understanding of what the interviewee is getting at. We could not access this type of information in a survey.

IV. Method Details

Procedures

1. *Create the survey script based on our background research*

   Based on our background research including the general research and the field trip, the group met and discussed what to ask in the survey. The survey focuses on the visiting experience of prior High museum visitors. It is worthy noting that since we could not guarantee that all the respondents have previously visited the High museum, we set the first question to be asking if they have visited the High museum. If not, they will be directed to an open-ended question asking what they would expect from the High museum, and would not be going through other High museum-specific questions that we designed. The questions will be listed in the Survey Script section below.

2. *Create the survey via Qualtrics*

   We carefully selected the platform to carry out the survey. Since we expect many respondents to be answering the survey through their phone, we made sure that our survey would look good on both a computer screen and a phone screen. Therefore, we selected Qualtrics since it allows us to have control

over how the form looks on a phone, and that GT students have full access to its service. We then created the survey via Qualtrics.

3. *Launch a pilot test*

   After the survey was created, we launched several pilot tests. We recognized that some questions did not look well on a phone screen and fixed those questions through changing the single choices scale question into a slide bar. We then tested and figured out that it took approximately 1-2 minutes to finish the survey, and decided that it is good to launch.

4. *Distribute the survey*

   We then distributed the survey via various platforms such as WhatsApp, WeChat and Slack. We waited for a week before collecting and analyzing the results.

5. *Analyze the results*

   We first used Qualtrics reports and Google Sheet to organize the results. We then used Google Colab and Matplotlib to analyze the data, and used Figma to create the visualizations.

Survey Questions & Metrics

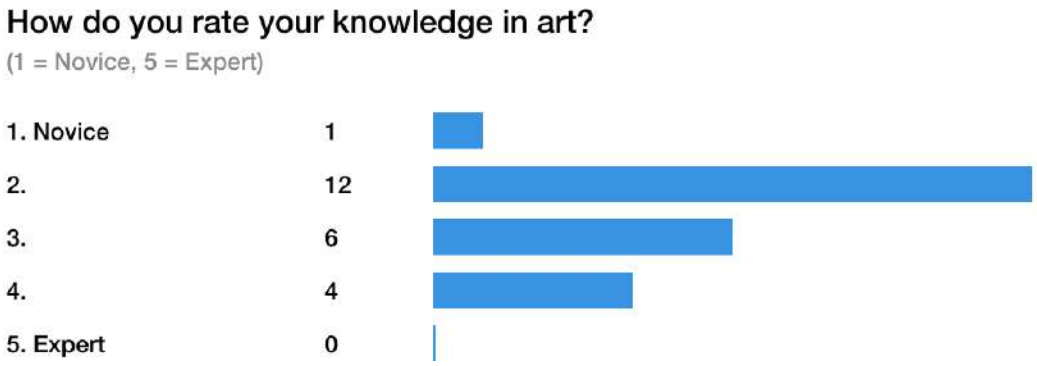
Research Question/Information Needed	Questions	Response Options	Rationale
Check respondent qualification	Have you been to the high museum? (single choice)	Yes — go through all questions except for the last one No — directly go to the last question on expectation	check if the respondent has visited the High museum before. If not, he will skip the High museum specific questions.
Demographic information	Age (textbox)	Open-ended	check if the respondent is within the age range of our target user population.
Background information	How do you rate your knowledge in art? (scale)	Rating Scale 1-5 (1 = Novice, 5 = Expert)	Know more about the respondent's background information that is related to art and art museum. This helps us understand our target user group better.
Their visiting style	How would you identify yourself with these types of visitors? (single choice)	1. I prefer viewing artworks by myself 2. I prefer discussing with other people 3. I prefer having a tour guide 4. I prefer having a digital guide 5. Other ____	Check the respondent's visiting style.
Their visiting purposes/goals/needs	What are your main reasons of visiting the High Museum? (multiple choice)	1. Artwork 2. Relaxation/Meditation 3. Education 4. Socialization 5. Other _____	Learn about why they visit the High museum. This will help us recognize the user personas and design our system accordingly.

Research Question/Information Needed	Questions	Response Options	Rationale
What information are they interested in	When viewing an artwork, rate your level of interest in its: (scale)	Rating scale 1-5 (1 = I don't care, 5 = I love it) 1. Visual components (Colors and compositions) 2. Background information (Time period, artists, etc.) 3. Expert's thoughts (Interpretation, meaning)	Check what information are visitors interested in when they are viewing an artwork. This will help us recognize what information should we focus on providing through our system.
Their sources of interested information	When you are interested in knowing more about an artwork, rate your likeliness to consult the following resources: (scale)	Rating scale 1-5 (1 = Never, 5 = Always) 1. Museum Labels 2. Audio Guides 3. Internet Searching 4. Museum Guides 5. Other visitors	Explore what method users are currently using to gain information. This will help us identify potential opportunities that our system could fulfill.
Use of mobile phone (attitudes, frequencies, goals)	Select phone-related activities that you've been engaged in during your visit: (multiple choice)	1. take photos/videos 2. social media post 3. messaging to discuss museum-related topic 4. find your way in the museum 5. searching for artwork information 6. scanning in-museum QR code 7. Other _____	Explore how users are using their mobile phones in museums. Since mobile phone is the primary digital device that people use in museums, we want to know what tasks are people conducting with it.
Current level of satisfaction of High Museum (what's bad)	Which aspects of the High Museum could be improved? (multiple choice)	1. Maps 2. Art Collections 3. Labels and Descriptions of Art 4. Guides (Tour guides & audio guides) 5. Social Activities 6. Seating Areas 7. Websites 8. COVID Precautions 9. Museum Layout 10. Other _____	Understand prior-visitor's current feeling about the High museum. Is there anything causing the visiting experience to be unpleasant? This helps us recognize painpoints.
Current level of satisfaction of High Museum (what's good)	What would drive your decision to re-visit the museum? (multiple choice)	1. the collection 2. education 3. museum events & activities 4. socializing 5. other ____	Understand what prior-visitors appreciate about the High museum. This help us to understand High museum's current visiting experience better.
Extra information	Please describe what you learnt during your last visit. (textbox)	Open-ended	This question intends to offer respondents an opportunity to supplement anything not mentioned in the prior questions regarding their High museum visiting experience.
Expectations	What are your expectations for your visit to the High Museum? (textbox)	Open-ended	For those who have not been to the High museum, we want to know what they expect from their visit. This helps us identify aspects that our system should cover and focus on.

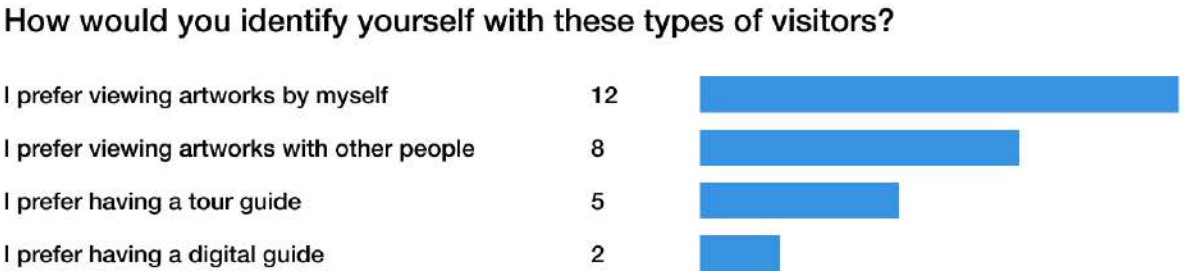
V. Analysis

Background Information

It is important for us to understand the general background info of our respondents. This helps us identify the user personas. We thus raised questions to explore respondents' art-related knowledge and visiting style.



95.6% of our respondents center around having around average knowledge in art (rating between 2-4), with most people identifying themselves as having slightly below average level of knowledge in art (rating 2). Only one respondent identified himself as a novice, and no one identified themselves as an expert in the art. This shows that High museum visitors generally have some degree of knowledge in art, but most of them still need extra information in understanding the artworks.

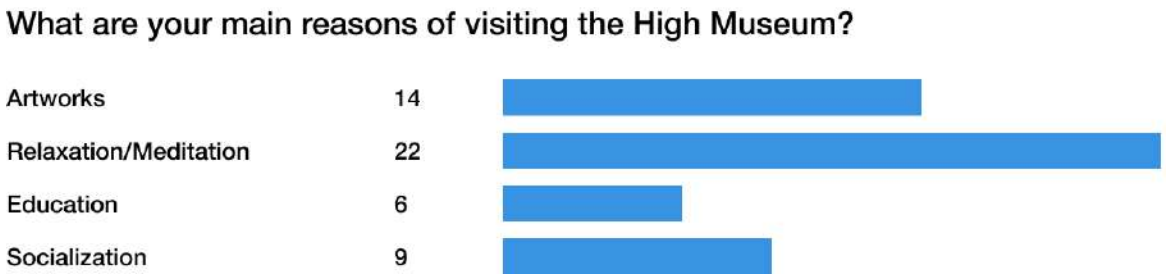


44.4% of our respondents prefer to view artworks on their own, 29.6% prefer to view artworks with other people, 18.5% prefer to have a tour guide, and 7.5% prefer to have a digital guide. This demonstrates that a majority of our respondents prefer to make their museum visit a relative personal experience without external interference such as chatting with friends or listening to guides.

There are also many respondents expressing interest in viewing artworks with other people. Combined with the interview, contextual inquiry, and other questions in the survey, this type of visitor sees having a companion as an important component of their visit. They receive help from their companions regarding museum navigation and art-related knowledge. Indeed, having a companion can even become the reason for visiting.

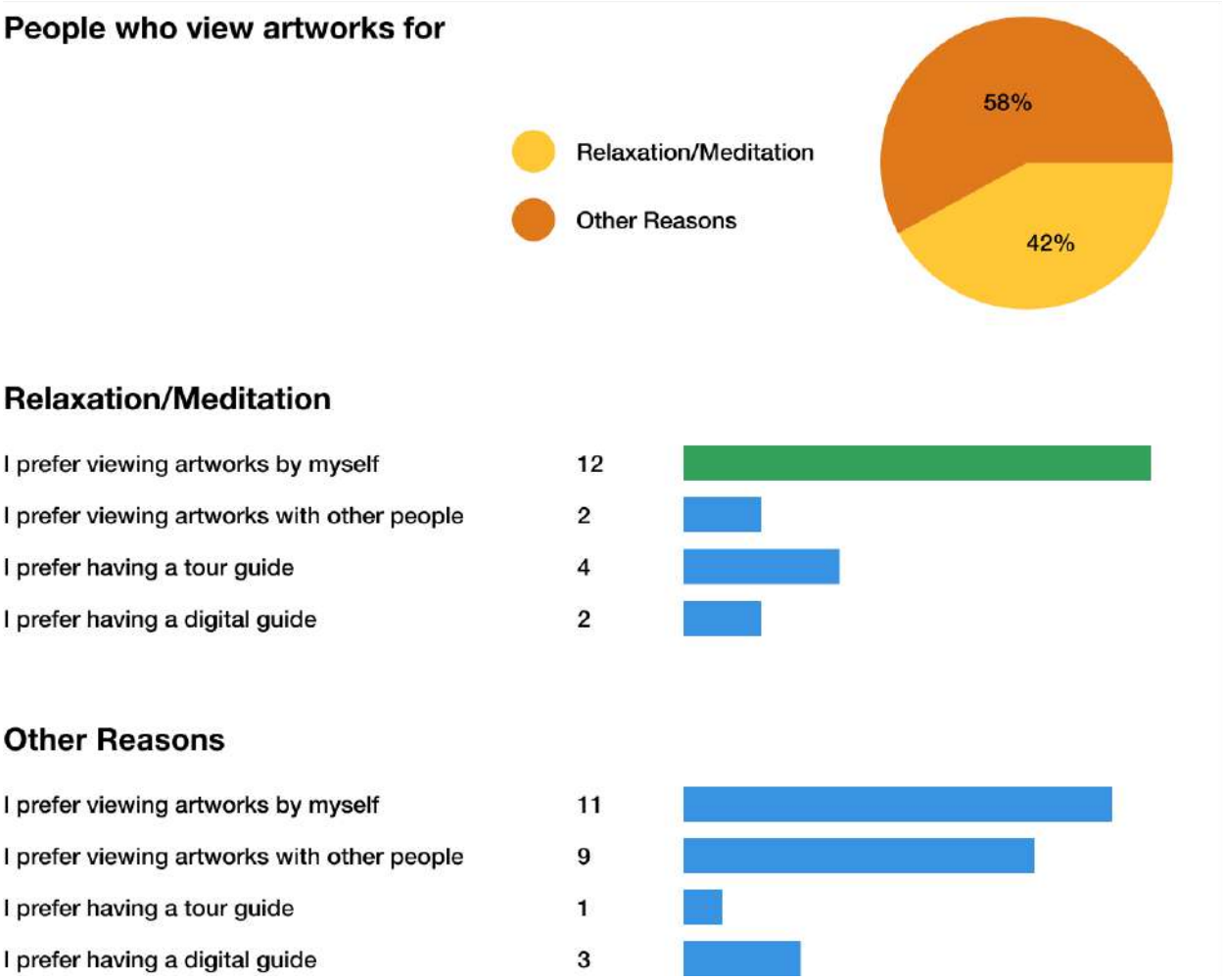
Only 26% of respondents prefer to have some sort of guide, and most respondents in this group prefer a tour guide over a digital guide. This potentially shows that the digital guide in High Museum is not satisfying, and

visitors have difficulty using them. This speculation is validated by our interview. It is also worth pointing out that tour guides are barely provided by the High Museum during the pandemic. Therefore, users are in need of certain forms of guidance that would be easy to use during the pandemic.



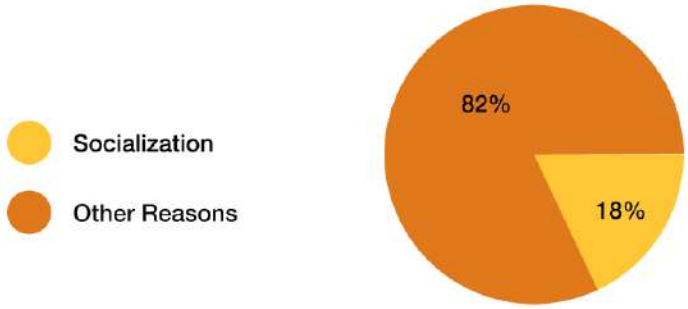
Most respondents visit the High museum for relaxation/meditation purposes. Many are also attracted to artworks exhibited in the museum. 9 out of the 27 respondents (this is a multiple choice question so the total adds to more than 27) express interest in socialization, and only 22.2% respondents come for educational purposes.

This shows that many expect to relax themselves through a museum visit. Our system should thus introduce an enjoyable and engaging visiting experience to help people with relaxing. To better understand the user needs of this group, we further explored the connection between main reasons of visiting and which type of visitor our respondents identify themselves with. The chart below shows that people who visit the museum for relaxation/meditation prefer to view the artworks by themselves. This informs that our system should design for individual usage to serve this type of visitors.



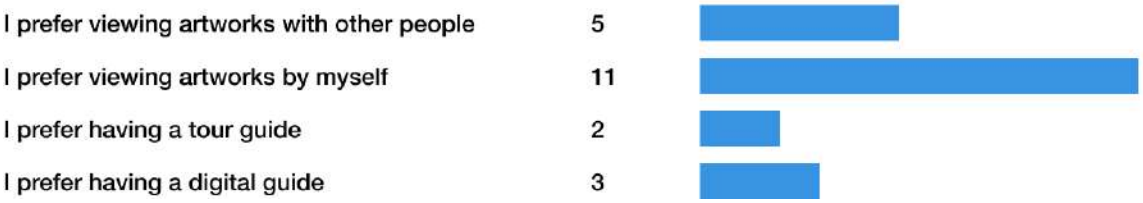
With over half of the respondents visiting the High museum for artworks, it is also important for our system to offer users art-related information in concise and easily understandable ways. Aside from this, the two charts below show that those coming for socialization purposes prefer to view the artworks with other people while those coming for educational purposes prefer to have a tour guide during their visit. The group will consider their needs and design accordingly.

