CPSC 481

# STAGE THREE - TEAM L
# MUSEUM COMPANION APP


## PROJECT ASSOCIATES:


| | | |
|---|---|---|
| ALEX STARK | **UCID:** 30062613 | **CONTACT:** alex.stark@ucalgary.ca |
| AMIR HUSSAIN | **UCID:** 30032874 | **CONTACT:** amir.hussain1@ucalgary.ca |
| BHAVAN PAHUJA | **UCID:** 30042172 | **CONTACT:** bhavan.pahuja1@ucalgary.ca |
| ISRAA FAROUK | **UCID:** 30076315 | **CONTACT:** israa.farouk1@ucalgary.ca |
| JASON CHEN | **UCID:** 10175285 | **CONTACT:** shuji.chen@ucalgary.ca |

# Project Description

This project is an AR app aimed at people who visit museums. This app aims to replace the standard of looking at the physical plaque descriptions with being able to point your camera at an artifact, scanning it, and seeing or hearing the corresponding description in the app. The app also aims to provide AR models of artifacts with audio & visual descriptions and allows users to then take pictures with these AR models and post them to social media. The artifacts can also have relevant animations that users can view. This app aims to transform the typical museum experience into a more hands on and interactive one while also accommodating for people with disabilities or language barriers by providing multiple ways to consume information provided about the exhibits.

# List of User Tasks that were prototyped Horizontally:

- User signs up for an account with the app.
- User signs in to the app using Google/Facebook.
- User signs in as a Guest.
- User changes the app language from settings.
- User changes the font size of the text in the app.
- User selects a museum from listed nearby museums.
- User selects a museum based on country and city.
- User buys museum tickets by being redirected to the museum's external website.
- User leaves the selected museum page.
- User signs out of the app.

# List of User Tasks that were prototyped Vertically:

- **User Scans an Artifact**
    - User listens to an audio description about the scanned artifact.
    - User reads a text description about the scanned artifact.
    - User selects Videos to watch related videos about the scanned artifact.
        - User selects one video from the list of related videos to watch.
    - User places an artifact in AR.
        - User listens to an audio description about the placed AR artifact.
        - User reads text based AR info on the placed AR model.
        - User views AR animation of the artifact.
        - User takes a picture with the AR artifact.
            - User shares the picture on social media.

- **User takes a time based tour**
    - User selects the desired end time of their tour.
    - User selects the desired artifact to view.
    - User scans an artifact.
    - User views their current location on a mini map.
    - User pauses their tour.
    - User ends their tour.

- **User interacts with a virtual map of the museum.**
    - User marks visited areas on the map.
    - User unmarks accidentally marked areas on the map.
    - User clears all markings on the map.
    - User exits the map to go back to the museum home page.

## Storyboard (On page 4)

## Cognitive Evaluation

We approached our cognitive evaluation through a user's point of view. We carefully examined, analysed and noted every single step that we did for each of the tasks, evaluated if it was intuitive and if a typical user would know to do the same. We were meticulous and included even minute steps such as clicking the next button as we wanted to make sure that everything we did was clear, thorough and concise.

By examining the cognitive walkthrough for **Task 1; Timed Tour** we can see that we lead & direct the user too much. People may want different things from a tour, and currently we only account for one type of customer; those who want to see artifacts in great detail. Some may just want a brief description through a small pop up explaining the artifact, while others may want information on the exhibit as a whole and not care too much about each individual artifact. We do not account for these possibilities and force the user to take the tour in this more detailed artifact by artifact way.

By examining the cognitive walkthrough for **Task 2; Virtual Map** it is evident that we have a lot of oversights in our prototype. Most users don't want to have to read instructions on how to use a certain feature in the app, however sometimes it is necessary. As seen in this walkthrough the user is left to put pieces together on their own, this may be intuitive to some, however it is more likely to be unintuitive. This helped us see that perhaps we

should add in some instructional boxes to help the user understand how to do certain things .

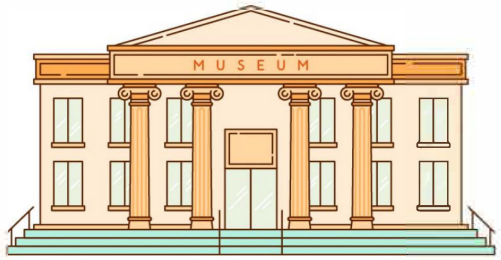
Lastly by examining the cognitive walkthrough for **Task 3; AR Display** we realized that AR is not a common feature used by most apps, because of this we must assume people are unfamiliar with how it works. As a result we should have had an optional tutorial on how to use the AR features in the app. Without this tutorial some users may be lost and be forced to spend time figuring it out on their own, this may lead to a lot of users simply ignoring the AR features. Therefore, a way to familiarize users with AR is necessary.

One thing that we could have done to improve our cognitive walkthrough process is to have teammates deal with the features that they were less familiar with (i.e they did not work on the prototypes for these features). As this would have made it easier to look at the tasks with unbiased eyes and a fresh set of eyes would be able to see if the tasks were clear and intuitive.

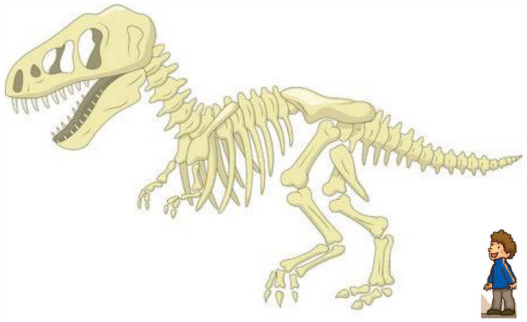
## Reflection

Overall stage 3 went relatively smoothly for our team, we excelled in communication and delegation. We held frequent meetings and shared all our work while in progress and after completion this helped us all uphold the same level of consistency across our work an example of this is; while we were creating our low-fidelity prototype we used the Balsamiq cloud feature, this gave us the ability to work on the wireframes in one place, this made it easier to link wireframes together and be consistent with design features (Eg: look and colour of buttons, etc) throughout our prototype even once tasks had been delegated.
The only thing our team struggled with was creating the Affinity diagram, we all had different understandings of what an affinity diagram was and this caused us to redo it multiple times.
From this I see the importance of discussion and planning before jumping right into the task at hand as this saves time in the long run and if we were to do it again that is definitely something that should be done first. Another thing that we would have differently is to delegate the cognitive walkthrough tasks to team members that weren't directly involved in the designing of those tasks as this would give a more unbiased view of the intuitiveness and flow of the steps in the task.

