



HIGH FIDELITY PROTOTYPE AND EXPERT EVALUATIONS

DECO7250: HCI - Linked Project Report 3



GROUP K

Pyae Phyo Kyaw 45238952

Aojie Xu 446766409

Shengnan Qi 45094493

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Feedback and Changes

The feedbacks from report 2 are essentially about not explaining the reason for usage of methods and concepts. So, in this report we included the justification for every method we use and every decision we made. Another feedback is about framing the report, how we did not pay much attention to the background of the iteration in previous reports. So, we focused on improving the framing by providing the purpose and progress of the project in context of the interaction design lifecycle. Next feedback is about linking properly, as we use vague language in report 2 to link concepts. So, we try to link the prototype with the conceptual design and UX profile using number linking. The last feedback from report 2 is that we did the establishing requirements stage incorrectly. So, we will include that last stage of the cycle 2 in this cycle.

Background

The purpose of this design project is to research and produce an interaction design for “Discovery” domain. We use the interaction design lifecycle model, which include stages such as establishing requirements, designing alternatives, prototyping, and evaluation. Those stages are done again and again in cycles (iterations) until the final product is out.

In the first cycle, we established initial requirements by researching UQ students using interviews, surveys, and observations. After that, we analyzed those data to get conceptual design v1, which is the initial mental model of our design team based on the analyzed data. Then, we create a paper prototype based on the conceptual design, so we can evaluate our mental model with actual users to see if there is a mismatch. According to the evaluation we did with the users, we saw many mismatches that need to be fixed in cycle 2.

In cycle 2, the feedback from report 1 indicated that our design needs a lot of work. So, we produced another conceptual model and another paper prototype since we were not sure that this one would match the users’ mental model either. (We use paper prototype again because they are cheap and easy to make or throw out). However, the evaluation of the new paper prototype indicated that our conceptual model is good enough to move on to the next stage. So, we update the conceptual model with new knowledge gained from the evaluation and also create a UX profile to identify the user experience goals of our design and how to achieve those goals. (UX goals are high-level objectives that aim to achieve user satisfaction and enjoyment when they use the system). After that, we create a medium fidelity prototype based on the UX profile v1 and conceptual model v3. Then, we continue to evaluate the prototype with target users using SUS method, Benchmark Evaluation method, Think Aloud method, and some survey questions. By doing these, we indicate which aspects of the conceptual design and UX Profile need improvements, and we listed them as the requirements for the next iteration.

Now, it is time for cycle 3. In this cycle, we will create a high fidelity prototype of the main interactions that a person will perform with our system. This prototype will effectively present both the proposed user interfaces as well as the core functionality of the application. We will also do the expert evaluation on our interaction design since all we do in the past is end-user

evaluation. We will use methods that are quick and cheap, which can help in identifying obvious usability issues. However, this design should also be tested with end-user since experts can miss problems that users may reveal and can make incorrect assumptions about what the end user knows or wants. So, here is our list of tasks that will be carried out in this cycle.

1. Establishing requirements based on the knowledge gained from previous iterations
2. Creating conceptual design v4, UX Profile v2, and the high fidelity prototype
3. Evaluating the prototype with experts as well as with users.
4. Propose requirements for release 2 based on the result of the evaluation

Establishing Requirements

According to the previous cycles, we identified that the goal of the user is to “save time and be productive” in the context of finding a study spot in UQ campus. We also identified what user values -

- Wanting to study in peaceful environment
- Wanting to study in university
- Wanting to know more information about a place
- Reducing hassles from their busy schedule
- Being worried about putting too much effort and wasting time unnecessarily
- Wanting to get personalize experience
- Wanting to see relevant information

In addition to that, we identified general concerns and interests such as –

- Performance and Accuracy
- Being able to know information in advance
- Being worried about not having productive day

Now, in this cycle 3, we want add more user needs and values by looking at analysis of the medium prototype evaluation.