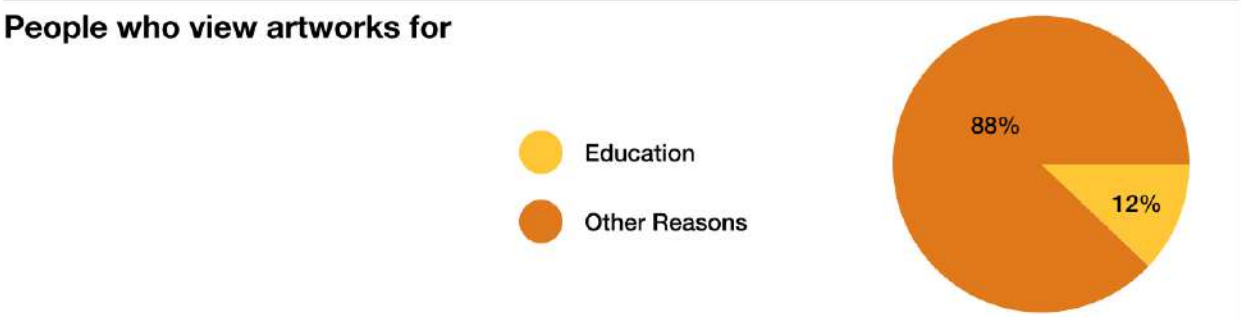
People who view artworks for

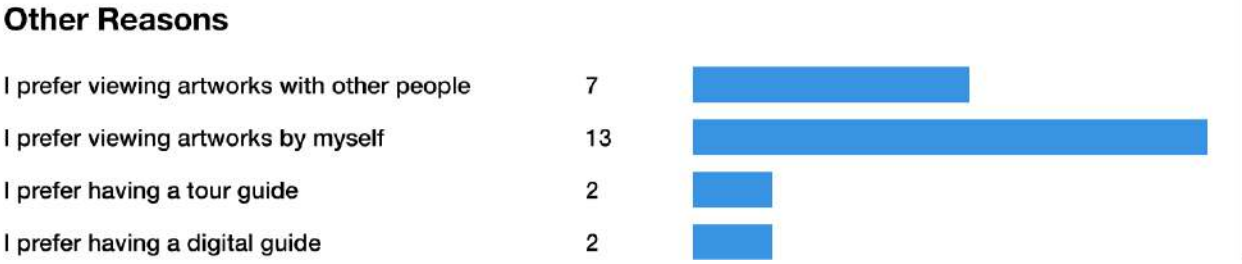


Socialization

Other Reasons







Behaviors

We asked two questions exploring visitors' behavioral patterns during their visits to the High museum.

when asking about visitors' preferences in obtaining information about an artwork, **72%** of participants choose to read information from **museum labels**, and **62%** of them will **search for information online**. Visitors are less likely to choose museum guides such as audio guides, in-person guide or volunteers for art-related information. Conversation with other visitors for art-related information isn't the most favorite choice for most of the participants.

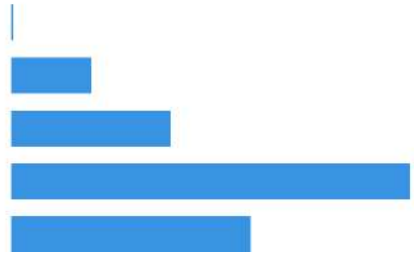
Such preferences could indicate the importance of artwork labels for educational and informative purposes. Many visitors choose to search online for additional information also indicates the lack of the certain type of information that is offered by the museum. It also indicates that audio and other in-person guides may have possibilities to be improved to be usable for visitors; reasons for this unwillingness to use guides need to be further explored with other methods.

When you are interested in knowing more about an artwork, rate your likeliness to consult the following resource:

(1 = Never, 5 = Always)

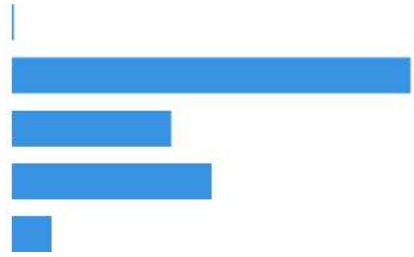
Museum Labels

1. Never	0
2	2
3	4
4	10
5. Always	6



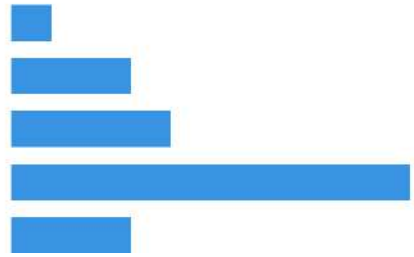
Audio Guides

1. Never	0
2	10
3	4
4	5
5. Always	1



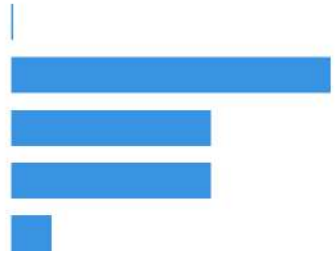
Internet Browsing/Searching

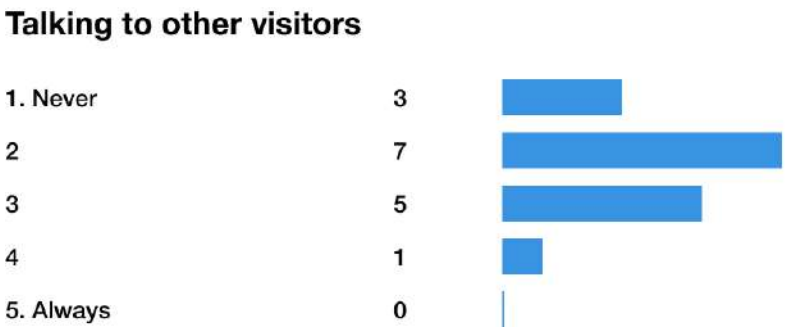
1. Never	1
2	3
3	4
4	10
5. Always	3



Museum Guides/Volunteers

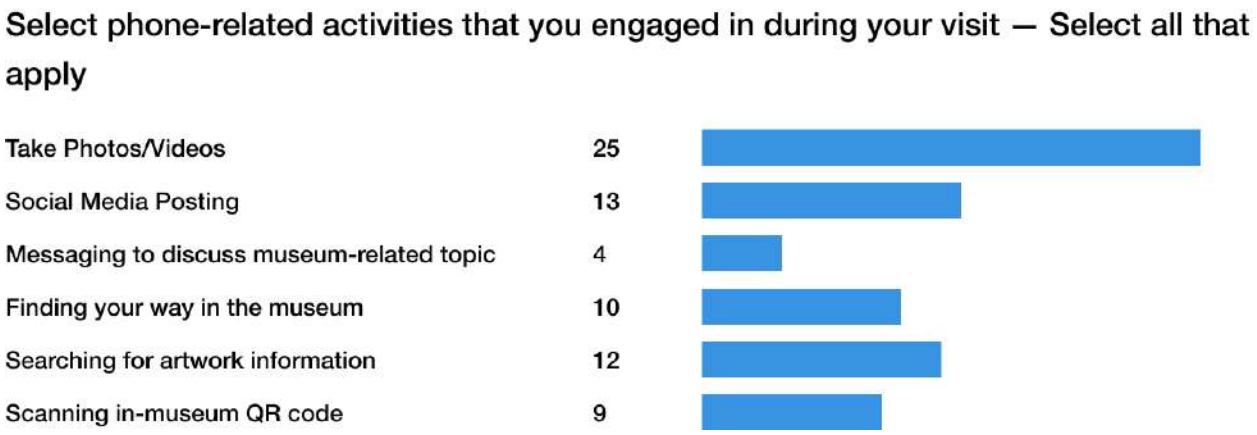
1. Never	0
2	8
3	5
4	5
5. Always	1





Based on our previous onsite observation, we are also curious about the details of our users' phone usage. Therefore, we ask the participants to respond to the tasks they used their phones to complete in the museum.

Data shows that most people use their phones to **take photos/videos (25)**, **sharing content on social media (13)** and **search for art-related information (12)** during their visits. It indicates the high demands for social sharing channels as well as additional information besides those offered by the museum during their visits. Reasons for taking photos are explored and discussed in detail in the interview & contextual inquiry sections. Data also shows the need for having a **navigation guide (10)** using their phones, implying the need for direction guides during their visits.



Needs

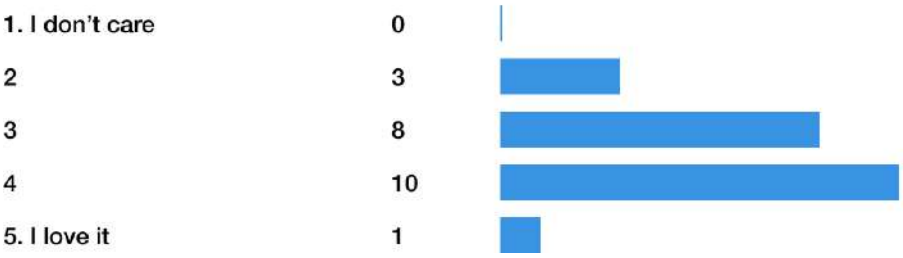
In order to understand our users' needs in and related to the High Museum, we also included some questions phrased in different ways to ask their thoughts on different aspects. Firstly, considering the users' needs for the artwork, which is the main part of a museum visit, we want to know what type of information our users are interested in. All the participants chose higher than moderate (3) interest in the visual components of the artwork. There are also 50% of the participants indicating their interest in background information about the artwork and an approximately same percentage (55%) of the participants also cared about interpretations of the artwork by experts.

When viewing an artwork, rate your level of interest in its:

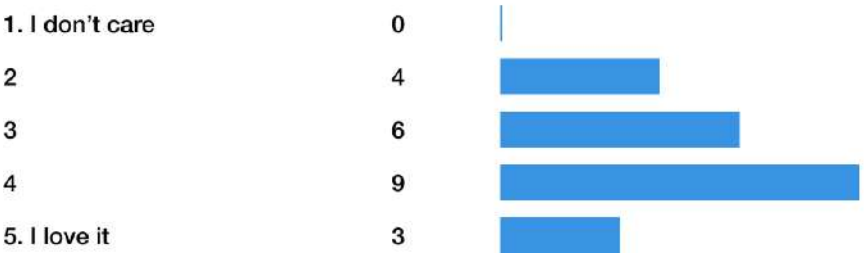
(1 = I don't care, 5 = I love it)

Visual Components (Colors & Compositions)

Background information (Time period, Artists, etc.)

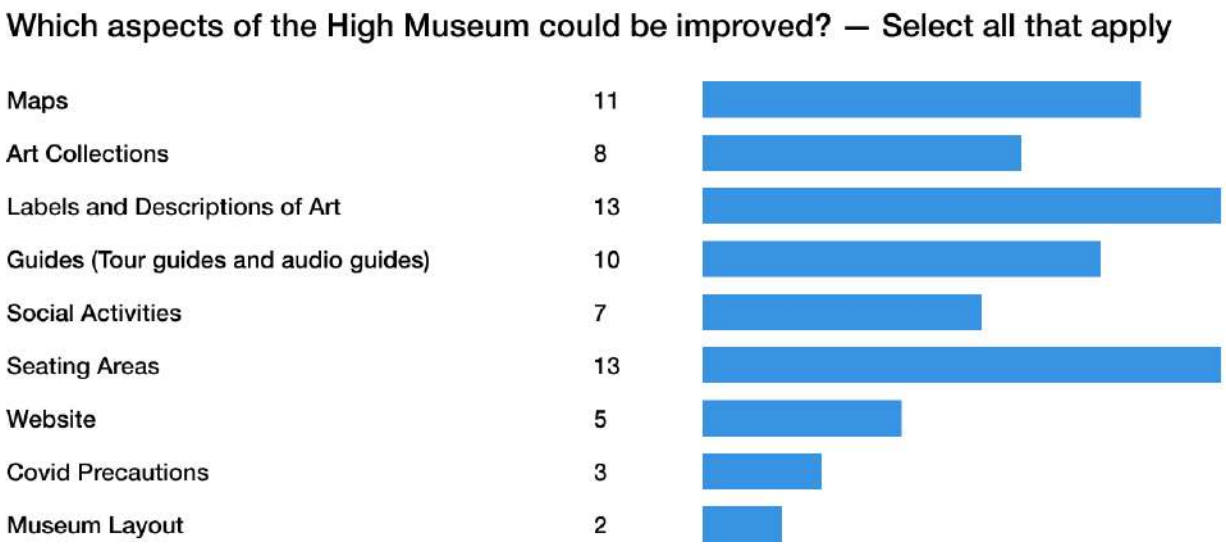


Expert's thoughts (Interpretation, Meaning)

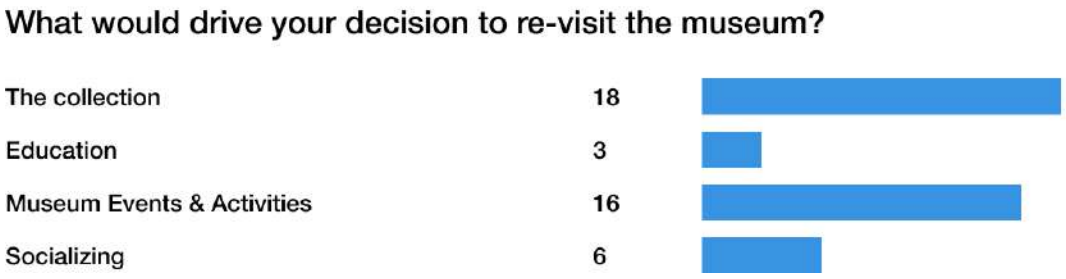


By knowing the preferred type of information of our users, we would be more clear about what we could provide in our solution.

Then we are also considering asking about the users' pain points or encountered problems during their visit. Since we also took the feature of the survey that it is not ideal to gain detailed information, we are only asking in a more general way to get a global view of possible problems existing in the High Museum. And in the responses, **seating areas (13), labels and descriptions of art (13), and maps (11)** are the top three sections with the most votes. We may try to find related reported problems or pain points in later data analysis of other research data.



Besides pain points, we also value the pleasure points of our users. We phrased the question to ask for the participants' re-visit motivation to see which part of the museum attracts them the most. And we got **the collection (18)** and **museum events & activities (16)** as the top two reasons for re-visit.



Getting a better understanding of the users' needs and problems, we confirmed that the users are looking for more information about the artwork and they are having problems with maps and seating areas in the museum. And we also found out that they would prefer museum events and activities.

Method 2: Semi-Structured Interview

I. Introduction

The semi-structured interview is the type of interview that doesn't strictly follow a formalized list of questions. A list of topics/questions is prepared before the interview as a guide for the conversation. Interviewers ask open-ended questions and have discussions with interviewees, without having a strict question and answer format (Cohen & Crabtree, 2006).

II. Information Goals

The goal of the semi-structured interview is to gain insights into visitors' visiting experiences in the High Museum of Art, and to explore opportunities to improve their visits during the pandemic.

First, we wanted to understand how visitors perceive their visits. What aspects do they like or dislike about the current practices offered by the High museum? Visitors' pain points and success moments would offer us a clear direction on creating design concepts.

Second, we wanted to understand the value of digital experiences during their visits, since there are great possibilities that our design solution would be in digital form. We wanted to understand what types of digital experiences visitors encountered and what they have gained from such experiences.

Third, we wanted to know about art museums in general, not only the High museum. We wanted to explore what motivates visitors to go to the museum in greater breadth. What are some internal and external factors that trigger their interests in the art museum, and what are they looking forward to gaining from those visits? This would help us explore values that we could offer to visitors to better engage them in the museum.

III. Method Justification

Strengths

Fast non-verbal data

Semi-structured interviews allow us to collect rich qualitative information quickly. Non-verbal information such as candidates' facial expressions and body language could also be observed and recorded, which offers insights that may not be discovered through remote research methods such as surveys. Each interview would take less than 1 hr, comparing to the contextual inquiry that requires at least 2 hrs for in-depth observation.

Individualized questions

We are able to talk to target user groups directly, and to have conversations in greater depth. Compared to the survey that asks one-size-fits-all questions, one-on-one interviews allow us to ask questions tailored to the individual participants based on their responses to previous questions. This brings us undiscovered insights and behavioral patterns that are difficult to be found from the quantitative survey.

Flexibility

Semi-structured interviews are more flexible compared to structured interviews. Both interviewers and interviewees are given room for various topics and free responses, producing greater opportunities to inspire new ideas.

Limitations

Difficult to control the pace of interviews

One limitation of semi-structured interviews is that, although given the flexibility to ask unplanned questions, interviewers are expected to collect enough useful data within a limited timeframe. This requires interviewers to be good at time and topic management. Sub-standard data is generated if interviewers lose track of thought or time, or attempt to extrapolate the off-meaning from an off-topic conversation.

Biased data

Another limitation for us is that our interviewees didn't span the full range of potential demographics. Due to the lack of time and access to points of contact, we only reached out to GT students who have recently visited

the High museum during the pandemic. Such limited representativeness of interviewees may create bias in our insights. Moreover, participants gave responses based on their memories, which could be less accurate as time went by, and it might be affected by their subjective attitudes.

Interviewers might also ask leading questions that affect participants' responses. Therefore, accuracy and bias from interviewees and interviewers should be carefully considered when interpreting data, and interviews should try to be neutral during sessions.

Difficult to analyze data

Data collected through interviews are difficult to be quantified, thus requiring a longer time to be interpreted and organized into useful insights.

IV. Method Details

Procedures

1. *Decided on the interviewee candidate qualifications.*

   Based on our previous research, we decided to interview people from age 18-34yr who have been to the High Museum of Art during the pandemic.

2. *Created the interview script.*

   There were 4 sections in our interview script.