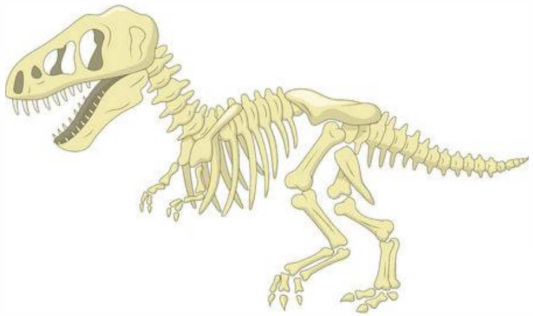
# Storyboard

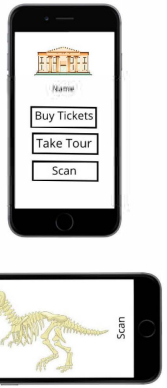



Hey there, I am Joseph. I am currently on a school trip to my local museum.

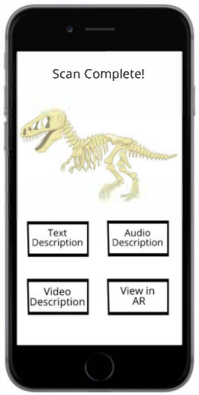


While touring the museum, I see a cool dinosaur I would like to know more about, and share with my friends.

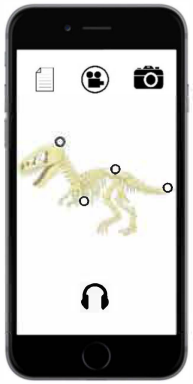





I download the app recommended by my teacher, and click on the scan option. This allows me to scan the dinosaur by just pointing my camera towards it.

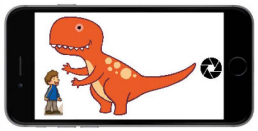



Once I scan the dinosaur, it gives me a bunch of options to choose from. I get to pick from several mediums of information including text, audio, video and AR. I'm interested in knowing what the dinosaur looked like when it was alive, so I select the View in AR option.



I can now click on points of interest on the display and gather more in-depth knowledge. I can also choose between audio, video and text information if I prefer one of the other mediums. Not only that, I now also have an option to take a picture of/with the museum display.

Since I want to share my experience with my friends, I am going to click on the camera icon.



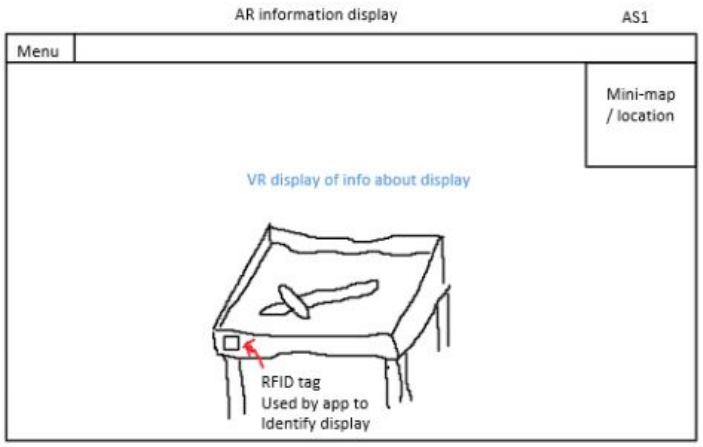

I can now take a picture with either a modified/animated version of the dinosaur or the original skeleton itself.

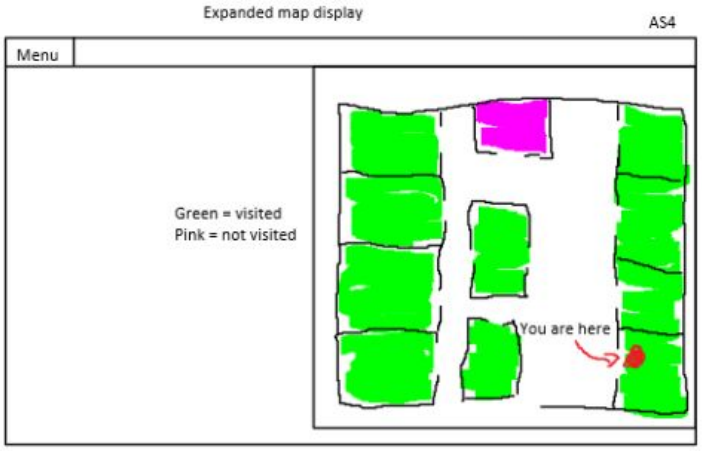
Once I take a picture with my favorite display at the museum, I am given an option to share that image across mutiple social media platforms.

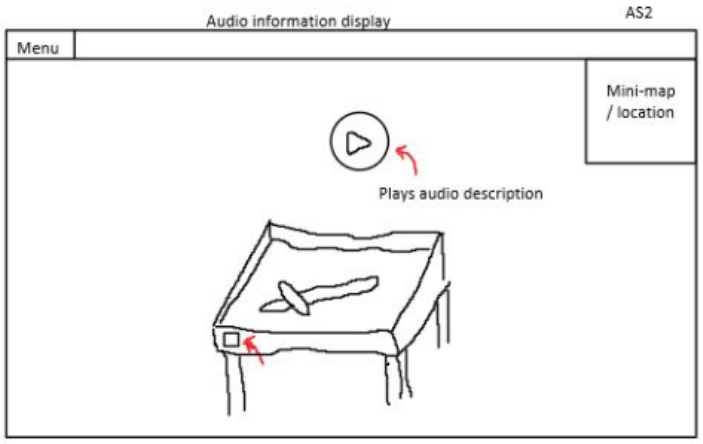
# APPENDIX

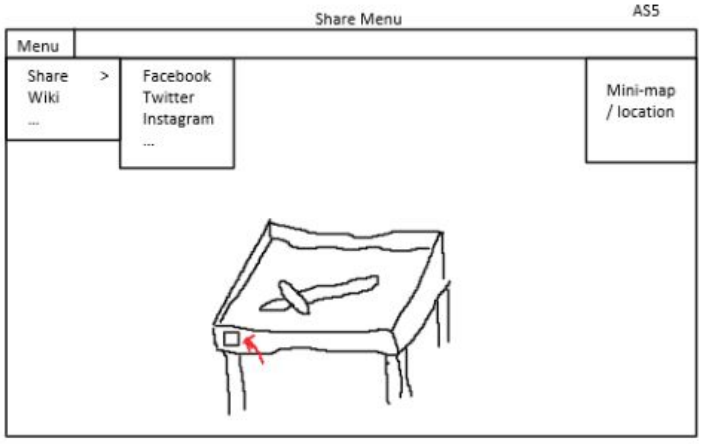
## Each Team Member's Individual Sketches

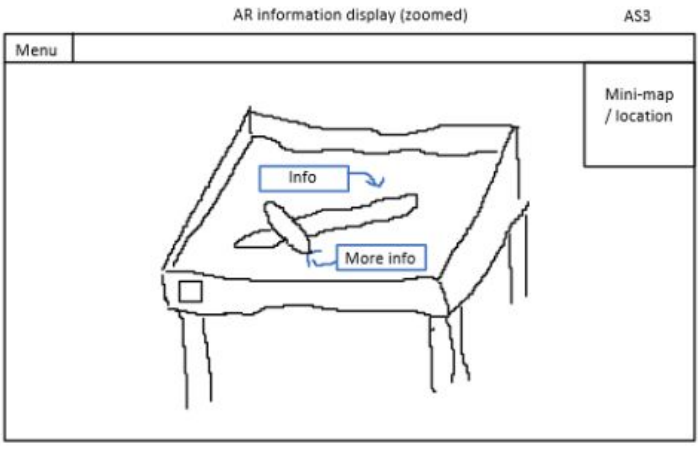
### ALEX STARK'S SKETCHES



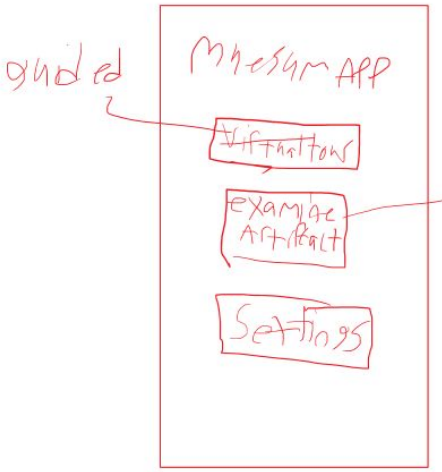



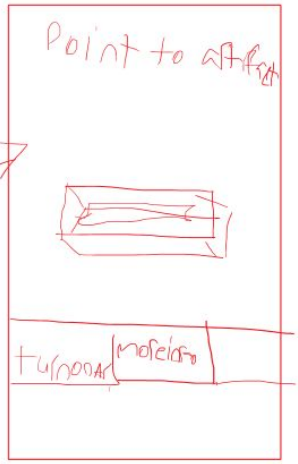



# AMIR HUSSAIN'S SKETCHES

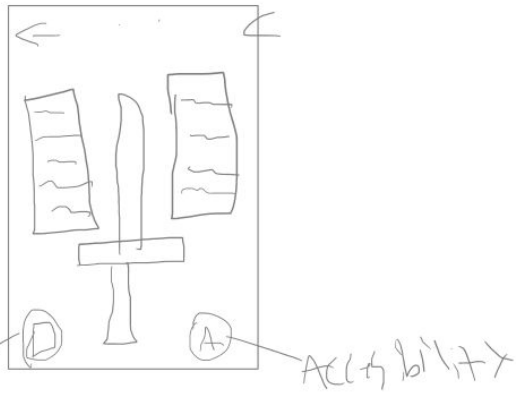
AH1: Welcome screen/UI
Basic not overwhelming not too much to look at



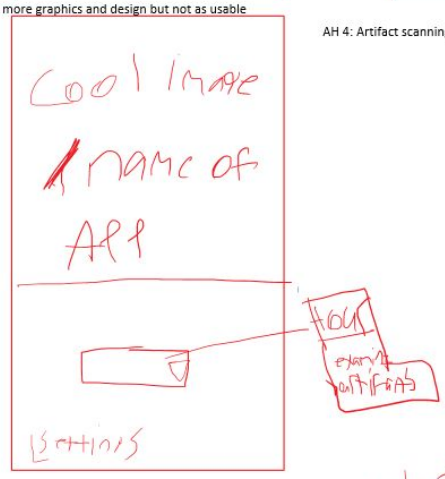

AH2: Scanning of artifact chose between AR more simplistic easy to read but not visually appeling