   - **Introduction**, introducing who we are, the purpose of the interview, data confidentiality and permission for recording.
   - **Warm-up questions**, asking demographic questions and participants' familiarity with art and art museums in general.
   - **Main questions**, asking topic-related questions.
   - **Wrap-up questions**, finishing interviews with an open question asking what else they want to share.

3. *Recruited interviewee candidates and scheduled interviews*

   We reached out to peer GT students who have recently been to the High Museum of Art. 5 participants were recruited. Each interview was scheduled for a 1-hour time slot.

4. *Conducted interviews*

   Interviews were conducted in person. Laptops and phones were used for note-taking and audio-recording. The Otter app was also used for interview recording transcription.

5. *Held data interpretation session*

   We conducted interviews separately, and gathered together afterward to share our interview notes during our group meeting. After interpreting data, we created the Affinity Diagram. More details are available in the Analysis section after the method Contextual Inquiry.

Interview Questions

Due to the nature of the semi-structured interview, interviewers didn't completely follow the script when conducting interviews, but most of the questions in the script were asked during sessions. Below is a list of

questions that were created in the script.

Interview Script

Aa Categories	Questions	Rationales
Background	Have you been to the High Museum of Art? How often do you go there?	Warm-up questions. Find out candidates' familiarity with the High Museum of Art.
Background	How interested are you in art in general? What's your past experience with art? How familiar are you with art museums in general? What about art museums that interest you the most?	Learn about candidates' familiarity with art and art museums. Explore internal and external factors that motivate candidates to visit art museums, which helps us explore values that we could embed into our design solutions to better meet visitors' needs. Those questions also help us collect information to create personas.
Background	Could you think of the last time you went to the High museum? What triggered you to go?	Learn about reasons for candidates to visit the High museum. Find out aspects about the High museum that attract visitors, which could be emphasized in our design solutions to improve engagement.
Visiting style	Who did you go with to the High museum? How many people did you go with?	Categorize visitors by their group size. Explore differences in pain points and success moments between visitors of various group sizes. This type of information also helps us create personas.
Visiting style	What was the viewing style? Did you view the art pieces by yourself or with your companions?	Asked for visitors in groups, not for solo visitors. Understand how visitors interact with artworks when they are in groups. Is there any difference between solo visitors and group visitors in terms of how they look at artworks?
Art information / interaction	Have you encountered any art piece that was attractive to you during your last visit? What part of it was attractive and why? What did you pay attention to when looking at it?	Understand what factors of the art attract visitors' attention, and what do visitors appreciate when interacting with artworks. This information can help us discover art elements that improve visitors' interests and engagements during visits.
Art information / interaction	When looking at the piece that attracts you, what did you usually do?	Explore types of interactions users have with artworks.
Art information / interaction	Follow up 1: If take a photo: what did you do with the photo?	Understand types of photos that visitors take and reasons for them to take photos. This information helps us discover visitors' social needs if they would share photos with others. It can also reveal opportunities to engage visitors with photo/video related activities.
Art information / interaction	Follow up 2: If search for information: What information did you pay attention to? Where/how did you look for this information? Could you find what you were looking for?	Questions about how visitors access art-related information in the museum. Find out visitors' experience with labels and descriptions offered by the museum, and explore channels that visitors use to access art-related information during visits. This would inform us what types of information that visitors expect to gain, and what could be improved from current practices in the High museum.
Navigation / guide	How did you navigate through the Museum?	Discover visitors' pain points in navigation. What can be improved to help visitors have more smooth, thus more immersive visits.

Aa Categories	Questions	Rationales
Untitled	Did you scan any QR code? Why did you scan them, or why not? What did you think about map/audio guides available at the museum?	Discover visitors' attitude toward QR codes and audio guides. What type of visitors scan codes and use audio guides? What motivates or inhibits their use of those digital media?
Satisfaction	What was the most memorable part of your most recent visit? What do you like most about the High museum and why? What do you dislike the most about the High museum and why?	Explore pain points and success moments that previous questions haven't discovered. Find out what visitors expect to gain from their visits, and what has been offered by the High museum.
Comparsion	Have you visited other art museums? (share one experience) Did(Do you know) other museums have something to help you with interacting with artworks? Which museum is that?	Explore current interactive practices that are offered by competitors. This information serves as a source of inspiration for our design solutions. Comparing other museums with the High museum may also help interviewees discover issues that they've ignored in previous questions.
Wrap-up	Do you have anything else you'd like to share about this topic? Do you have any questions for me?	Give interviewee opportunities to talk about topics that we may not have thought about when preparing the script.

We chose to combine the data from Contextual Inquiry with the Semi-structured Interview. Participants for both methods were lack of representativeness, so combining data should help us gain more generalized insights as participants' were more diverse. Moreover, information collected from both methods was qualitative data, which should be easier to be interpreted together. More details are discussed in the Affinity Mapping section.

Method 3: Contextual Inquiry

I. Introduction

Contextual Inquiry is a user-centered design approach that includes in-depth observation and interviews of a small sample of users in their workplace to obtain a robust understanding of their work practices and behaviors. The "contextual" indicates that the research takes place in the users' natural environment, for example, their workplace and in our case, the museum, as they perform their activities the way they usually would. The "inquiry" then reveals that the researcher observes the users as they conduct their tasks and asks for more information to understand the ways and the reasons for the users' practices (Salazar, 2020).

II. Information Goals

During our contextual inquiry, we want to collect the following sets of information related to the users' visit to the High museum:

Visiting Style

In order to discover the users' needs in their museum visit, we may have to know first about how they would visit an exhibition. We care about their general viewing style, for example, do they prefer visiting in a large group (more than 6 people), a small group (2-3 people), or alone? Do they have a plan for their visit and do they need to check a map for that? Or are they just random wanders who go with the crowd? During their visit, do the users chat with others? What do they talk about?

This information would help us understand the characteristics of our users and allow us to create more accurate personas later.

Personal Preferences

During their visit, we are curious about the users' preferences and more important and relevant to our problem, what would make them feel enjoyable: what types of art do they consider as visually appealing and attractive? What types of art are they paying more attention to and spending more time on? What information are they looking for when they are viewing an artwork?

Besides the users' preferences on the content of the exhibition, we also want to know how do the users' visiting styles come into play here to improve their level of satisfaction with the experience. Does chatting with others make them happier? If so, why? What part of the conversation is key to the improved experience? The person they talk to, the exchange of opinions, or learning new knowledge?

The users' personal preferences could give us a general picture of how an enjoyable visit would look like and in this way we would be able to identify potential pleasure points that will elicit great design implications.

Additional Resources

The users are not in the museum by themselves. They have a lot of direct and indirect resources there to help them gain a better experience. Therefore, we hope to discover the users' use or lack of knowledge of those additional resources and their attitudes towards the resources.

Direct resources include pamphlets, audio guides, tour guides, websites, etc., which are provided by the High Museum for the users to consult or seek help. Would the users be able to find them easily? What are the users expecting to get from the resources? Do the users find them really helpful? Indirect resources would be tools or people that the users do not consider primarily as resources but may unconsciously get information or help from, for example, the users' phone, the users' companions, etc. We intend to see the users' frequency and the purpose of turning to indirect resources and the users' level of reliance on them. Why do they take out their phones? What are they doing with their phones? How often do they do that? Do their phones help them find what they want? Are they using indirect resources to get access to direct resources?

Additional resources are key to our design implications because the form of our solutions potentially depends on our findings related to the users' use of additional resources. This information also partially helps with identifying the pain points of the visit experience.

Problems

Problems are one of our primary goals. We would pay attention to and note down any experience-related problems in the process of the contextual inquiry. We would have a clear note on the context, reason, and the users' thoughts of the problems, for example, what makes the users feel confused during their visit? And if available, we would also ask for the users' solutions to the problems, for example, do they try to use any resources to resolve their confusion?

Discovering problems directly helps us identify pain points and the level of emergency of them to the users. Asking for solutions would provide us with potential design ideas.

Inspirations

The High museum might not be the only museum the users have been to. Therefore, we expect to hear users sharing their previous visits to other museums which they consider as enjoyable or problematic. And we may dig deeper into that by asking users why they make this comment and try to gain inspiration for our own problem solutions.

III. Method Justification

Since our topic and problem are experience-focused, and it is also hard to get an accurate sense of users' visit process in second-handed information resources, we decided to do this field study to observe and collect first-handed events, in order to get a robust understanding of the users' practices.

Strengths

Immediacy and accuracy

First of all, the contextual inquiry is able to collect "live" data immediately, which other research methods could not because they rely largely on users recalling past experiences. Following and observing the users in the context, we would be able to not only collect the information right at the moment, which also makes the data relatively more accurate than data collected from users recalling, but also dig deeper on interesting points by directly asking the users questions about certain behaviors.

Richer non-verbal data

The contextual inquiry is also outstanding at its offer of rich non-verbal data that we would not be able to collect in the survey or interview. We would be able to notice the users' facial expressions, behaviors, and even nuanced changes in their tone when conducting a contextual inquiry. Their meaningful non-verbal data at key points of the task-completing process would be worth noting down, asking about, or discussing later. It allows us to discover the reasoning, motivation, and underlying mental models. Furthermore, we would also be able to uncover unconscious and invisible details which are habitual to the users and would otherwise be ignored in other research methods. For example, one of our users has the manner to take photos of interesting artworks, but they do that during the second round of visits. If we only ask them during interviews or in surveys about photo taking, they might not mention the "second round" contextual information since it has already become their manner.

Non-verbal data are not limited to the users. We are also able to collect environmental data, for example, in our case the High museum settings, as well as the interaction between the users and the context. We could take notes down and take photos or videos of users walking back and forth in the High Museum, recording the influences of the context on the users and the users' impact back to the context. In this way, we would be able to analyze elements in the context that influence the users' experience because we are sharing the same information input with the users by being in the same context with them.

Inspirations

In terms of future references, observing and speaking to the users enable us to create more vivid personas. If we only collect data from surveys and interviews, we might miss lots of details about our users due to the lack of non-verbal data. However, being with the users face to face for 2 hours would allow us to collect enough information about not only what topic-related behaviors of the users will include, but also how the users will be like in a comprehensive perspective. All the pieces of information will help in building a more representative persona and creating user stories or scenarios closer to real-life cases.

While we gain some advantages in conducting a contextual inquiry, we do have some factors that may bias the collected data due to either the characteristics of this method itself or the reasons of participants of this research method.

Limitations

Biased data - method

One of the drawbacks of contextual inquiry is that the quality of the data relies heavily on the observers and the interviewers. Because the interview part in this research method is a semi-structured interview, we do not have an arbitrary plan of what questions will be asked, how the questions will be asked, when a follow-up question will be asked, what types of follow-up questions are asked, etc. Therefore, it is largely possible that we may miss some important data by failing to notice related behaviors or we may misinterpret information due to a lack of clarification from the users.

Furthermore, the existence of the observers and interviewers will also bias the data. The users could not perform exactly the same as how they normally behave when they know someone is watching them and will be asking questions about their behaviors. Under that situation, their behaviors are possible to be altered and the data collected will be not that accurate.

Biased data - participants

For this contextual inquiry, we only had 2 users and both of them are female and are Gatech students. Therefore, their data may not be diverse enough to be representative of the larger group. Also, because both of them are non-native speakers (so are the interviewers), the quality of information conveyed through communication would be reduced due to a loss of accuracy of understanding the exact meaning.

Considering those limitations, during our group discussion for interpretation, we focused on cleaning up the data by getting rid of the obviously biased information, for example, information that is specific and unique to that single person. We will also combine data collected from other research methods with data from this one and consider them together for our analysis and future design process to reduce the influences of the limitations as much as possible. These will also be discussed in detail in later sections.

IV. Method Details

Procedure

Recruiting

We first set the standards of our ideal contextual inquiry participants based on our topic, so they would be people that:

- are in the age group of 18 - 34
- have not been to the High museum before
- have adequate communication skills
- are available for a 2-hour contextual inquiry

And we ended up finding two participants who meet these requirements and are willing to do a contextual inquiry with us.

Planning

Before we set a time with our participants, we came up with survey questions and interview questions which helped us construct our list of questions to ask during the contextual interview. And then we set a time which is the afternoon of September 25th to visit the High Museum and got the pass purchased.

Onsite Contextual Inquiry

We went to the High museum together and split into 2 teams to start our visit. As interviewers and observers, we brought pens and notebooks to record gained information. And we also took pictures and videos when we noticed some noteworthy moments. Here is a photo of one of our participants using their phone to look up for information (photo post with their permission):

We decided to not ask interview questions in a row before the visit but instead find chances to raise them during the visit. We expected that the participants would give out more accurate and practical answers when they were in the context and had available items around them for examples. We also tried to repeat our notes to the participants to make sure their intended meanings were recorded without misinterpretations.

And we did not interrupt any of their actions to get the actual and true reactions of our participants during their visit, but there was one intervention that needs to be mentioned. During the visit, one of our participants mistook the exit of the exhibition as the entrance and in the beginning, the observer did not remind them of this mistake because the observer wanted to see the related behaviors and ask the reasons for this misunderstanding later. However, as the visit went on, the participant's confusion started to grow larger and most of the time they were complaining about not being able to understand the exhibition while neither gaining nor giving any new information. Therefore, the observer decided to direct them back to the right track of the visit by telling them the mistake, in order to stop wasting time on confusion. It turned out that the participant naturally explained why they would have the misunderstanding and the group ended up having a more efficient contextual inquiry experience.

After the interviewers and observers realized that the acquirement of new information was getting slow as the process went towards the end, they used the rest of time asking prepared problems which they did not have a chance to raise and wrapped up the contextual inquiry with a brief summary and sincere thanks to the participants.

Metrics/Questions

Because the questions part of the contextual inquiry is semi-structured and even slightly unstructured due to the characteristics of this research method itself, we prepared an observation guide with possible questions that could be asked to gain more information, but not everything was covered during the process and not everything happened actually is covered in the guide.

Observation Guide

Noteworthy Practices or Behaviors	Questions	Rationale
Participants obviously pay attention to certain items (artwork, maps, labels, etc.)	What are you looking at? Why do you want to see that?	When our participants are obviously attracted by certain items, for example, changing their directions to get to the item or spending more time on that item, it means that for them those items are different. We want to know the reasons behind their attention to see how the existence of the items influence their behaviors and experience.
Participants show facial expressions	I noticed that you [smiled, frowned, etc], how did you feel? What were you thinking about and why? What made you feel that? Did you encounter any barriers? How did you fix that?	Facial expressions are indispensable in understanding the participants' behaviors and thoughts, especially that these are normally unconscious behaviors which would usually be ignored by the participants themselves. Therefore, pointing them out and inviting the users to share their feelings behind their facial expressions would help us uncover hidden details.
Participants pause or take breaks	What were you thinking? Why did you stop for a while?	Pause and meditation leads to silence that we actually do not want a lot during the contextual inquiry. Because both of them indicate that there could be a brainstorming going on in the participant's mind with a huge amount of information, we would not want to miss that by not asking what the users were thinking after they finish meditation.
Participants mention their past experiences	Could you please tell me more about that? What exactly the museum did to set the facility? How did you feel about that and why? What was the museum or exhibition you were talking about? Could you please show me any photos of that?	Even though we should focus on the ongoing practices in the context, we would also want to hear the participants recalling their past stories. This is due to the experience-focused characteristic of our topic. We want to know what is considered a good or bad experience by the participants, what design makes them think the experience is enjoyable and impressive, and what could be used as inspirations to our solution.
Phone Usage	What are you using your phone for?	Since our solution might be embedded with the visitors' mobile phones, we want to know the visitors' level of reliance on their phones and their needs that could be met by phone usage.

V. Analysis of Semi-Structured Interview and Contextual Inquiry

Justification

As we have discussed before, there are still biases remaining in our collected data. Therefore, we decided to combine the information we gained from both the semi-structured interview, which consists of data from 5 people (3 females and 2 males), with the information we acquired from the 2 participants (2 females) in the contextual inquiry together to do the analysis. We decided to use **affinity mapping** as the analyzing tool of our data. We are going to provide a brief introduction and justification of this method before we go further into the details of the analysis.

Affinity mapping is used to organize ideas. It allows us to build the structure of the information physically and get a direct sense of the hierarchy of the information. We would be able to see the relationships, insights, and implications during the establishment of the affinity diagram. We can also discover embedded patterns or clusters in the information when we go through the notes, eliciting possible higher-level discoveries of the pain points.

Procedure

Conducted the Interpretation Session

After both semi-structured interviews and contextual inquiries, our team got together to conduct an interpretation session to share our observations and information collected through questions. During the session, each team member shared their notes from interviews and observations. The assigned notetaker wrote down interpretation notes, questions, and design ideas generated by other team members in a Google Sheet. The assigned moderator was responsible for time control and other members asked questions when listening to the interviewers. Roles were rotated after each round.

Created the Affinity Diagram

We generated a total of 131 notes in the Google Sheet after the interpretation session. Then we used the Miro for the creation of the affinity diagram. Notes were imported into Miro as 131 yellow sticky notes.