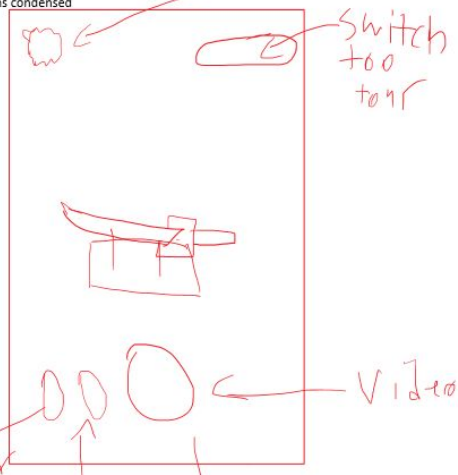

AH7: looking at an artifacts




H3: Home screen alternative more graphics and design but not as usable

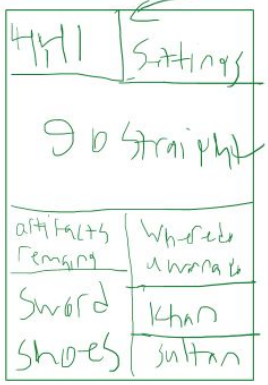



AH 4: Artifact scanning icons condensed



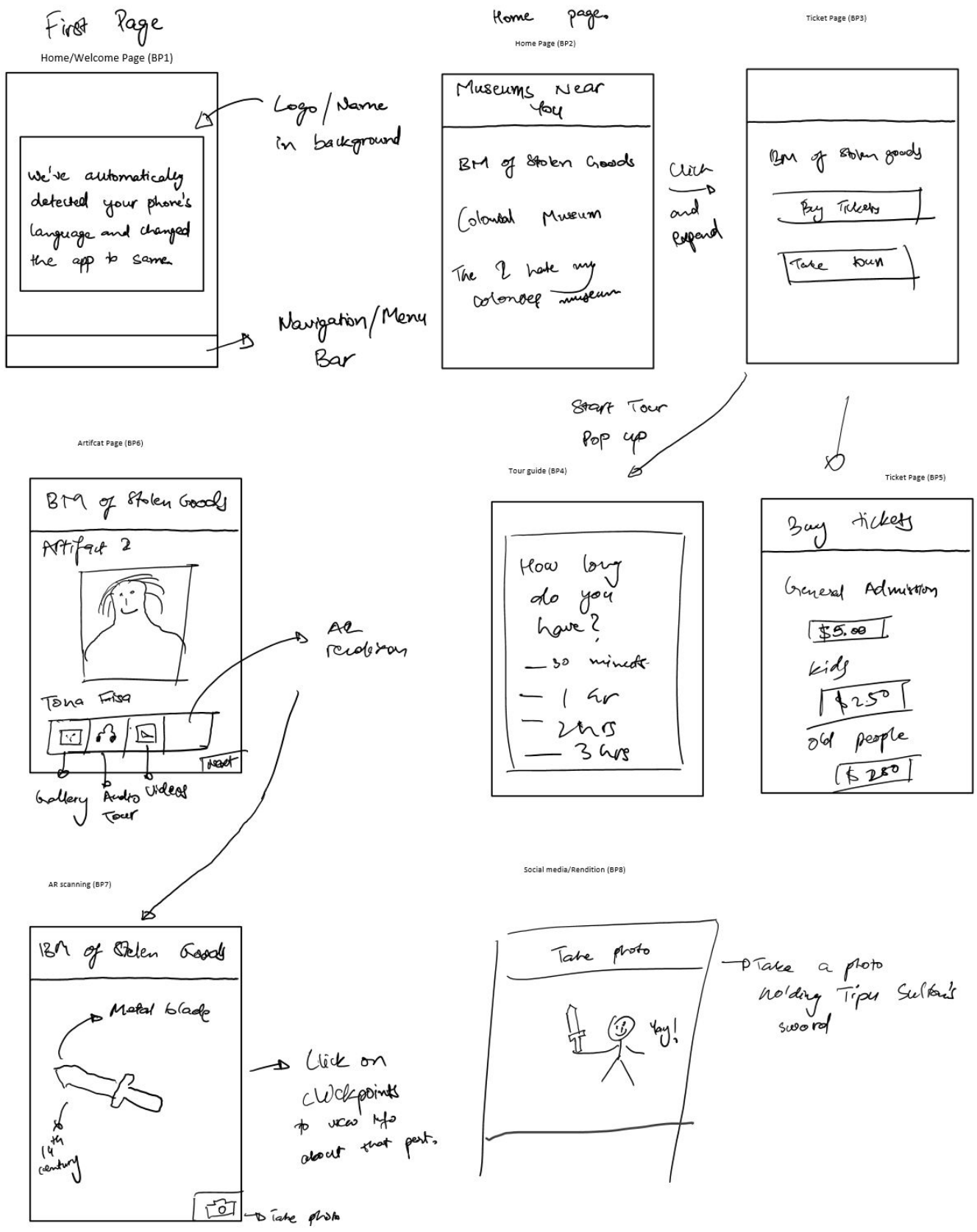


AH5: Virtual tour more visual less explanatory



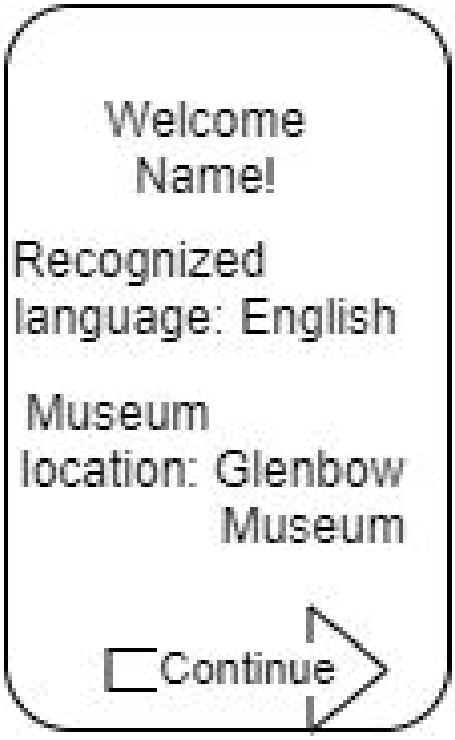

AH6: texted version of the virtual tour

## BHAVAN PAHUJA'S SKETCHES

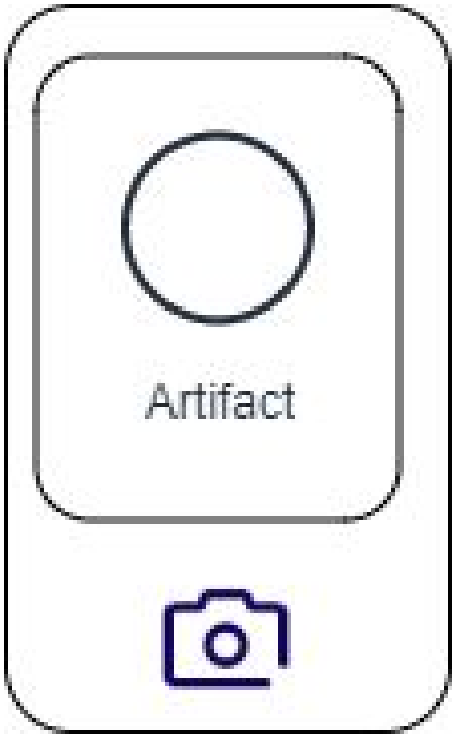


## ISRAA FAROUK'S SKETCHES

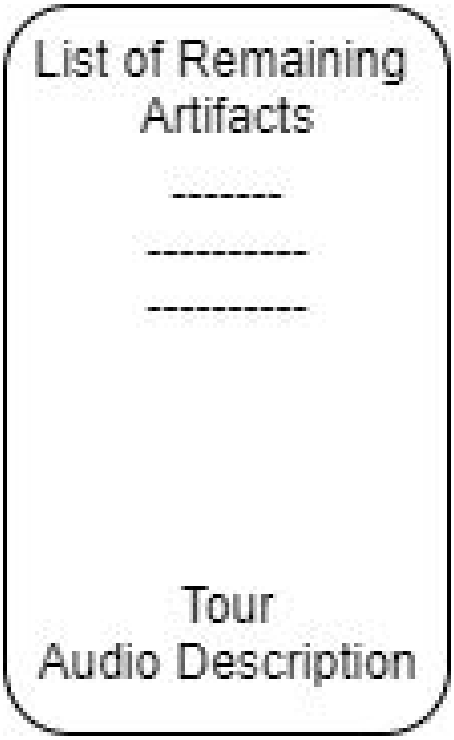
IF 1 Home Page



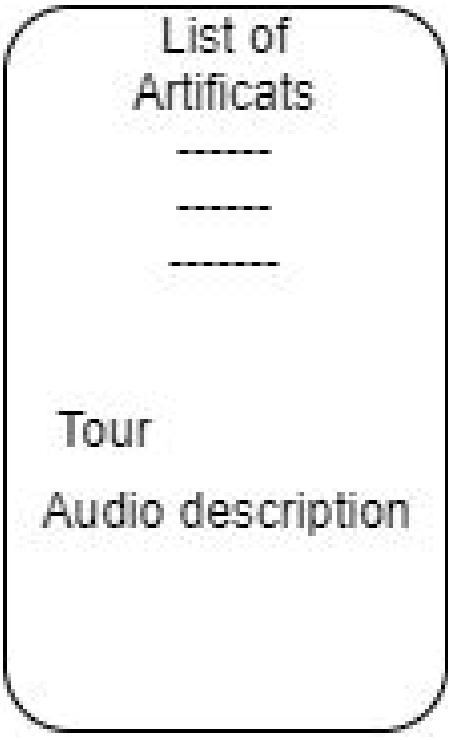

IF 2 Scanning Artifacts




IF 3 Unseen Artifacts



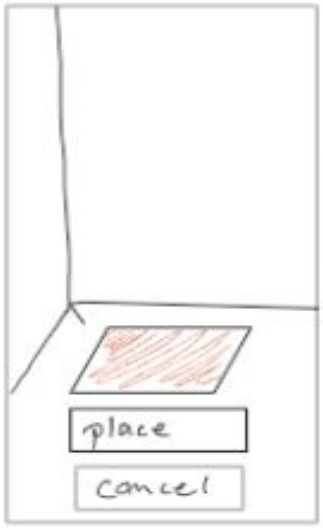

IF 4 All Artifacts



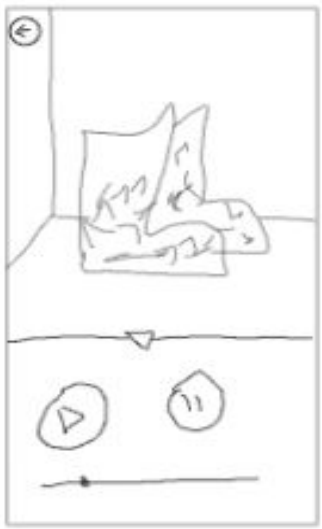
## JASON CHEN'S SKETCHES

Scanning Exhibit **JC1**


Placing the AR model **JC2**



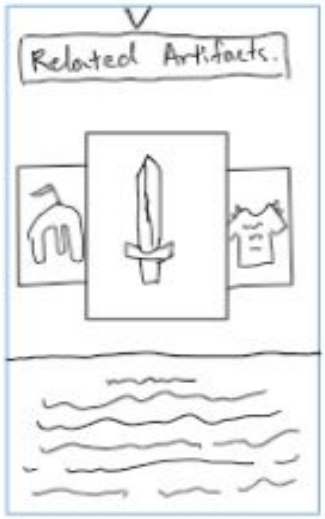

Audio description for the artifacts **JC3**



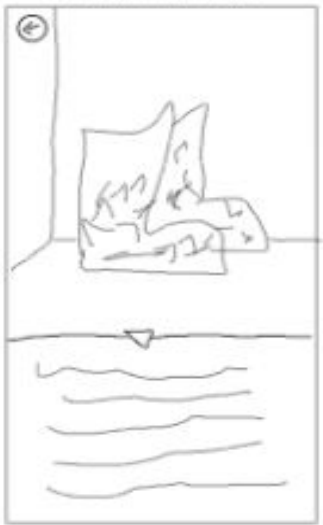
Information displayed in AR **JC4**

Animations of the artifact **JC5**

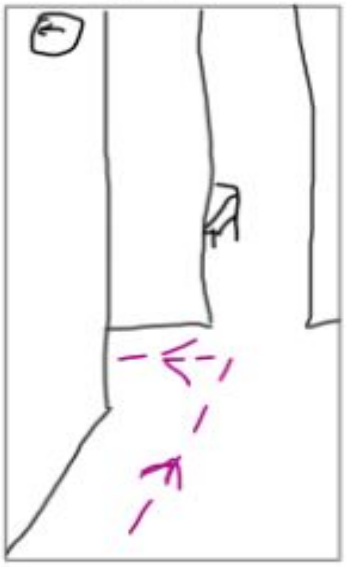

Related artifacts **JC6**




Text description of the artifact **JC7**

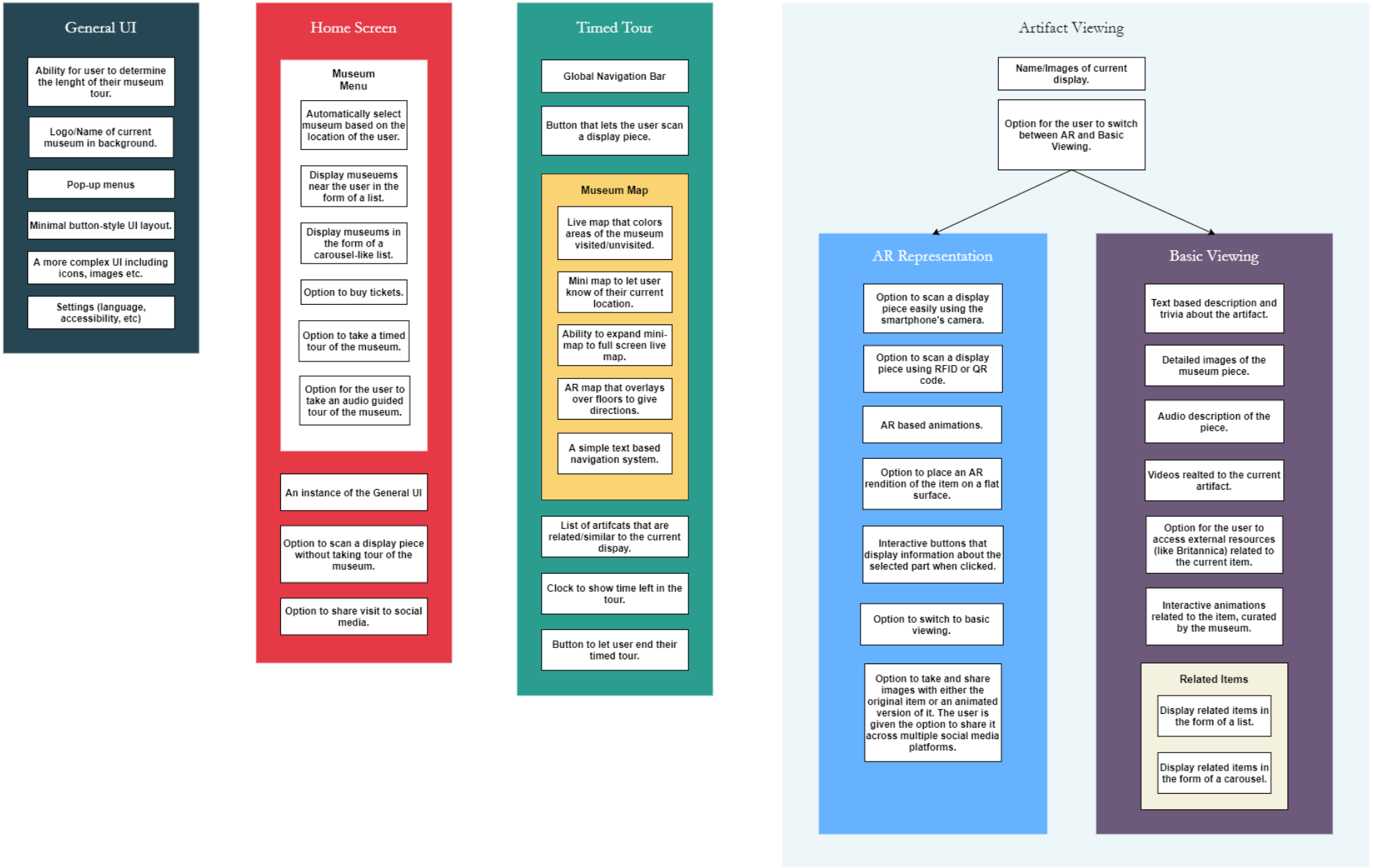


AR navigation **JC8**

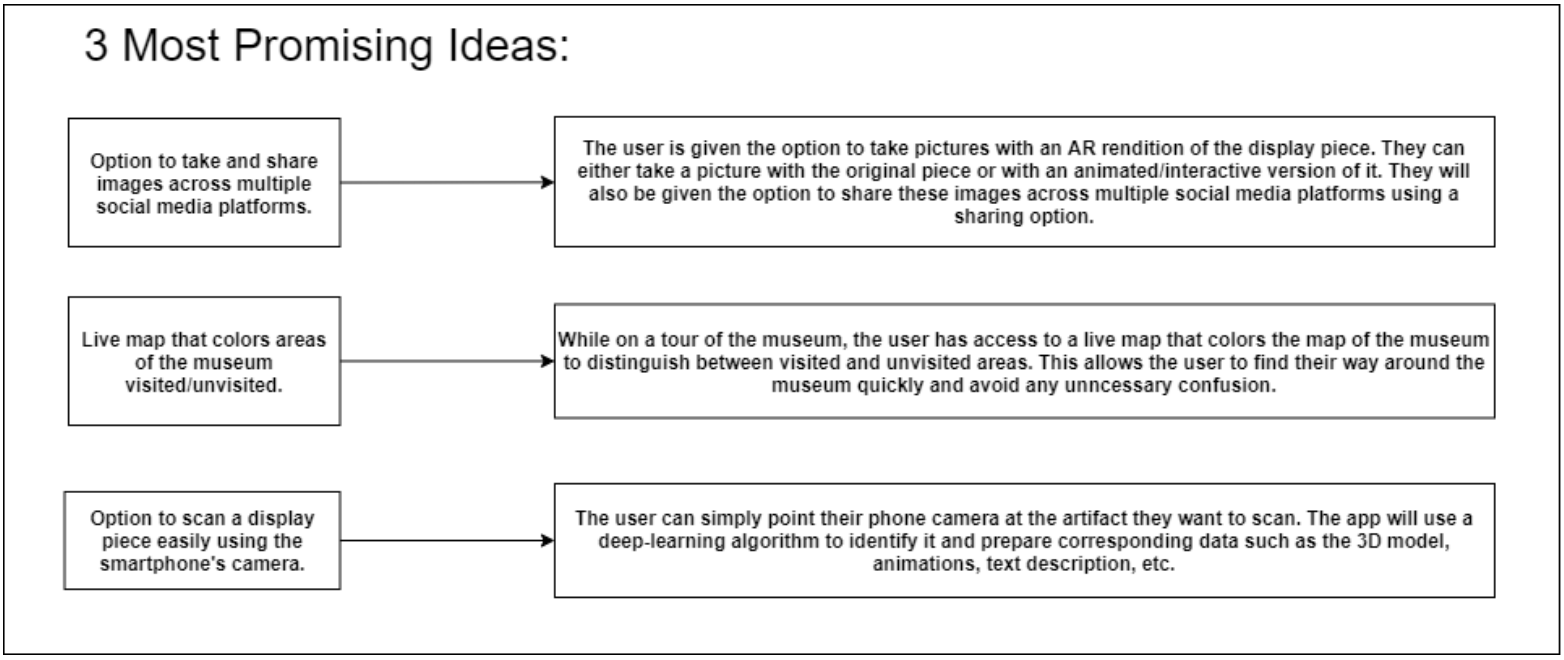


Options for the selected artifact **JC9**

# Affinity Diagram (Museum App)



## 3 Most promising ideas



# Cognitive Walkthroughs

TASK CENTERED DESIGN WALKTHROUGHS

## Task 1: Timed Tour

Fred Johnson has an appointment in two hours and wants to kill them time until then at a nearby museum. Since he wants to ensure that he is not late for his appointment he only wants to spend one hour at the museum. He notices a poster near the entrance that is advertising an app that allows him to see exhibits in AR (a technology that has always interested him) and has a timed tour option, but he does not have much experience downloading new apps onto his phone.

| Description of task step | Does user have training or knowledge to do this step? | Is it believable that they would do it? | are they motivated? | Comments (including possible solutions) |
|---|---|---|---|---|