To start, each team member was assigned approximately 32 yellow notes. One member read out and put one of their notes on the canvas, and other members browsed through their notes to find those they thought belonged to the common theme and dragged them under the same group. After the first round of note-reading, we divided all the yellow notes into several big groups with more general topics.

For the second round, we read through each yellow note group and divided notes into more specific topics. Then we created **blue notes**, which were detailed user needs that characterize the aspects of issues discussed by grouped yellow notes.

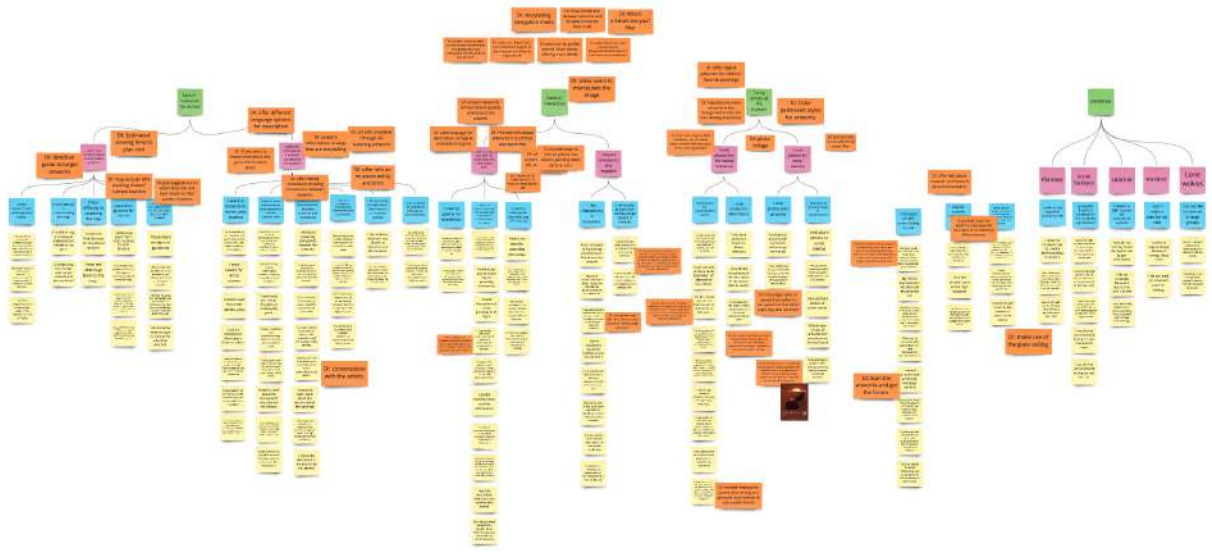
After summarizing all the blue notes, we found patterns and organized them into larger areas of interest/issues under **pink notes**, which were grouped those correlated later under **green notes** to show a whole area of concern.

Walked the Wall

Team members then went through the wall walk process to generate design ideas. We read the diagram top-down and put down our design ideas onto orange notes next to other notes that triggered the idea. Those design ideas would be used later during the design idea generation stage as inspirations for our design solutions.

Data

We ended up with 119 yellow notes, 28 blue notes, 11 pink notes, and 4 green notes, which are presented below.



- Lack of resources for visitors
  - I want more understandable and accessible guidance.
    - I prefer a museum with a well-organized layout.
      - I do not like the permanent exhibition because too many artworks are put on the same wall, so it's visually crowded to look at.
      - My favorite museum is the Louvre because it separates artworks based on culture, therefore it is very organized.
      - I prefer to navigate based on chronological order or the development of art styles.
    - I have difficulty understanding the map.
      - I think the map is not easy to understand so I decided to not use it.
      - I used the map from the QR code, but got confused and gave up using it.
    - I have difficulty accessing the map.
      - I could not find the map on the official website.
      - I was not able to go back to the map.
    - I want more guidance for my visit.
      - I prefer to use a paper map to retain my phone for other functions.
      - I was expecting a pamphlet for both the map and information about the exhibitions.
      - I like the Louvre museum because they offer different routes for planned visiting time to choose from, offer a pad with GPS to track current location, and tell me where to go next.

        - If I am visiting alone I would consult the map and wish to see a layout of the architectural structure as well as my current location and where to go next.
    - I do not know if I'm going in the right direction due to a lack of guidance.
        - I thought the exit was the entrance because it was directly in front of a prominent stairway.
        - There were no signs to guide me.
        - I followed the group but I recognized that the navigation is confusing: so many floors and buildings, cannot find artworks and find my way.
        - I do not know where to start so I just go in a random direction.
- Sufficient information should be provided by the museum.
    - I want to know the artist's name, year, location.
        - I paid attention to the artwork itself and the basic info: location and year, I didn't read the descriptions.
        - I read labels for artist names.
        - I would read the artist's names and years.
        - I look for background information from the labels.
        - I read the label to know when and where it is made. For this purpose, the label offers enough information.
        - I pay attention to art styles, I would read descriptions on the wall, then the labels.
        - I didn't look for particular information but think the description of the Calder & Picasso exhibition is nice because it gives nice background information.
    - I want to know the artist's purpose, meaning behind artwork, creation story.
        - I would love to read detailed introductions about a gallery before viewing the paintings to get a better context.
        - I look for stories, history, meaningful contexts, anything not random from the labels.
        - I read labels for artists' thoughts on creating the piece.
        - I would read why it is made/meanings behind it to help understand the work.
        - I was expecting the label to explain why the artists created the piece and the meaning behind the piece.
        - I want to know about the background story behind the artwork.
        - I wish the label provides me with the context and inspiration of the painting, as well as the artist's own interpretation, or any randomly surprising fact.
        - I paid attention to the affordance of the piece, why it is made, and the meaning of it.
    - I want to know the connection between artworks and exhibitions.
        - I like labels explaining connections between the artworks.

        - I could not make sense of the exhibition because I could not find the connection between artworks.
        - I wanted to check if the paintings placed together were from the same artist.
        - I wonder if there is any relation between the importance and the location of the painting.
        - I wanted to know if the paintings in one gallery had some connections/associations.
        - I wanted to learn more about the stories behind the paintings.
        - Even though the artworks are organized into exhibitions, I do not understand the connection between exhibitions.
        - I found the description in the label to be too general.
    - I want the museum to provide more information about the artworks.
        - I expect the audio to offer different information from those in the wall labels.
        - I scanned the QR code once but realized that the information given is similar to those on the wall description, so I did not listen to it anymore.
        - I remember other museums show videos of artists making artworks but this is missing in the high museum.
        - I would want to buy books that contain interesting information about the artwork.
    - I did not know enough about the museum or museum policies.
        - I do not know whether I was allowed to take photos in the museum.
        - I do not know the information (what kind of artworks are presenting in the museum) about the museum itself.
    - I use my phone for additional information about artworks.
        - I considered using google but don't have enough time during the high museum visit. I would consult google if I have enough time in prior experiences.
        - If there were a lot of artworks in a gallery, I wouldn't search for additional information about all the artworks.
- Need of interaction
    - I wish it takes less effort to understand the information given.
        - I use my phone for translation.
            - I used my phone to search up English words in labels and descriptions I didn't know the meaning of.
            - I used google translate to translate the information to my native language to read and comprehend the info quickly.
        - I want the information to be more organized, concise, and understandable for novices.
            - I find labels for paintings are not less descriptive than those for furniture and lightings that were more friendly to people without an art background.

- I think bullet points would help in providing information.
- I found descriptions of some paintings to be vague.
- I was having difficulties understanding the labels and associating the labels with the artwork.
- I thought there wasn't a lot of information about the room/gallery on the wall labels/descriptions.
- I prefer reading more concise information.
- I looked at translated keywords in my native language to quickly understand information.
- Because of museum timings and personal time limits to explore the entire museum, I couldn't read all the descriptions and information properly.
- I read the descriptions slowly as a non-native English speaker.
- Even though there were labels, I couldn't locate them or associate them with the correct artworks.

    - I need an audio guide that takes less effort to use.
        - I was too tired to scan the QR codes.
        - I also like the Palace of Versailles because they have a device to track location and will play audio descriptions automatically when approaching the artwork.
        - My favorite museum is the Louvre because you can rent a headset with CD players.
        - I prefer audio guides over reading information because I can view the artwork while listening.

- I require stimulus to stay engaged.
    - I like interactions in museums.
        - I was attracted to the shining plate because I like interactive artwork.
        - The most memorable piece is the installation outside the building because it is interactive.
        - I like Anish Kapoor's work the best since I can speak in front of the plate and there will be echoes. I enjoy the interactivity.
        - I like the installations outside the building as I can interact with them.
        - I enjoy exhibitions that offer more sensory experiences aside from the visual one.
        - My favorite work is the installation outside the buildings because I like interactive artwork.
        - I enjoy and feel more relaxed when there are interactive exhibitions.
        - A museum in Houston has digital walls so I can take photos in front of the wall.
    - I feel visually fatigued after viewing a large number of artworks.
        - I would not pay more attention to visually identical or repeating artworks.
        - I feel tired after 40 minutes and I do not check labels as frequently after getting tired.

- Taking photos at the museum

- I took photos for future reference.
  - I took photos for visual/aesthetic reasons.
    - I would take photos of artworks that I think it's good, that have interesting content, and that is large.
    - I took pictures of the artwork itself when I'm attracted to the artwork.
    - I like the circular stairs in the High Museum, I took a photo of the stairs.
    - I took pictures of artworks that I found visually appealing and organized them in a folder on my phone for future inspiration for her professional work as a designer.
    - I didn't click any photos while first viewing the gallery to not disturb my viewing experience - I used to go around the galleries a second time to click pictures of artworks I liked.
    - I like to take photos of artworks to keep them for personal reference.
    - I took photos of artworks that attracts me for future reference. Photos remind me of what I think when I look at art.
    - I recorded videos of the info videos playing in the museum for inspiration.
    - I usually write a diary for the visit after my trip: I insert photos and add a description of how I think about it. I did not do this for the high museum trip because I do not have enough time.
  - I took photos for information.
    - I also took photos of labels for future reference.
    - I would also take photos of the description if I don't have time to read it.
    - I took a photo of the label to retain information that I wanted to reference/look up later.
- I took photos for social reasons.
  - I took photos with the artwork.
    - I took group pictures with my friends before large work of art.
    - I took selfies and group photos with my friends, we will imitate the pose of characters in the painting.
  - I share photos on social media or with friends/families.
    - I will share photos on social media.
    - I would upload photos on social media as well as sending to friends and families.
    - I like to take photos of artworks and post them to social media if good.
    - I took pictures of artworks I feel interested in and send pictures to friends and families.

- Personas
  - Planner
    - I prefer to stay organized during my visit.
      - I check the museum map for a while before starting to explore.

            - I would follow my friends during my visit if the group is big (high museum). If the group is small, I will plan the visit.
            - I would split with my friend if we have different purposes and rejoin later.
    - Social/Facilitator
        - Going with friends is an incentive for me to visit the High Museum.
            - I go to the high museum because 1. I want to go with friends(6) 2. I have free time 3. free tickets.
            - I went to the high museum with 6 friends on the second Sunday motivated by the free ticket.
            - I went to the high museum because I heard that one of my friends designed architecture for the High Museum.
            - I would chat with my friend during the visit to bond with them.
            - I would chat with my friend during the visit for fun.
    - Learner
        - I visited the High Museum for educational purposes.
            - I would chat with my friend during the visit to gain information.
            - I like art museums because it teaches me local cultures.
            - I only stay in big groups when group members know a lot and I want to hear them sharing.
    - Wanderer
        - I don't make a plan for my visit.
            - I prefer to navigate freely instead of having a fixed route.
            - I do not have an intended plan for visiting.
    - Lone wolves
        - I do not like to view art in large groups.
            - I viewed artworks with another friend instead of staying in the big group.
            - I usually go to art museums by myself. I went to the High museum by myself.
- I discussed art with others during my visit.
    - The group would also talk about how much of the museum is left to explore and how long it takes before going for lunch.
    - My friends discussed with me how cool the artworks are.
    - My friends usually start the chat, either asking me my opinion on the artwork or asking me if I know about the artwork.
    - I like to go to museums with people that I can have conversations with or learn from.
    - I viewed artworks with a friend to exchange opinions.

    - I got the information from conversations with friends and museum labels because I am interested in the artwork.
    - I prefer to go with companions and never go to museums alone, I like to exchange thoughts with friends.
    - I did not search for extra information but would prefer to discuss artworks with friends.
- I like the museum architecture as much as the artwork.
    - I enjoy looking at the architecture of the museum as much as the exhibition.
    - I like the circular stairs in the High Museum.
    - I like the circular navigating gallery in the high museum because it is easy to navigate from top to bottom.
- I think in-person visiting is important to the museum experience for more details about the artworks.
    - I went to the high museum because 1. I like visiting museums and I haven't visited museums for a long time due to the pandemic; 2. I have heard good words about the high.
    - I think visiting/viewing in person is important to see details that can't be captured in photos eg. frames, paint strokes.
    - I wanted to get closer to the artwork to view it more clearly.

Method 4: Comparative Analysis

I. Introduction

Comparative Analysis is a research method where we look at competing and similar products/services to analyze their performance and usage in the real-world. It allows researchers to understand current trends and evaluate their goals and strategies based on the performance of comparable solutions. We evaluate 8 apps/services related to themes such as interaction design for artworks, museum visitor assistance, and augmented reality.

II. Information Goals

Our goal is to identify different ways in which people interact with art and museums and how that can potentially influence their museum-going experience at the High Museum of Art. We consider diverse and comparable services, identify functions of interest, and draw interpretations relevant to our goal. We also define our selected services and their selection criteria as well as evaluate these services on metrics that closely relate to the visitor experience. Hence, the goal is to the understand the pros and cons of comparable services and establish new design ideas.

III. Method Justification

Strengths

Provides strategic insights

Analyzing comparable products can provide insights about different features, functions, user flows, and feelings evoked by the solution among the target user group. This can help understand user's perception, pain

points, and behavior towards existing solutions and hence guide the design process.

Can serve as inspiration

Comparative analysis is not limited to a product's direct competition. Researchers can compare related services or even evaluate specific verticals of a product/service. These external sources can serve as inspiration for novel ideas and provide designers a fresh perspective to complement their user-centered approach.

Helps benchmark performance

This method can help set a standard benchmark for the solution and determine minimum user expectations during the design process. The process, hence, makes it easier to set personal/team design goals.

Helps learn from past experiences

If a potential design idea has been tried before, researchers can analyze its success and failure to determine the right approach. It allows us to answer questions such as what worked and what didn't work? This can also help designers prepare better for elements that can potentially go wrong. Looking at the successes and failures of comparable services, hence saves time and helps incite or eliminate design ideas.

Limitations

Lack of personalized feedback from users

This method doesn't allow us to receive specific feedback on elements of interest from the user. Since the analysis is primarily a case study of related services, and is dependent on the limited information, it is not possible to obtain detailed thoughts of the users.

Generalizability Issues

The analysis needs to be carried out accurately since some solutions can appear to work in some contexts but might not be generalizable in every context. It is important to note that positive user feedback in one context does not necessarily translate to every setting and the user needs must be clearly evaluated before adopting successful ideas.

Difficult to carry out for novel ideas

When experimenting with novel ideas, it is difficult to find existing services that are similar or operate on the same technologies. Therefore, it is possible that the analysis yields no useful interpretations for ideas that are new and haven't been worked on by others.

IV. Method Details

Procedure

Searching for comparable products or services

We searched for various related services and products online and compiled these resources in a single document along with brief details about each solution.

Filtering out relevant solutions

We then evaluated which products or services are most relevant to our problem statement and selected them for further analysis. We documented the selection rationale to understand the relevance of each service.

Analysis

We then analyzed the different solutions and presented/documented our findings. In our analysis, we tried to understand user feedback for relevant features, the pros and cons of the solutions, and evaluated how these examples can be used to improve the design for our context.

Metrics

Company	Selection rationale	Metric/Question	Metric/Question rationale
Sunshine Aquarium (Tokyo)	The aquarium once released an award-winning AR embedded navigation app for visitors.	How does the AR feature help visitors navigate during their visits?	To understand how users interact with AR embedded navigation technology and explore its pros and cons.
Latvian National Museum of Art (Latvia)	The LNMA museum app features interactive storytelling to guide visitors during their visits.	What aspects do they focus on to make art storytelling more interactive?	To understand what factors should we consider when design interactive art viewing experience.
Latvian National Museum of Art (Latvia)	The LNMA museum app features interactive storytelling to guide visitors during their visits.	How do they integrate modern technologies into the art viewing experience?	To explore the level of engagement of current interactive design practices for art viewers, and how effective they are for guiding visitors.
The Metropolitan Museum of Art (the MET)	The MET is providing a well-established guide with clear navigation instructions and audio resources.	How does the MET embed the audio resources in the guide to provide an integrated experience?	To learn how to shape the experience of the visit to be more natural and considerate without disturbing or frustrating the visitors.
The Isabella Stewart Gardner Museum	The Gardner museum has some uniquely designed audio-guided routes besides the general overview of the gallery.	How does the Gardner museum do the storytelling to engage the visitors?	To learn and gain inspirations for engaging the visitors by using storytelling methods.