| Download the app | No | Yes | Yes | User has little to no experience download new apps.<br><br>Possible Solution: Museum employees offer to help user install app. |
| Launch the app | Yes | Yes | Yes | |

| | | | | |
|---|---|---|---|---|
| Select the museum they are visiting. | No | Yes | No, user just wants to start viewing exhibits | User may not have location service turned on to find nearest museum.<br><br>Possible Solution: Have a guided walkthrough on the app show how to search for a museum. |
| Click the “Continue as Guest” button. | Yes | Yes | Yes | User does not want to waste time creating an account or logging in using social media, so he ignores those options. |
| Select Take a tour | Yes | Yes | Yes | As the user has a time constraint, he may wish to use this feature to ensure that he leaves on time. |
| Adjust hour hand to appropriate time he wants to leave | No, he may never have done something like this before | Yes | Yes | User may not be familiar with clock format time picker.<br><br>Possible Solution: Have a short description on how to use it appear on screen. |
| Adjust Minute hand to time you wish to stay | Yes | Yes | Yes | If user was able to adjust the hour, it is reasonable to assume to they can adjust the minute. |

| | | | | |
|---|---|---|---|---|
| Select Start tour | Yes | Yes | Yes | User may accidentally pick an incorrect end time for the tour.<br><br>Possible Solution: Have an extra confirmation pop-up to allow user to confirm the end time is correct. |
| Select an artifact based on interest | Yes | Yes | Yes | User may not see any artifacts that are interesting to them. |
| Select how you want to view the artifact | No | Yes | No, user just wants to look at the artifact in VR. | User may not understand what each symbol means and may not be able to read the small descriptions.<br><br>Possible Solution 1: User can simply test and see what each button will do.<br><br>Possible Solution 2: Have a small help pop-up for each option. |
| Select “Text Description” | Yes | Yes | No, user intended to view artifact in VR. | User clicked on wrong button to view the artifact.<br><br>Possible Solution: Make buttons larger/more spread out with larger descriptions. |

| | | | | |
|---|---|---|---|---|
| Select “Place artifact in VR” | Yes | Yes | No, user just wanted this without all the extra work. | Possible Solution: Have the app default to an AR display of the artifact. |
| Select the back button to go back to the tour page | Yes | Yes | No, user just wants to scan the next artifact. | Possible Solution: Have a button to scan a new artifact on the same page that you are displaying a scanned artifact. |
| End tour | Yes | No, he would just close the app and leave. | No, he would just close the app and leave. | Either time runs out or user selects the option to end the tour early. |
| 1. Event: Cannot find museum | | | | |
| Location not turned on | No | No | Yes | Going into the location settings can be difficult if you are not technologically advanced<br><br>Possible Solution: Create a small demo that the user can reference |

| | | | | |
|---|---|---|---|---|
| 2. Event AR not working | | | | |
| Not able to display AR | No | No | Yes | If there is not enough space to place the AR object It will error out. |

**Findings:** By examining this cognitive walkthrough, it is evident that we lead on the user a bit too much. People may want different things from a tour, and now we only account for one type customer; those who want to see artifacts in great details. Some may just want a vague description a small pop up explains the artifact, others may only want some information on the exhibit as a whole and not care too much about each individual artifact. We do not account for these possibilities and force the user to see it one way.

## Task 2: Virtual Map

Fred Johnson is coming back to this museum for the second time, the last time he came here he missed a couple of exhibits. He enjoys wandering on his own without a guide, however he wants to ensure he sees everything. He has heard that the museum has an app and plans to use it this time.

| Description of task step | Does user have training or knowledge to do this step? | Is it believable that they would do it? | are they motivated? | Comments (including possible solutions) |