Company	Selection rationale	Metric/Question	Metric/Question rationale
Jheronimus Bosch, The Garden of Earthly Delights - Website	The Garden of Earthly Delights website creates a engaging sensory experience that perfectly combines the visual with the auditory.	How does the website establish such sensory experience?	To learn how to establish a sensory experience in art viewing, especially in regards to how the auditory aspect could be used to make art viewing more engaging.
Making Collage in Museum 1: The MAGNES Collection of Jewish Art and Life - iPad Workstation	The MAGNES museum allows visitors to create collage with digitized artworks while they are physically present in the museum, thereby making turning the passive art viewing into an actively engaging activity.	How does the MAGNES museum make its visitors more engaging in their museum visiting?	To explore an existing system that reduces the passivity of art viewing by allowing and encouraging visitors to interact with art through collage-making.
Making Collage in Museum 2: Below the Surface - Website	The Below the Surface website allows users to create collage with its digital collections and access collages made by other users.	How can a website make art viewing experience more engaged and enjoyable through collage-making?	To study what additional aspects of collage-making could help art viewing experience to be more engaging and what functions could be combined with collage-making to enhance its interactivity.
LightSpace 3D	LightSpace allows drawing in 3D physical spaces using augmented reality and enables creative expression through drawing and face painting modes	How can 3D creative drawing experiences in AR improve interactivity in museums?	To explore how AR drawing in 3D spaces has potential for engaging interactions with museum exhibitions and artworks.
National Museum of African American History & Culture - NMAAHC: Visitor App	National Museum of African American History & Culture visitor's app enables its museum visitors to view details about exhibitions and artworks, museum maps, cafe and gift shop details, and allows them to "record" reactions to artworks, as well as "viewing" popular reactions	How can social effects such as reactions improve engagement with museum artworks?	To understand how social effects such as sharing ones reaction about artwork and viewing other reactions is applied in the real-world and its influence on visitor experience.

V. Analysis

1. Sunshine Aquarium -- Penguin Navi App

We want to look at Sunshine Aquarium’s navigation app because the problem the Aquarium tries to solve is similar to what we have for the High Museum of Art: **how to help visitors find their way in a relatively confusing environment through an entertaining and interactive method** (Only selected creativity, n.d.)**.**

It’s important for us to explore the possibility to use new technologies such as AR to improve visitors’ visits. We want to know if the implementation of AR is really effective in helping users, and what are some limitations of such practice.

Based on our research, Sunshine Aquarium released the limited-time navigation app "Penguins Navi" for its 35-anniversary celebration in 2013, which features AR penguins as a tour guide to help visitors find their way to the aquarium from train stations (サンシャイン水族館 世界初 ... - mec.co.jp, n.d.). Unfortunately, since this is a limited-time app, we cannot download to use and test it by ourselves now. The only sources of information are news articles, promotional videos, and the creator's design blog.

In the app, visitors who are outside the aquarium need to turn on the GPS, which will recognize their current locations and display a group of CG penguins in the direction towards the aquarium. Visitors then can follow penguins to the aquarium (Buffet, 2013). The distance to the destination is also shown on the upper left of the screen. When approaching the destination, visitors are asked to scan QR codes on penguin boards that are placed near the aquarium, and AR arrows will show up pointing to the next direction after users scanning QR codes.

1: Penguins have different movements

2: Map of current location from destination

3: Conversation bubble to find penguin board

4: AR arrow from scanning penguin board

Some key features are discussed below:

Sunshine Aquarium -- Penguin Navi App

Aa Feature	Interpretation
Penguins have different movements and reactions when guiding the direction	By giving various reactions such as shaking heads of falling on the ground, penguins become more lively, thus more entertaining
Users can take pictures of penguins and share them on social media	AR photo shooting satisfies users' needs for social sharing. It also serves as a campaign method so more people will know about this app
When visitors get close to the aquarium, a thought bubble shows up from the penguin to guide visitors looking for a penguin paper board to scan QR code for further guides into the aquarium (image3 bubble text "Where's the penguin board?").	Visitors are given further instruction on direction by helping penguins looking for the board, which adds gamification element to the process and increases interactions between visitors and penguins
AR arrows show up after visitors scanning QR codes on penguin boards	AR arrows are added in addition to penguin guides when visitors are close to the aquarium. The reason for adding another form of AR guiding isn't clarified by the designer, but it may help to reduce confusions caused by more complicated conditions such as crowds and elevators near the aquarium

Feature	Interpretation
Users can click on the lower-left corner of the screen to open a street map that shows their current location from the aquarium (img2)	The map aims to let users check how far they are from the destination, but the map view is too small and doesn't allow users to zoom in for details

One concern of using AR guides is that users tend to pay more attention to the AR elements than their physical surroundings. Users need to be careful not to hit other pedestrians or cars while staring at their phones (Yukk, 2013). Another downside is that users can barely see penguins' faces, as they are leading the way in the front (Ascii, 2013).

This navigation app has been reported to improve visitor attendance by 152%, and users spent on average over 9 minutes per time playing with it, while 93% of users were willing to recommend it to others (Only selected creativity - sunshine aquarium: Penguin navi,n.d., Reporter, 2014). Based on the data, it seems that using an AR guide to help visitors navigate in space is advisable in terms of user satisfaction and engagement. Although the technique to create lifelike virtual characters is demanding, this idea is a good inspiration for our design. By incorporating unexpected elements with AR, the process of finding direction could become more interactive and fun. However, the design of the physical environment should also be considered for safety concerns.

2. Latvian National Museum of Art -- Mobile App

The mobile app of Latvian National Museum of Art offers an innovative solution for the issue that **visitors don't have enough onsite guides to provide more information for their visiting**. We want to look into details of how this app enables visitors to learn about artworks at their own pace using interactive technologies.

Navigation

Tour info page

Direction guide within tours

There are 4 sections in the app, each features a themed tour, which needs to be downloaded as a package before use. Each tour offers a detailed step-by-step route for visitors to walk through every key stop.

Art information & Storytelling

During the tour, a brief description of each stop is provided in both text and audio formats. Users can click to read or listen to learn about the background of artworks and interesting facts about the history of the building. Some artwork also offers an AR option. Visitors turn their phones toward the art, and some pins will show up in the painting. By tapping on the pins, visitors can have a close look at different parts of the painting and read stories behind them (Ovserly, 2016). One of the tours offers a video series that has authors of paintings tell stories about their works.

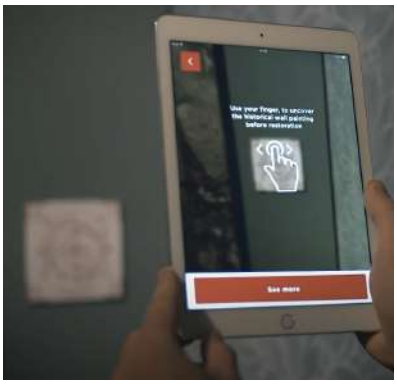
Audio & text description of art

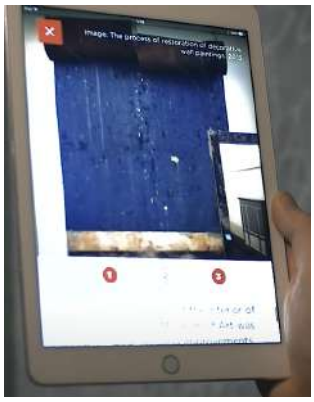
AR scanning feature for art info

Info page after AR scanning

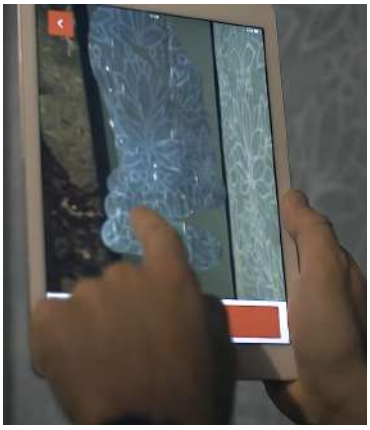
Behind the scene

Another use of AR in the app is to enable the discovery of historic wall paintings in the museum building itself. Visitors can scan a QR code on the wall and “wipe off” the current wall painting to reveal historical wall art(Ovserly, 2016).





Scan QR code to reveal wall art



Some key features are discussed below:

Latvian National Museum of Art -- Mobile App

Aa Feature	Interpretation
Number of stops and the approximate duration of each tour are displayed on tour summary page before the visitors start the tour	Showing duration and number of stops of each tour allows visitors to decide which tours to choose based on their paces and preferences
Pictures showing how to navigate between stops are included	Text descriptions + images that include human figures walking towards the target direction make navigation more understandable
Text+audio description of art background and stories are available on each stop during a tour	The content of audio and text descriptions is the same, so visitors can choose either format based on their preference or needs; audio may be especially useful for visitors with visual impairment
Scan artwork for more information from AR pins	For visitors who want to know more about stories beyond background information from a label, AR pins give them options to look at interested elements inside a painting with richer information. Currently only part of paintings have the AR option in LNMA app
Visitors can watch video series about how artists created their works	Videos help visitors to learn more about arts, but this feature isn't necessarily used when visitors are inside the museum, since they may not have earphones or enough time watching all videos
AR wall painting restoration	Wiping off the wall to reveal old paintings from the past is a good use of AR for gamification. Users need to actively interact with the environment (or device) to obtain information, thus making the learning experience more active

Overall, the use of AR for guiding visitors can help visitors to reflect, analyze and engage more in arts, authors and personalities depicted in their works. Navigation through the museum is also turned into a learning experience for visitors to learn about the museum building itself. Interactions are designed to be learnable, and the passive visiting experience is turned into an exploratory process. People are able to find out information at their own time and pace, and art can become more understandable for any type of visitor.

One concern of planned tours is the loss of freedom for visitors. For those who don't want to follow the entire planned route but still want to read more information about a certain painting, they have to swipe through all

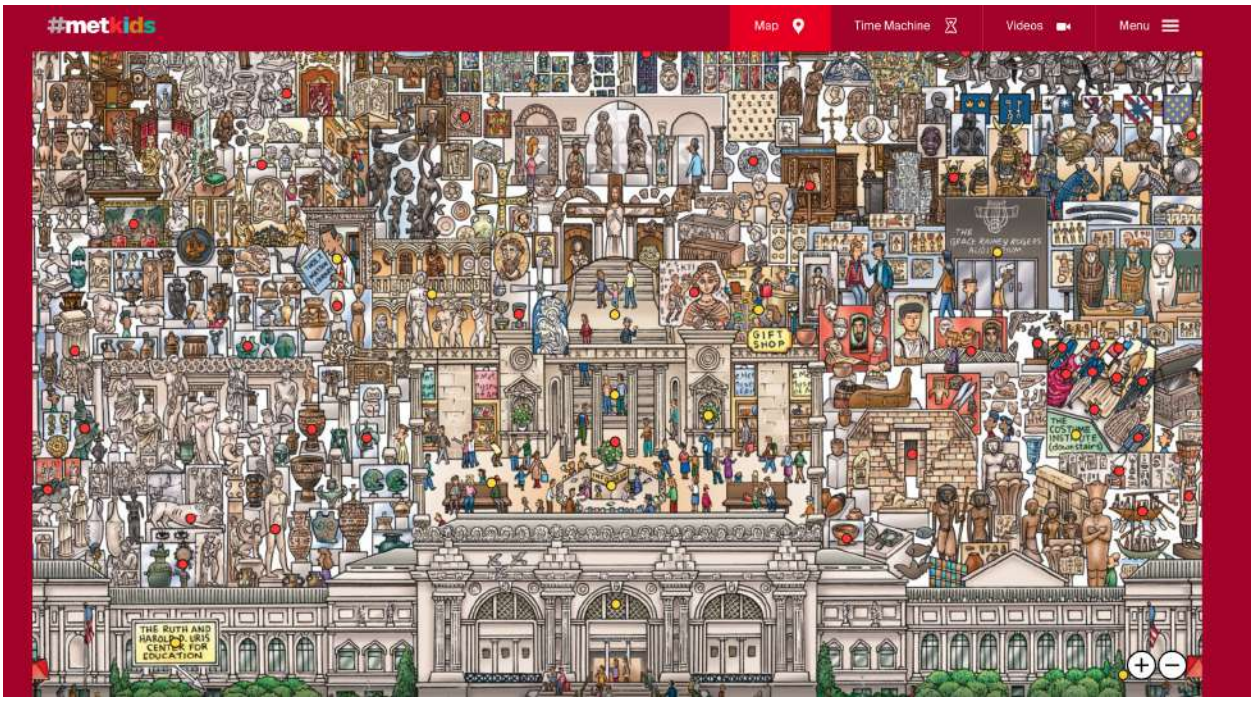
the previous tour stops to find information for that particular piece of art. In this case, using AR to scan art for more information could be a useful alternative to text/audio descriptions. However, it could be disappointing when the AR option isn't available for all artworks.

3. The Metropolitan Museum of Art (the MET)

We chose the MET as one of the comparative analysis cases because it is the largest museum in the United States and is also famous in the world. It has a well-developed and well-established digital guide system, which served 1.12 million visitors in 2020 during COVID (https://www.statista.com/statistics/247422/yearly-visitorship-to-the-metropolitan-museum-of-art-in-new-york/). Therefore, it is helpful to explore its online information guiding resources to see how the MET is improving visitors' experience in the museum.

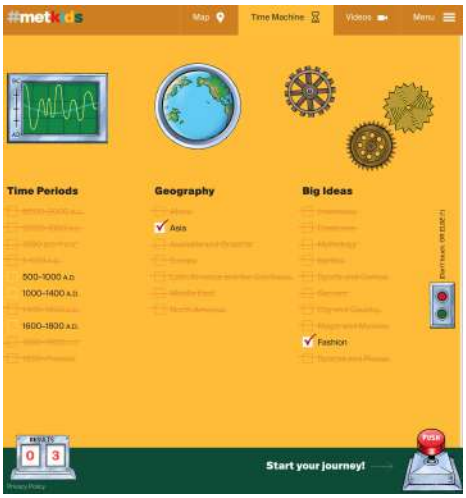
The digital guide contains both verbal and audio information, providing visitors with information about the exhibitions including the visiting route, general information of the artworks, podcast discussion related to the exhibition, etc.

Besides the primary digital guide, the MET also has a page exclusively for kids to explore the museum called "#metkids". In "#metkids", there is a hand-drawn map of the museum with clickable small buttons on it.

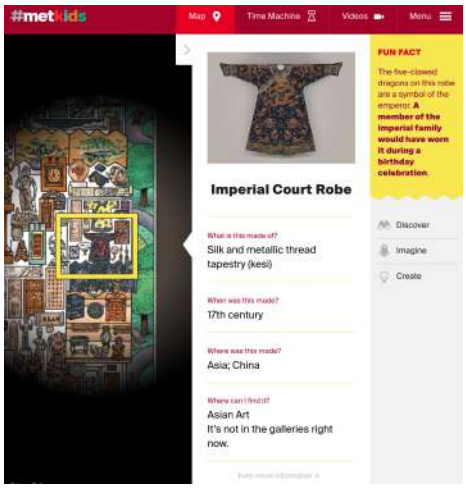


A screenshot of the #metkids page

The users are able to click on their interesting artworks on the map and the information page of that artwork will pop up on the right side of the screen with the artwork itself highlighted in the painting. The users are also able to find a specific artwork by using the "Time Machine" which allows the users to filter the artworks by their period of time, geo-location, and theme.

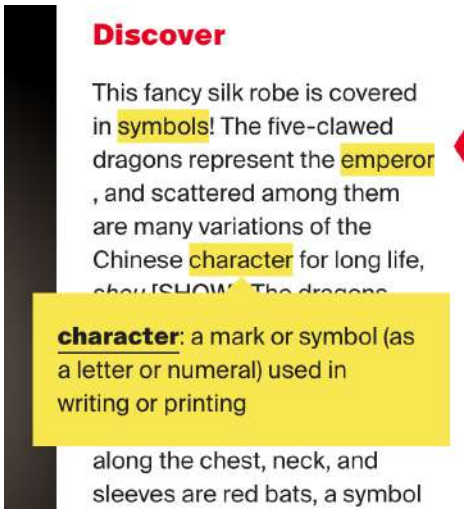


The time machine page



The information page of the artwork

For each artwork, the information is presented in a simple and clear way, with words that could be unfamiliar to kids explained in annotations.



How the MET is providing explanations

After a general overview of visiting-related features of the digital system, we want to see how its digital verbal and audio guide work to help the visitors better enjoy the physical exhibition. Therefore we explored the system by completing visiting tasks via the digital guide.