|---|---|---|---|---|
| Download the app | No | Yes | No | Fred may not be able to locate the app in the app store.<br><br>**Possible Solution:** The Museum can have posters with links to the app and QR codes to help download it. |
| Launch the app | Yes | Yes | Yes | |
| Select the museum they are visiting. | No | Yes | Yes | Fred may not have location service turned on to select the correct museum. Have a guided walkthrough on the app on how to do so. |

| | | | | |
|---|---|---|---|---|
| Select the option to continue as guest | Yes | Yes | Yes | Fred will have to ignore the username, password, and social media log in pages to do so. |
| Select the Museum App button | Yes | Yes | Yes | Fred is not interested in any of the other features and he will only want to see the museum map. |
| Click on exhibits that he may not want to visit as to mark them out | No | No | Yes | There is no indication that clicking on the app would lead to the map being marked<br><br>**Possible Solution:** Have a note letting Fred know that |
| Walk to exhibits that interest him | Yes | Yes | Yes | Although he may complete the task successfully, he may not have known that as he visits an exhibit that it will be marked off in his map.<br><br>**Possible Solution:** Have a pop up that includes instructions on how to use the museum map. |
| 1 Event: Cannot find museum | | | | |

| | | | | |
|---|---|---|---|---|
| Location not turned on | No | No | Yes | Going into the location settings can be difficult if you are not technologically advanced<br><br>**Possible Solution:** Create a small demo that the user can reference |

**Findings:** From this cognitive walkthrough it is evident that we had many oversights in our prototype. No one wants to have to read instructions to use a certain app however sometimes it is necessary. As seen in this walkthrough the user is left to put a lot of pieces together on his own, things that way be intuitive for some, however to most it is more than likely to be unintuitive. This helped us see that perhaps we should add in some instructional boxes to help the user understand some things .