Task: View the current special exhibition: The Medici: Portraits and Politics, 1512–1570 and learn something about the exhibition

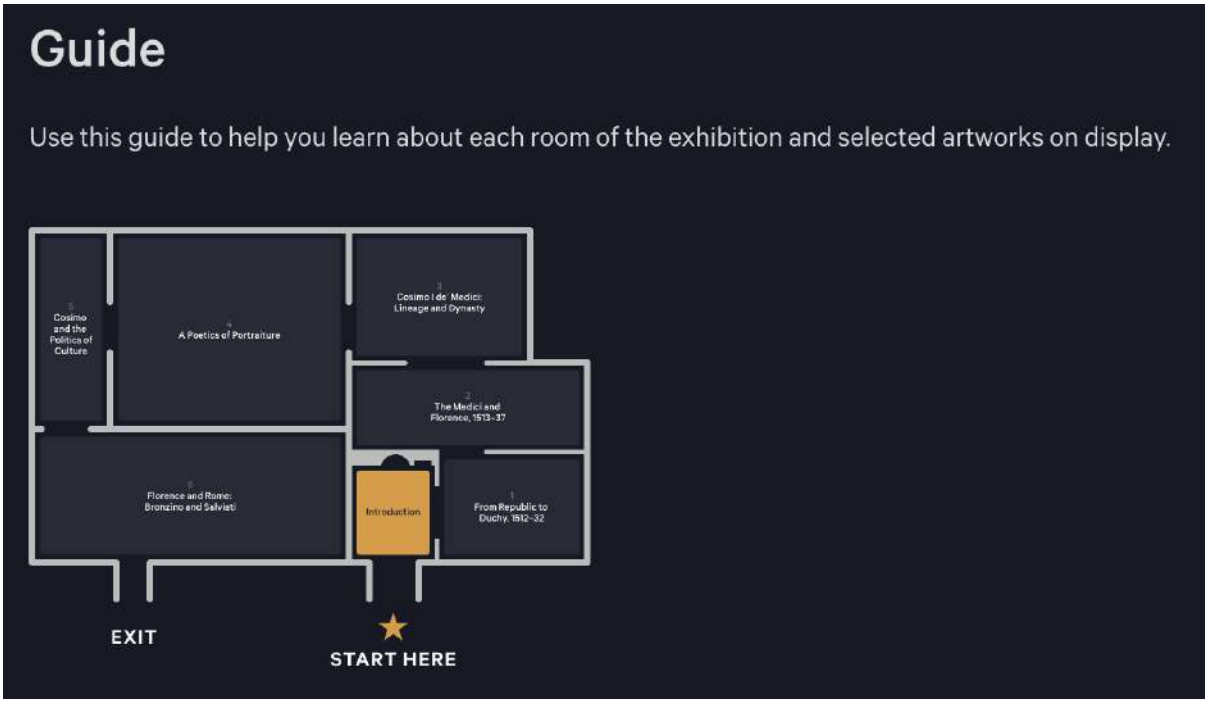
Goal 1: Find the information page of this exhibition

- Visit the website of the MET

- Click on “Exhibitions” under the tab “Exhibitions & Events”
- Scroll down and find the section of this exhibition
- Click on it and get to the information page.

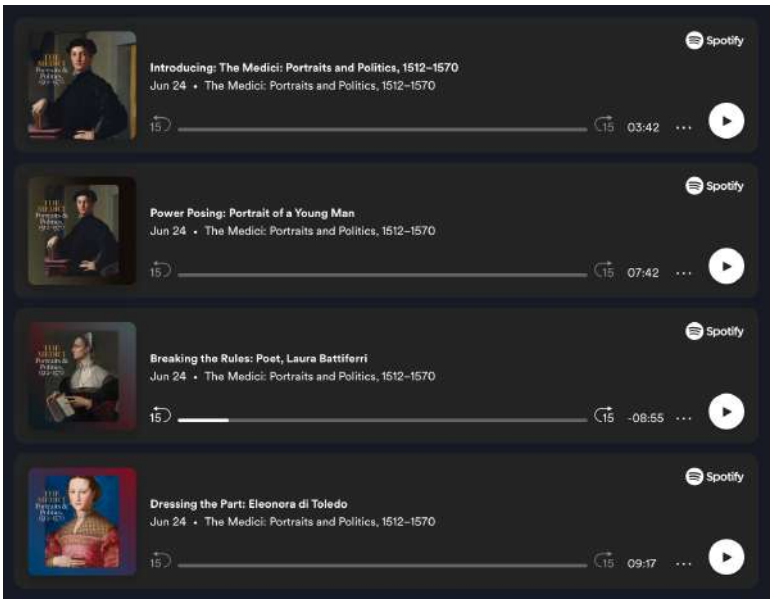
Goal 2: Find the guide and follow its instruction

- See the “In-gallery Guide” in the list on the left of the screen
- Click on it and get to the guide page
- See 4 collapsed sections: “Introduction”, “Guide”, “Listen”, “Next up”
- Click on “Introduction” and read the paragraph, knowing the historical background and primary theme of the exhibition
- Click on “Guide” and see the starting point and the current section highlighted



A screenshot of how the guide looks like

- See photos of artworks in each room with an icon for information on the lower right corner
- Click on the icon and see a window popping up with the name, period of time, texture, and a paragraph discussing the aesthetic descriptions and relevant historical implications
- Follow the guide and view all the artworks
- Click on the “Listen” section and see podcast audios with some portrait paintings by the side



The playlist of the audio resources

- Listen to the audios and know the information and stories of the person in the portraits

  [**Assumption:** May have to go back to the certain painting because the audio is describing details in the painting.]
- Finish listening and click on “Next up” and see some additional resources about this visit, including shopping, primer, dining, and membership
- Click on “Primer” because do not know what it is about
- Get to a new page with more information about the main character of this exhibition conveyed in a storytelling way with a theme “how to be a renaissance influencer”

We discussed our understanding based on what we have for now. However, we have to admit that, since we were performing this task entirely online whereas, in fact, visitors may have a combined experience of both the physical settings of the MET and the digital guide, there should still remain findings that we could not acquire due to the lack of in-person testing.

The Metropolitan Museum of Art

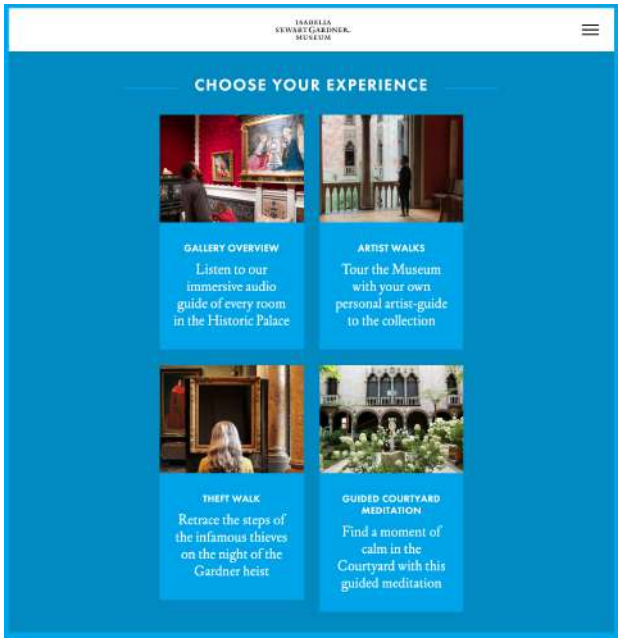
Aa Function / Feature	Interpretation
Combine navigation with content information in the guide	It helps the visitors not only know better about the exhibitions but also not lose their way in the gallery.
Provide officially-taken photos of the artworks for both verbal guide and audio resources	It allows the visitors to find the right artwork.

Function / Feature	Interpretation
Put audio resources after the guide	It may cause extra steps to the visitors which will waste their time when they talk back and forth to check the relevant artwork.
No transcripts for the audio resources	It may decrease the accessibility of the guide while it could be due to copyright issues.
Primer	It interprets the exhibition in an alternative way, which is more informal but also more interesting than the primary guide. However, this page is relatively less accessible for the visitors.
Hand-drawn paintings to present the artworks	It is an effective way to engage kids (and not only kids) in knowing more about the exhibition, but it has limited capability of displaying all the artworks due to space constraints.
Explain unfamiliar words for kids	It helps kids better understand the content. It inspires potential design ideas that annotations can also be employed to help all visitors understand artistic terminologies in the content of exhibitions.

4. The Isabella Stewart Gardner Museum

The Isabella Stewart Gardner Museum is an art museum founded by Isabella Stewart Gardner. It is located in Boston, Massachusetts. It collects significant artworks of European, Asian, and American art. Its collection includes paintings, sculptures, tapestries, and decorative arts.

We want to have an in-depth study on its audio guide because not similar to typical museums which provide only one version of an audio guide, the Isabella Stewart Gardener Museum offers guides that have different visiting routes and in different languages. It provides audio guides in 5 different languages including English, Spanish, French, Japanese, and Chinese. And it has 4 different routes of visiting with transcripts also available:



The 4 different audio guiding routes.

- Gallery Overview
    - It is an immersive audio guide is designed to be used with the map of the Museum.
- Artist Walks (https://www.gardnermuseum.org/audioguide/english/artist-walks)
    - It allows the visitors to explore the art of the past with living artists through immersive audio walks. In each of these audio walks, an artist shares their personal impressions and discusses Isabella Stewart Gardner's unique arrangements of her collection, encouraging listeners to take a closer look.
- Theft Walk (https://www.gardnermuseum.org/audioguide/english/theft-walk)
    - It introduces the famous heist that happened in 1990 at this museum. Starting in the Dutch Room on the second floor, retrace the steps of the thieves with Anthony Amore, Director of Security, and explore how the loss of these masterpieces affects how we experience Isabella’s vision today with Nat Silver, William and Lia Poorvu Curator of the Collection.
- The Guided Courtyard Meditation (https://www.gardnermuseum.org/audioguide/english/guided-courtyard-meditation)
    - This meditation is designed to bring the visitors into connection with themselves in this moment and can be experienced on-site or online. It invites the visitors to reflect and meditate in the beautiful courtyard.

As a museum that has a really audio guide instead of audio resources, we would like to investigate how the museum combines navigation guide and storytelling together to lead the visitors from the start to the end.

Task: Follow the Gallery Overview guide and see whether it is possible to get a smooth and enjoyable visiting experience even though we are not in the museum physically

Goal 1: Find the audio guide and choose the one that would help the most

- Go to the website and click on visit
- Find audio guide option in “While You’re Here” under “Museum Resources”
- Click on “Audio Guide” and see a language selection page
- Click on “Chinese” because it could be understood the best
- See the information saying this audio guide needs to be used with a map and the map (also in Chinese) is available both at the front desk and on the website

Goal 2: Listen to the audio guide and follow the instructions to finish the visiting

- Start the introduction and listen to the standard Chinese
- Listen to the guide and the guide includes instructions mentioning physical locations, special locating features like glass corridor, and move directions like “turn around and walk through it”
- Follow the instructions and start viewing artworks
    - Instructions including
        - How the artwork looks like

    - Where should the visitors look to find the feature the guide is talking about
    - The artistic and historical information about the artwork
- End the virtual visiting as the last audio stops

We also did the task on the English version and found that there is barely any information missing. However, we still acknowledge the possible loss of details due to completing the task virtually.

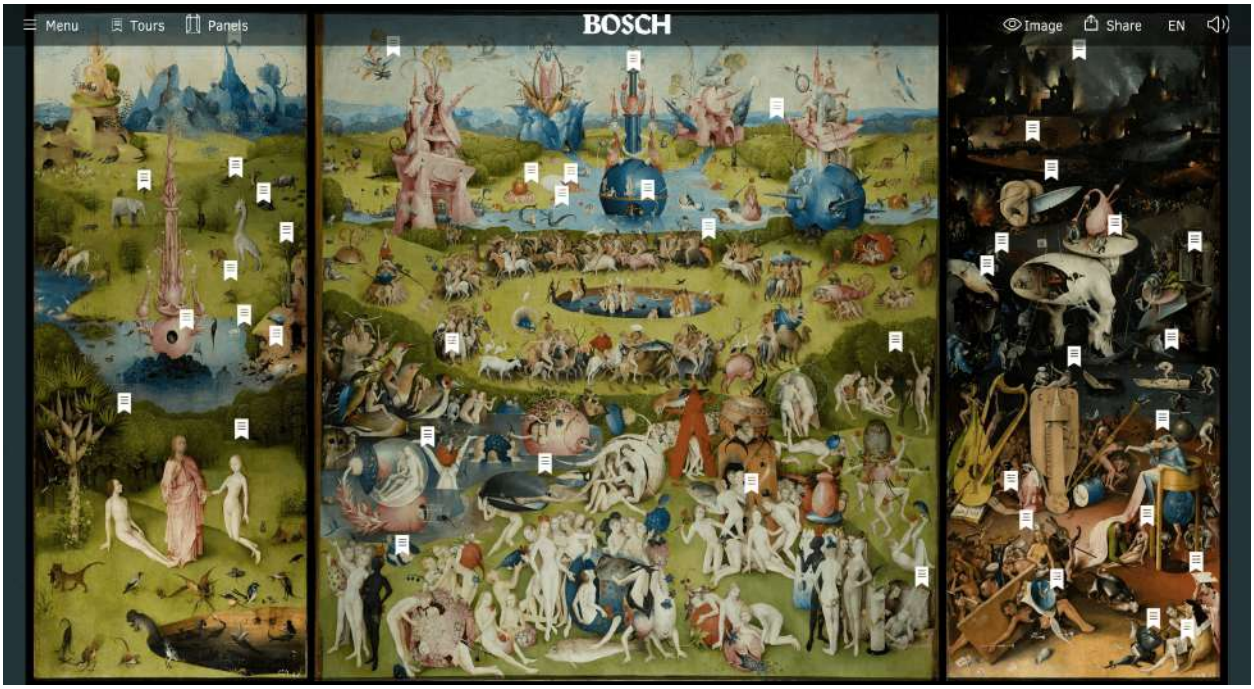
The Isabella Stewart Gardner Museum

Aa Function / Feature	Interpretation
Provide transcripts for the audio guide	It improves the accessibility of the audio guide for the visitors. People who have difficulties in listening to or understanding the audio may find it easier to read the transcripts.
Provide different languages	It also makes the audio guide more accessible and reduces the frustration in the visiting due to language barriers.
Provide different visiting routes in different narratives	It offers alternative visiting routes that allow the visitors to have an experience of the exhibitions through different artistic or historical lenses. The storytelling may make the visitors feel the visiting as being more enjoyable. However, the other 3 routes except the gallery overview are only available in English and would not be informed to the visitors if they choose other languages in the beginning. It may let the visitors miss interesting experiences.

5. Jheronimus Bosch, The Garden of Earthly Delights - Website

Jheronimus Bosch, The Garden of Earthly Delights is a website (https://archief.ntr.nl/tuinderlusten/en.html) showcasing artist Jheronimus Bosch's famous painting *The Garden of Earthly Delights*. The website is an interactive documentation of the artwork, which allows users to experience the work in both visual and auditory ways. We are interested in how the website presents the artwork in this digital way such that users could be more engaged with the artwork.

This artwork is a panel painting that has an inside panel and an outside one. Upon opening this website, users will see the inside panel of Bosch's work. Several white labels are located in different parts of the work.



Frontpage of the Jheronimus Bosch, The Garden of Earthly Delights website

Upon clicking them, the image will zoom in and users can listen to explanations of each part. The website also provides transcripts for the audios so that one can also read the explanations. On the top left corner are several buttons that one can click on. Specifically, the "Tours" section provides users with a tour through the artwork: it will go through the labels in a pre-set order, explaining the content of the painting in a logical way.

The webpage after one click on a label

What's fantastic about this website is that upon zooming in to any section of the painting, background music corresponding to the content would be played. For example, when users zoom in to the section above, they will hear the sound of an owl, together with the chirps of other birds and the sound of water. Such an auditory element helps users to feel more engaged when viewing the artwork as they would experience it both visually and acoustically. The addition of music makes the image pop out from the flat computer screen, thereby creating an environment where users may indulge in the viewing experience.

The features mentioned above are summarized in this chart:

Jheronimus Bosch, The Garden of Earthly Delights - Website

Aa Function / Feature	Interpretation
Provide audio guide and transcript	The guides do a good job explaining various details in this painting. Unlike museum labels which usually offer only a general introduction, the guides accurately account each section of the painting. The incorporation of transcripts alongside the audio improves the accessibility of the website as people can both read and listen to the information.
Offer tour	The tour offers users a more organized way to to through the guides. It explains each section in a logic that tells a story of the artwork. It gives unguided users a place to start with.
Addition of background music	The addition of acoustic elements strongly boosts users' engagement in their viewing experiences. It helps settle users in an environment where they can both look at and listen to the painting.

We especially want to learn from the acoustic element from this website. The addition of music is a simple but effective trick. It enriches the user experience by introducing a second sense aside from the visual one. It helps users to imagine the scene in the painting, so that users will understand the artwork better.

In addition, the tour idea is quite inspirational. Even with detailed description of each section in the painting, one may still wonder where to start with: which label should I click first? What's the connection between different sections of the painting? An optional tour helps to resolve these issues, which allows users to choose whichever way they prefer to view the painting.

One concern is that this website is designed for just one painting. If we are to design for the museum, we need to take into account a large number of artworks in various forms. It is barely doable to provide such a detailed explanation for every painting in the museum, not to mention this approach might not be suitable for other forms of art such as sculpture and installations.

6. Making Collage in Museum 1: The MAGNES Collection of Jewish Art and Life - iPad Workstation

The MAGNES Collection of Jewish Art and Life is a museum under the University of California, Berkeley. Its 2020 exhibition *In Real Times. Arthur Szyk: Art & Human Rights (1926-1951)* features an iPad workstation that allows users to create collages with cropped digital images in the collection.

Overview of the iPad workstation

On the left side of the workstation is an iPad that have many cropped image of Szyk's digitized works. Users can make collages with them on the iPad, and are encouraged to share them through the museum's Flickr account. They can then download their collage from Flickr when they get back home. The screen of the iPad is projected onto the wall, so all visitors would see others making the collage in progress. In addition, it is worth pointing out that the images provided in the iPad covers the entire Szyk collection while only a small part of the collection is physically exhibited in the gallery space. Therefore, the iPad workstation also allows users to access more artworks that are not physically on view.

The exhibition was not on view for long due to the pandemic. However, it has received positive feedback from users during the opening ceremony. Many visitors choose to try out the iPad workstation, and some shared their creations on social media. One of our group members, Catherine, worked in the curatorial team. All the information introduced in this section comes from her personal experience.

The MAGNES Collection of Jewish Art and Life - iPad Workstation

Aa Function / Feature	Interpretation
Allowing users to make collages	This adds interactivity to the exhibition. Instead of passively viewing the artworks, users can manipulate the digitized artworks to create their own works.

Function / Feature	Interpretation
Allowing and encouraging users to share their collage on social media	This helps extend the museum trip beyond the physical visit. Once the experience is shared on social media, it is documented and introduced to more people.
Providing access to artworks not physically on view	Usually, the actual museum collection is way more than what is physically exhibited. However, due to the limitation of time and space, only a small section of the collection is put on view. Offering people access to more collection helps them to enjoy more artworks.

One problem is that the iPad workstation is an installation in the museum. There are legal concerns behind this reason since the iPad is fixed to the workstation and is locked to the collage-making platform. Therefore, users do not have access to the cropped images outside the museum space. At this point we are still unsure what form would our system take, but the legal issue is definitely worthy of taking into account as we go further.

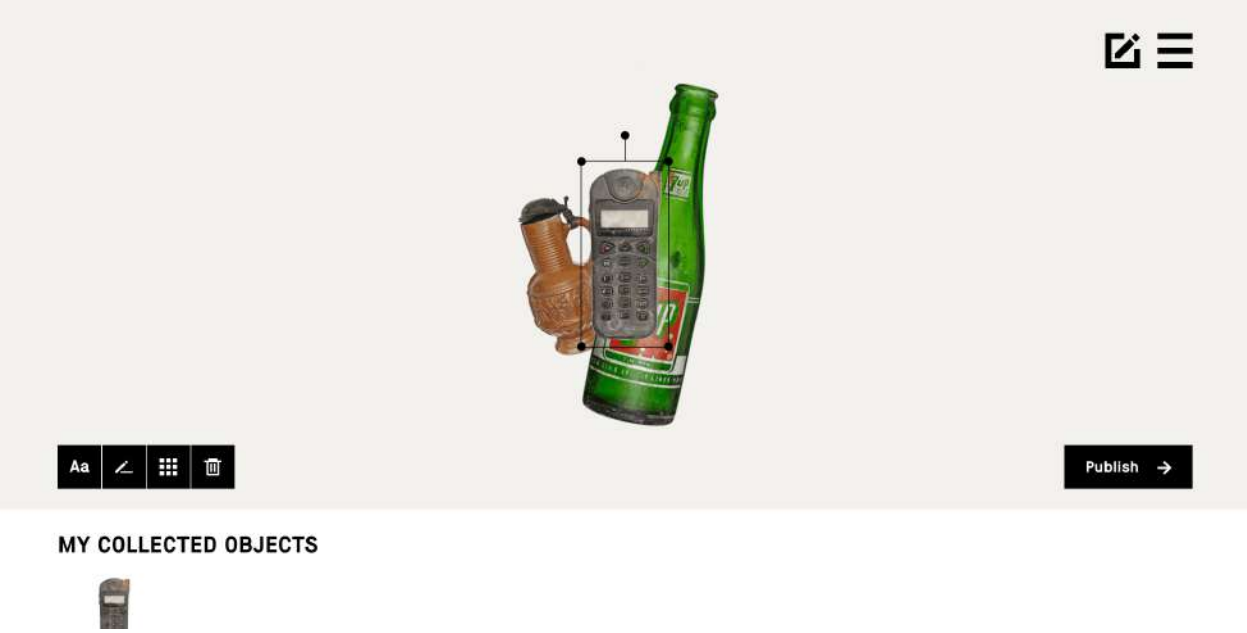
7. Making Collage in Museum 2: Below the Surface - Website

Below the Surface is a website(https://belowthesurface.amsterdam/en/) documenting over 9500 archaeological finds exhibited in the Rokin metro station in Amsterdam. What makes it special is the website's "create your own display" section, where users can use images of the objects in the collection to create collages.

When users view the objects on the website, they can click on the button "Add to your display." Users are then redirected to a new page, where they can change the size and orientation of the object image to make collages.

The webpage when one clicks on an object in the website

Users are then redirected to a new page, where they can change the size and orientation of the object image. They can add multiple images and move them around to make collages.



Collage-making page

In addition, users can also publish their collages so that others may view them on the website. They can also share their creation on social media. In this section one may also choose to work on an existing collage that others made and make changes to the elements used. Just click on "Remix this display" on the bottom right, and one will be redirected to the artboard.

The webpage of existing collage that other people created

Below the Surface - Website

Function / Feature	Interpretation
Allowing users to make collage	Similar to the previous examples, again making collages helps users to interact with artworks/objects. We have went through making collage in physical museum space, and have come to making collage in a website. The two methods are suitable for different conditions. The first works well with physical visit, the second for those sitting before a computer screen.
Allowing users to make collage with existing collages that other users made	This provides a good starting point for those who do not know what to do. The simplest way to create a collage is to work on an existing one. In addition, this allows users to access the creation of other users besides the object images, which helps to build connections between users.
Allowing users to save objects that they are interested in	This works like a shopping cart. Instead of having to quickly pick and draw, one can take time to go through the collection and then make collage with the most satisfied images.

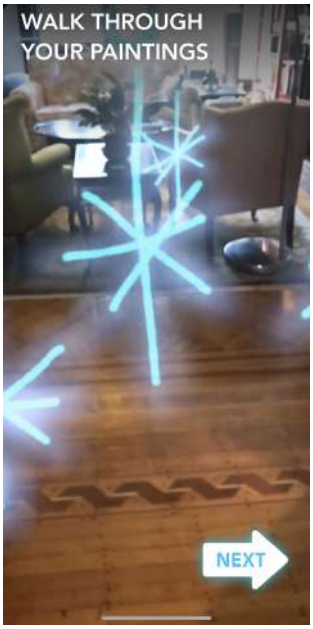
One problem with this website is that it works the best on a computer screen. This is not a condition that museum visitors have when they ponder before an artwork in the museum. Depending on the design of our system, we might go with something more mobile.

8. LightSpace - 3D Painting in AR

LightSpace is an interactive augmented reality-based app that allows its users to draw 3D artworks using their mobile devices in any setting. We want to evaluate LightSpace since the interaction of drawing 3D artworks on mobile devices has the potential to be an engaging interaction in a museum setting with physical artworks and exhibitions.

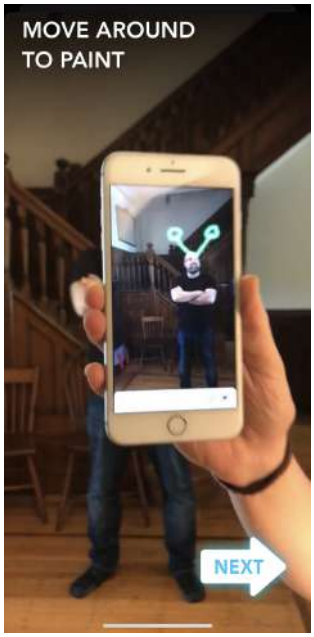
The app accesses the device camera to show a full view of the surrounding physical space. There's a toolbar at the bottom with various static and animated brush options for the user to draw with. The user can then select a brush and draw on their mobile screen while moving around in the physical space, thereby creating a 3D effect. The users may also record their drawing process or the finished artwork and share it with their friends or on social media. The app also provides the functionality of adding GIFs and meme references to the scene or artwork, adding to the interactivity and creative possibilities for the users.

In addition to drawing in the physical space through AR, the app builds on the same functionality using the mobile's front camera to provide a "Face Painting" mode. In this mode, the app tracks the user's face and "attaches" the drawings to the movement of the user's face. This allows users to draw custom and interactive overlay filters on their faces.



Walking through drawings in AR.

Drawing with touch in AR, recording the drawing process.



Moving around to draw at different settings.

The app has over 10k reviews with an average rating of 4.5, however, there have also been a few reviews complaining about several glitches in the app. Though the app has great utility for creative expression in generalized settings, we can consider similar ideas related to art creation in AR specific to a museum setting to boost the interactivity and shareability of artworks.

LightSpace

Aa Function / Feature	Interpretation
Drawing using AR	Drawing in AR is an interactive way to express creativity in multiple settings. In a museum, it can serve as a way to compliment art with art and create a more personalized sharable experience.
FacePainting	FacePainting as a feature, though directly unrelated to the museum visiting experience, can serve as an engaging way to take personal photos/selfies with artworks.
Recording and sharing with friends	Recording videos and sharing with friends or on social media is usual for visitors. Videos/photos including personal AR drawings can be an intriguing aspect for its viewers.
Adding GIFs	GIFs/popular meme references are widely popular and can help improve the relatability and shareability of the captured moments. This is useful for people who are more social and enjoy incorporating such elements of fun into their everyday experiences.

9. National Museum of African American History & Culture (NMAAHC) - Visitor App

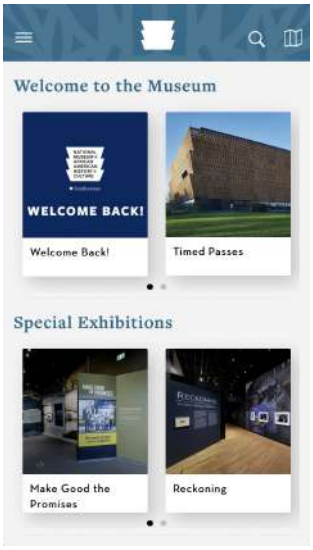
The National Museum of African American History & Culture offers a mobile app for their visitors with various features that help them better explore the museum. We study this app to gather insights on how visitors

interact with museum-specific apps and which features add the most value to their visiting experience. The app supports three languages - English, Spanish, and French.

The NMAAHC app aims to be an all-in-one information source for visitors to browse through the museum's map, exhibitions, and events. It also incorporates information about the in-museum cafe and gift shop describing the different available offerings for the visitors. An interesting feature of the app is to allow users to "Explore stories". The concept is to allow users to capture their reactions to artwork and view other people's popular reactions. Visitors can browse through different artworks displayed in a grid format in the app and learn more details about them. On the detail page, they can view a "Reactions" button which also shows the number of people who have reacted to the artwork. Clicking on that button takes the users to a questionnaire page asking the user to select the word that best describes their reaction. After their response, the users can view how other people responded to that question. It also provides social media integration to share these reactions with friends and family.

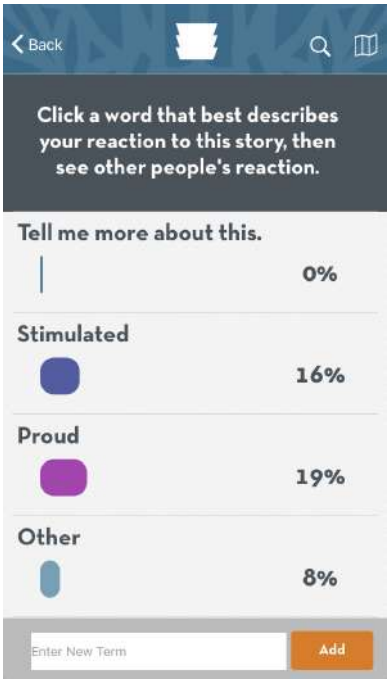
THE NMAAHC app splash screen.

Museum exhibition detail page



App dashboard screen.

Though the concept presents novel opportunities to improve interactivity and highlight common sentiments about artworks, we realize that the app's options and questionnaire style interface fails to invoke a social connection with the "stories". This could also be attributed to the fact that app has not received as many downloads or responses to fully utilize this feature.



"Recording" and "viewing" reactions about an artwork/exhibition.

NMAAHC Visitor App

Aa Function / Feature	Interpretation
Explore Stories / Reactions	Though this aims to add interactivity to the app with "recording" and "viewing" other people's reaction to artworks, the survey styled interface and the limited options hinder the communication between people to truly express their reactions
Museum Map / Navigation	Categorized in levels, this provides easily accessible digital images of the floor plans of the museum. Aims to help visitors easily navigate in the museum. Information regarding navigation is also provided in the detailed view for an artwork informing the user where it is located.
Exhibitions	Exhibitions aims to help the visitors clearly view organized information about different artworks belonging to a particular exhibition in the museum. It provides a background about the exhibition and enlists its different artworks and their relevance.
Cafe & Gift Shop Information	Food and souvenirs/gift shop items are an important part of a visitors experience. The app tries to provide an easily accessible UI to inform the user about various available offerings at their gift shop and cafe.

Discussion of Research Findings

Reflecting on our research process, we realize that even though there might be biases and limitations which would influence the validity of our data and the findings drawn from them, we were still able to observe some patterns of information indicating occurrences of certain problems and needs. And our different research methods also work well at helping us understand the topic from different perspectives. The survey allows us to get an overview of information about the users, for example, their characteristics, preferences, and needs. The

interview and contextual inquiry give us more specific and unique details on users' thoughts, needs, and pain points. And the comparative analysis provides us with abundant inspirations from other organizations in the industry to solve our problems.

Among the data we collected, which are likely to be biased and not representative enough due to the implementation process, we confirmed some previous research conclusions and identified new findings after the analysis of the data. We are going to discuss them to analyze their validity and recognize their values.

Finding 1: The users express a large interest, need, and reliance on the information provided by the museum, while the currently provided resources of information in the museum are inadequate to satisfy the users.

Artwork Information

In both the survey and the interview, our participants mentioned spending time reading the labels provided by the museum. There also appear interested in know more about the artwork, for example, the expert's thoughts and background information, and the whole exhibitions, for example, the connection between the artwork or exhibitions. To users, the label by the side of an artwork is the main source of the information they would rely on more than other additional resources like tour guides. They are expecting to find their interesting information by reading the labels.

However, for the users, the current information provided by the labels in the museum is not helpful enough. Firstly, the information itself is not well-organized and causes confusion to the users. The abundance of information provided by labels also varies a lot from a huge paragraph to some simple words. And the labels still fail to provide the type of information the users require at some point. Furthermore, as observed in the contextual inquiry, the use of words in the provided information is not visitor-friendly enough that our participant needs to take out their phone constantly to get explanations to help them understand. In a global view, the placement of artwork and the exhibitions is also not connected efficiently, so some users complained about not being able to understand the relationship between the artwork and exhibitions.

The cases of the MET and the LNMA studied in the comparative analysis suggest some feasible solutions. The Premier section of the MET uses a theme to connect all the artwork together and the LNMA lets the artists and the authors tell stories about the artwork. Both of the storytelling methods may help the users better understand the exhibition and provide places to involve in more information.

Additional / Supplementary Sources of Information

Even though labels are the primary source users consult to, there are also users who tried the supplementary sources in the museum, for example, the audio guide and tour guides. Also, when some of the users fail to gain information from the information provided by the museum, they would use the internet to search for more.

However, the audio guide provided by the High Museum is not as effective as most of our participants expected. It was only available for the limited exhibition and it did not provide much new information. The High Museum was also trying to offer exhibition catalogs but they were just put at random places with few people noticing them.

The Garden of Earthly Delights website is providing an audio guide about details in the artwork instead of providing general information about the artwork, but we worry that it might be costly to do so. The different routes led by different people talking about behind-scene stories and experts' thoughts about the exhibitions and the museum in the Gardner Museum would be an inspiring example for us.

Navigation Information

It happens in both the interview and contextual inquiry process that users need to consult the map provided by the museum to navigate in the museum.