## Task 3: AR Display

John Doe is visiting a museum, upon entering the museum, he notices a poster informing him that he can use his smartphone's AR camera to scan the exhibits to unlock a variety of interactive options. He had some experiences with AR technology by the means of Pokémon Go, and he is interested in trying out new technologies. Therefore, he decides to download the app and try out the AR features.

| Description of task step | Does user have training or knowledge to do this step? | Is it believable that they would do it? | are they motivated ? | Comments (including possible solutions) |
|---|---|---|---|---|
| Download the app. | No | Yes | Yes | **Possible Solution:** Museum employees offer to help user install app. |
| Launch the app. | Yes | Yes | Yes | |
| Select the museum they are visiting. | No | Yes | Yes | User may not have location service turned on to select the correct museum.<br>**Possible Solution:** Have a guided walkthrough on the app show how to do so. |

| | | | | |
|---|---|---|---|---|
| Click the “Continue as Guest” button. | Yes | Yes | Yes | User does not want to waste time to login since he just wants to try out the AR options. |
| Select “Scan an Artifact”. | Yes | Yes | Yes | User wants to try out the AR function, therefore he is motivated to select the “Scan an artifact” button. |
| Points the phone at an artifact (A sword). | Yes | Yes | Yes | Since the user had some prior experiences with AR, he would know how to point the camera at an artifact.<br><br>**Note:** The camera may launch the frontal camera, in that case the user will have to adjust the camera to rear-view camera.<br><br>**Possible Solution:** Detect if the camera was launched in selfie mode, then prompt the user to switch to the rear-view camera. |
| Press the “Scan” button. | Yes | Yes | Yes | |
| Select “Place Artifact in AR” button. | Yes | Yes | Yes | User wants to see the AR interaction. Therefore, he would be motivated to press it to see the 3D model of the artifact. |

| | | | | |
|---|---|---|---|---|
| Moves the phone to scan for horizontal plane to place the 3D model. | Maybe not | Yes | Maybe not, user may just point the phone on the ground. | Although he had some prior knowledge of AR from Pokémon Go, he may not know that it needs a horizontal plane to place the 3D model. He may also dislike the fact that he must move the phone around, he may think it will look silly while doing so. |
| Press the “Place” button. | Yes | Yes | Yes | User is motivated to place the 3D model on the desired plane. |
| Select the view AR info button. | No | Yes | Maybe not | There is no text description of the button, it is just a button with an eye icon, and the user may not know what it means.<br><br>**Possible Solution:** Add text description to the buttons. |
| Select the tip of the sword. | Yes | Yes | Yes | User would like to read more about the details of the artifact. |
| Select the “Hide AR Info” button. | Yes | Yes | Yes | The icon changes from an eye to a “crossed-out” eye. Therefore, the user should be able to understand the implication. If not, then there is a possible solution.<br><br>**Possible Solution:** Like above, add text description to the button. |

| | | | | |
|---|---|---|---|---|
| Select the “View Animation” button. | Yes | Yes | Yes | After trying out the first option, the user would want to check out the rest of the AR options. Thus, it is possible for the user to select this button. |
| Select “Animation 2” button. | Yes | Yes | Yes | After realizing there are multiple animation options to be played, the user would want to view them all. |
| Select “Back” button. | Yes | Yes | Yes | User would like to go back to the default 3D model page to try out other options. |
| Select the “Play” button for audio description. | Yes | Yes | No | User is interested in AR interaction; Audio description is not in their interest. |
| Select the “Selfie” button. | Yes | Maybe | Maybe | The user may not be motivated to press the button because they will just take a screenshot of the 3D model since it lacks text description.<br><br>**Possible Solution:** Add text description to clarify the intention of the button. |

| | | | | |
|---|---|---|---|---|
| Press the "Camera" button to take a selfie with the 3D AR model of the artifact. | Yes | Maybe | Maybe | The user may not be motivated to take a selfie with the AR artifact model.<br><br>**Note:** Again, the camera may launch the incorrect camera. Thus, missing the artifact entirely.<br><br>**Possible Solution:** Notify the user the camera does not detect the artifact in frame. Prompt the user to either point the camera at the artifact or switch the camera from rear to front, or vice versa. |
| Share the selfie to one of the social media he choice. | Yes | Maybe | Maybe the user wants to retake the photo. | User may not want to share the picture he took on social media.<br><br>**Possible Solution:** Add a "Save to device" option for the user to save the picture taken locally. |
| **1. Error: App does not recognize the artifact due to suboptimal scanning condition.** | | | | |
| a. User scans the artifact from the back. | Knowledge low | Maybe | Yes | If the user scans the artifact from the back, the system may not recognize the artifact. It will force the user to relocate and attempt the scanning process again. |

| | | | | |
|---|---|---|---|---|
| b. User stands in suboptimal distance from the artifact. | Knowledge low | Maybe | Yes | If the user stands too far away/ too close to the artifact, the AR camera may not recognize the artifact due the size being too large/ small. Again, prompting the user to retry the scanning process. |
| **2. Error: Cannot find the museum** | | | | |
| Location not turned on | No | No | Yes | Going into the location settings can be difficult if you are not technologically advanced<br><br>**Possible Solution:** Create a small demo that the user can reference |

**Findings:** AR is not a common feature used by many apps in general, because of this we must assume people are not familiar with how it works. Since the knowledge of this is very low we have to at least have a tutorial option on how to use. It can be something completely optional, just something that pops up and lets you know that a quick tutorial on how to use the AR features is available. Without users will be lost and forced to figure it out on their own, this will lead to most users simply ignoring the feature. Therefore, a way to get the user familiar with AR is necessary.