While in the High Museum, the digital map on their website is not helpful for the users to understand their location and direction, and the map is also hard to be retrieved once the users left the first floor where is the only place the QR code for the map is provided. Furthermore, based on the observation, the layout of the High Museum is also confusing and lacking the guidance of directions, which caused the participant to mistaken the exit for the entrance.

The Penguin Navi shows us how to guide the visitors in an engaging and efficient way by employing AR technology. However, we also have the concern that the AR guide would distract the users while they walk in the museum, causing potential dangers. Therefore, incorporating detailed instructions of directions and photos of landmarks in the guide of the MET would be an ideal inspiration for our solution.

Museum Information

The High Museum has a set of spiral stairs that impressed a lot of our participants for the interview. Some participants were also curious about the history of the High Museum itself. Users do show strong interest in and would definitely pay attention to things other than artwork and exhibitions. Besides, museum policies and manners are also information that users care about a lot because some participants showed concerns about violating the policies.

There was no obviously presented information about the museum itself or any policies. Our contextual inquiry participant also did not know where to find them.

In the LNMA, the information about the museum and its architecture is provided on the wall, so this might be a way that the High Museum can consider.

In understanding that the users' specific needs for information and their thoughts on the current information in the High Museum along with some good examples from other museums, we would be more well-prepared to design our solution to address the current problems.

Finding 2: The users need refreshments and prefer interactions while the High Museum is lacking improvements on both.

Refreshments

We confirmed that visiting a museum can be tired by hearing lots of our participants complaining about their exhaustiveness. Physical tiredness could be addressed by providing seating areas in the gallery and this is also what most of the museums are doing. However, the High Museum's seating areas are not accessible to the participants enough according to the feedback. We may mark this point because according to our own observation, the seating areas are sufficient in most of the exhibitions in the High Museum, so we infer that the participants may be talking about the sign of seating areas not being obvious enough.

Interactions

Boring is one of the common features associated with museum visits in our data. Some participants also pointed out that they would be visually fatigued after a while. Interactions with the artwork are what most

museums are trying to provide to engage the users and reduce boredom, but these are absent in the High Museum.

We collected a lot of innovative and effective interactions from our comparative analysis. For example, the gamification by Penguin Navi, the collage creation in the MAGNES museum, and making the users' own artwork in the Below the Surface website.

Confirming that the users do need refreshments and interactions to be more engaged in their visit, we are more determined on the direction of where our solution should go.

Finding 3: The users need a way (use their phones) to collect visit-related information and material for future references and socialization.

Future references

In the data collected from our research methods, we noticed that mobile phones are involved largely in our participants' visits. One of the purposes is to take photos of labels and artwork. Most of our participants would take photos of artwork that is visually appealing for them and some may archive them for future inspirations. There are also participants using photos of labels as notes for the information about the artwork and they would come back to it for searching more information online by themselves.

Socialization

Besides taking photos of the artwork, our participants also took photos with the artwork. And they would also take group photos together in the museum or in front of the artwork if they visited as a group. Our participants would also share the photos on social media or with their families and friends.

The Below the Surface Website also provides an interesting case for our reference. It allows the users to access others' works, connecting and promoting the interaction between the users would meet some users' need for socialization.

Identifying this frequent need of the users provides us with more opportunities to improve the entire experience of users' visits by involving the collection of information into the workflow.

There are also other findings of users themselves, for example, their visiting styles, viewing preferences, and personal habits. We've either incorporated those into the current discussion or saved those for the evidence for user personas and design implications.

User Needs, Other Influences, and Design Implications

We draw our personas and empathy maps, user needs, and design implications from the information we collected in background research and all the research methods in this stage, especially some useful notes from our contextual inquiry.

User Needs & Design Implications

Category	User Needs	Design Implications	Source of Reference
Prior to the visit	Prepare for the visit	The solution should notify the users of the museum's policies and what's typical to bring for a museum visit.	Background Research & Interview
During the visit	Get a visually enjoyable art experience	The solution should recommend visit routes based on the visual preferences of the users.	Interview
During the visit	Find a way to socialize with their friends.	The solution should recommend or provide group activities for the users to interact with others including their companions.	Survey & Interview
During the visit	Find how to navigate in the High Museum	The solution should provide accurate locating and intuitive navigating instructions to the users based on their needs.	Survey & Interview
During the visit	Find out museum-related information (policies, exhibitions on view, etc.)	The solution should provide a fast lookup function that allow the users to get what they want to know in a short time.	Background Research, Interview, & Contextual Inquiry
During the visit	Find an ideal spot for photography	The solution should recommend highlights in the museum based on the users' needs.	Background Research, Interview, & Contextual Inquiry
During the visit	Know the estimated visiting time	The solution should provide estimated time/how long is the rest of the exhibition.	Interview
During the visit	Refreshment to prevent visual and physical fatigue	The solution should step in regularly to remind the users to take a break or invite the users to do some refreshing activities.	Survey & Contextual Inquiry
During the visit	Gain information about the artwork	The solution should enable the users to gain knowledge of what they want to know about the artwork.	Survey, Interview, & Contextual Inquiry
During the visit	Want organized, concise, and understandable information	The solution should provide more well-designed information that is friendly to all users with any level of ability and background.	Interview & Contextual Inquiry
During the visit	Know connection between artwork and exhibitions	The solution should provide a type of storytelling that presents a clear relationship between the artwork and the exhibitions.	Survey, Interview, & Contextual Inquiry
During the visit	Share or receive information with/from others	The solution should provide a platform for the users to post their thoughts and read posts from others.	Survey & Interview
Post-visit	Keep a record of certain artwork	The solution should have a function that could archive the needed information about artworks chosen by the users.	Contextual Inquiry
Post-visit	Share their experience	The solution should support sharable contents that the users could directly send or post to other people or platforms.	Interview & Contextual Inquiry

Personas & Empathy Maps

We then came up with the following three personas with patterns of behaviors and needs we've observed in our data collection process. We also provide their empathy maps to add in more details and make more sense of their behaviors and needs.

TED MOSBY 32, Architect

ABOUT

Ted is an architect with an income of $87k a year based in Atlanta. He works 12 hours a day, and he has some sleep problems, so he would drink Riesling in the evening. He does not have a partner. And he prefers to stay by himself listening to others' talking.

He goes to art museums alone as a relaxation, and he loves Bauhaus. During his visit, he has a habit of taking photos of interesting artwork or architecture and he may come back to them for future inspirations. And he would also write diary after his visit.

FAVORITES

Music: *Blues & Jazz* Movie: *La la land*

PROBLEMS

- There are so many people in the High Museum over the weekend, especially on the second Sunday of every month.
- He usually only could go for a visit on weekends and has only 3 hours due to his job and schedule while he wants to view as many exhibitions as possible.
- He wants to find a place or way to share his thoughts without talking to people directly.
- He does not want to violate any museum policies, but he does not know where to find those.

Think & Feel

- I only have 2 hours left and gotta hurry up.
- I wonder whether anyone else notices about this in the painting.
- There are so many viewers and I wish I could be closer to the painting.
- I would rather place this painting over there.

Hear

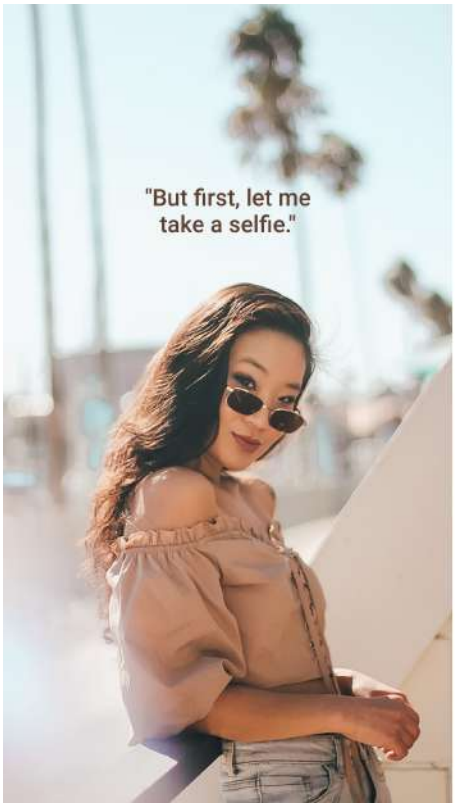
- The security guard talking to others "please have your backpack in the front"
- Overhear other visitors' conversation "there is another exciting exhibition on view next month, it's about..."
- Audio resources: podcast of other artists discussing the current exhibition
- Background music from the right airpod

See

- crowd
- spiral stairs & lighting & layout & the glass ceiling
- full calendar
- interesting exhibitions
- labels — just basic information
- signs & policies

Say & Do

- Take notes
- Take photos
- Check time and what's rest of the exhibitions constantly
- Check the map



BRITTANY (BRIT) 24, Influencer

ABOUT

Brit lives in Beverly hills, Los Angeles with her lovely pet dog Tuna. She travels a lot and recently she visits Atlanta. During her travel, she would post Instagram lives. She loves to go out with a large group of friends and she talks a lot.

She wants to go to the High Museum because she heard there are some great instagram-worthy artwork pieces. She would spend hours before her visit to prepare her outfits and matched bringing.

FAVORITES

Music: *EDM*

TV Show: *Keeping up with the Kardashians*

PROBLEMS

- She could not quickly locate those Instagram-worthy spots in the High Museum.
- The High Museum does not have many interactive exhibitions that are ideal for Instagram stories.
- She wants to talk about the art in her post captions, but she could not understand some terminologies and does not know the most important information.
- She is easy to get bored.

Think & Feel

- I want to sit
- It's so boring
- How about doing a makeup tutorial with a theme of oil paintings?
- Which Instagram filter would look the best? Where should we go after this?

Hear

- her friends complimenting her #ootd
- overhear other visitors' talking about the artwork
- "Brit! Come over here it's such a good spot to take photos!"

See

- eye-catching artwork
- other visitors' dressing & behaviors
- lighting and color of the wall
- museum cafe

Say & Do

- look for spots to take photos at
- check whether she looks good
- look for seating area or restroom
- shopping at the gift shop
- "Let's take a selfie!^_^"

JACOB ROSSI 18, Student

ABOUT

Jacob is an international student at Gatech from Italy. He is a first-year history and literature undergraduate. He likes to hang out with some close friends but not in a big group. He loves reading and writing.

He visits the High Museum for multiple times. He always goes with friends and have conversations with them to exchange thoughts and opinions. He sometimes needs translation or explanation for the verbal information in the labels. He also takes notes.

FAVORITES

Music: *Country* Movie: *Cloud Atlas*

PROBLEMS

- He wants to know more about the historical and professional information but the labels usually do not provide.
- He does not have time to read over every single label but really wants to.
- He also wants to hear comments by experts.
- He wants to explore museum resources like audio resources, but he does not know where to find all of them.

Think & Feel

- What is the history behind this painting?
- Who is the "Lord" referring to in the description?
- What does this word in the title mean?
- Why are some descriptions so long and others so unhelpful?
- What's the connection between artworks in this gallery space?

Hear

- other visitors talking
- his friends' opinions
- audio resources

See

- labels, descriptions
- his notebook
- paintings with familiar artists' name by the side
- map

Say & Do

- take notes
- "Do you know the fact about this artwork?"
- search for more information
- scan the QR code for the audio guide
- purchase exhibition catalogs in the gift shop

Potential Core Functionality

After summarizing and analyzing the data, we get patterns of user needs and problems as well as exemplary solutions and inspirations. Now based on the focus of our topic and the contextual characteristics of the High Museum, we elicit the following potential core functionalities of our solution:

The solution should primarily support acquiring and saving information about the artwork and exhibitions.

Considering the recurring mentioning and discussion about labels in the museum, we realize that the current art-related information and administration information (e.g. policies) provided by the High Museum are still not sufficient enough comparing to what our user sample needs. At the same time, the users are still relying heavily on switching between the build-in functions of their phones, like photo albums and notes, to collect noteworthy information. Therefore, our solution aims at providing an integrated function that would enable the users to get access to the information they need to the greatest extent and archive the information in a well-organized and convenient way.

The solution should provide a platform for the users to be involved in socializing activities.

Given the finding that most people (visiting alone or with companions) would likely to either have an exchange of opinions with other people or share their visit-related experiences like photos unilaterally to the society, our solution plans to provide a platform that would support both within-system communications of thoughts and the sharing of materials to other platforms.

The solution should also offer sufficient refreshments to the users.

Boredom and fatigue are common in the feedback we got from our research. In order to slow down the decrease in the users' engagement as the time goes, our solution is expected to reinvigorate the users physically and mentally before the users lost their interest and strength in the exploration of the museum.

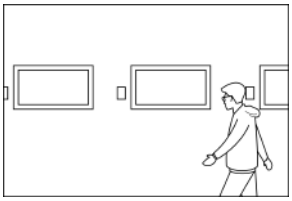
The solution should enable the customization of the visit.

Users are having their unique preferences while visiting the museum. Thus, it is necessary for our solution to prepare some personalization functions for users who have specific intentions or plans of their visit.

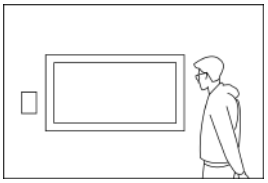
Storyboarding

Task: Checking for more information for an artwork

Persona: Jacob

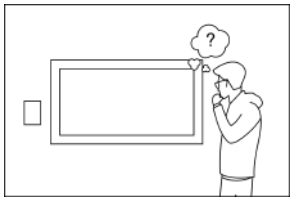


1. Jacob browsing through artworks at an exhibition

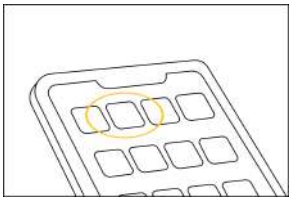


2. An artwork catches the Jacob's eye and he pause to look

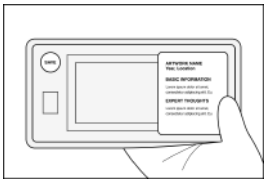
3. Jacob tries to look at the label next to the artwork and finds minimum information



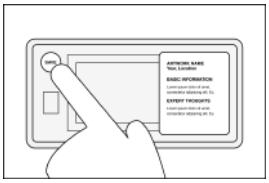
4. Jacob wishes to know more background information about the artwork and the artist.



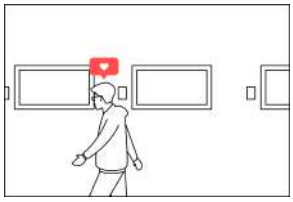
5. Jacob pulls out his mobile phone to open the HMoA (GT) app and tries to scan the artwork



6. Jacob can see different kinds of information about the artwork pop up on his screen



7. Jacob clicks a button to "note/record" this information for future reference.



8. Jacob is happy and continues exploring the museum.

Lessons Learned

Thoughts on Research Methods

It was difficult to be sure about which method fits our goal the best. We chose to conduct semi-structured interviews, contextual inquiries, the survey and comparative analysis for R2. Interviews and contextual inquiries generated the richest data, which is really valuable for exploring needs and pain points directly from our user group. The survey is also valuable as its quantitative data helped us discover behavioral patterns, which were used for the creation of personas and empathy maps. The comparative analysis offers limited information about our target user group, because we had little access to users' feedback on those competitors. However, this method is useful in giving us inspiration for design ideas. We didn't choose to conduct task analysis or product walkthrough since we didn't have a specific current product that need to be redesigned. Overall our choices on research methods and deliverables are helpful in providing data and exploring user needs.

Challenges

One problem that we had is the recruitment for both semi-structured interviews and contextual inquiries. Due to the limit of time, we decided to choose our peer friends and roommates as our participants. Although they all fall into our target user category, and they have all been to the High museum recently, the lack of diversity in our choice could result in biased data. 4 out of 5 of interview participants actually went to the museum together as a group, so the information that we collected was similar. The fact that our participants are mostly international students could also lead to ignorance of issues that visitors from other age groups or cultural backgrounds would have. If there were more time, we would have gone to the High museum and try to reach out to visitors in person and find those who are willing to participate in our interviews, and this would help us to gain feedback from visitors with more diverse backgrounds.

Another challenge for us is time management. We listed tasks for R2 at the begging of this phase. However, as the research went on, it got harder and harder for us to keep up with our original planned deadlines. We didn't have enough time to thoroughly digest information collected from all research methods together; instead, we spent too much time writing each part of the report separately. We managed to communicate with each other during our team meetings about what we found in our researches, listed down key findings from each method, and made sure everyone understand their assigned part of the works. But if we could have done it differently, it'd be nice if we could stick to the original deadline, and have a dedicated meeting for synthesizing all our findings and insights in depth.

What Went Well

We were able to involve all team members when conducting each research method. All of us participated in the creation of the survey and interview script, and each person was assigned participants to conduct interviews or contextual inquiries. We discussed and chose competitors together for comparative analysis, and generated ideas for personas, empathy maps and the storyboard as a team. Having everyone participated in all research methods and deliverable creations helps us learn about those methods with hands-on practices, giving us deeper understandings. Especially when some of us were not familiar with certain methods, other team members could offer their thoughts to help each other learn.

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