“We found out that it takes too long and takes too many errors to do the first task because of the inability to find favorite button in the main screen. (People keep clicking on other things that makes the error count up). The log out button is also the problem because user takes longer than necessary find it.” (report 2 -> Benchmark evaluation -> Insight Gained)

“We found that people find it difficult to use Favourite feature because of the inability to find the mark as favorite button (average rating 2). We need to fix that button to something so it does not confuse the user anymore. Another thing we found out is that people don’t really like to log in and create account. They want to use the app directly. We have to find a way to

present activity log of the user without needing to create account.” (Report 2 -> UX Survey -> insight gained)

*“Why colors are different in these circles?”(#P1), “I’m confuse log out with search function”(#P2)
“navigate from the main screen is easier”(#P3), “I don’t really like to create account”(#P5)
(report 2 -> Think aloud evaluation)*

By looking at these statements, we could identify “Wanting clarity” as one of the human value since users want to see clearly which icons mean which feature, clearer positioning of the elements, and clear explanation about the different color usage. We can also identify another value, “Wanting to protect privacy” since user said they don’t want to create account which might mean they want to protect their privacy or they want to speed up the process of finding study spots.

“What if I check your app in my house and it said there is an available seat in UQ study room. Then, I commute to UQ and when I got there, the seat is already taken.” (HCI Studio5 – Tutor comment on our system)

By looking this comment, we could identify “Wanting to know the reliability of information” as another user value.

Designing Alternatives

As we have new user values, we need to update our conceptual design as well as UX profile to reflect the changes.

Conceptual Design v4.0

The conceptual design is the abstract model of our system that reflects the designer mental model as well as the user mental model. It includes three living documents such as system concept statement, design guidelines and system requirements. We have been updating the conceptual design whenever there is a new information about user wants and needs, and this is the fourth time updating since we got new user values such as “Wanting to get clarity”, “Wanting to protect privacy”, and “Wanting to know the reliability of information”.

System Concept Statement v4.0

| Components | Version 4.0 | Changes from v3.0 |
|---------------------------------------|--|---|
| One sentence problem statement | Design and develop an application to be used on a mobile device that detect user location, provide accurate information about study spots around them, provide ways to describe reliability of seat acquirement , and provide ways to access personalize results of study spots faster so | Update the statement to reflect the new value, “Wanting to know the reliability of information” |

| | | |
|-------------------------------|---|---|
| | user can find more relevant study spot that can help them to save time and be productive. | |
| High Level Description | <p>The system aims to provide list of nearby study spots with their availability information, room specifications, and ways to access personalize results of study spots faster with the objective of supporting the person to be more productive and save time.</p> <ul style="list-style-type: none"> - It will get real-time data of the availability of the study room by using algorithm that utilize CCTV feed from UQ Security Department. - It will get specification of the study spot by using information from UQ administration. - It will show the list of the study spots around the user by using the geographic location in the user phone. - It will include the map to navigate the user to the fastest route - It will include search bar to allow user to search for specific study spot. - It will include feature to filter/personalize the results. - It will show the activity log of the user by storing user's location history in their phone (offline, no need online account) | <p>Changed from requiring user account to offline storage of location data.</p> <p>Rationale -> "Wanting to protect privacy" is added to the human value so online account creation is removed from the system.</p> |
| Interaction Paradigm | Mobile | No change |
| Interaction Mode | Instructing | No change |
| Key Interface Metaphor | <ul style="list-style-type: none"> • Map • Left arrow head • Blue arrow head • Magnifying Glass • Funnel • Microphone • Heart | <p>Star is replaced with heart metaphor for favourite. ("Wanting clarity" user value.) Pencil metaphor is removed since there is no user profile to edit.</p> |

Design Guidelines v4.0

There are three addition to our design guidelines v3.0 - “Clarity” and “Privacy”, which reflect our new user values.

| Guideline v2.0 | Description |
|----------------------------|---|
| Performance | The design should allow user to do the task as fast as possible. |
| Accuracy | The information in the design have to be accurate. |
| Comprehensiveness | The design should provide information comprehensively. |
| Minimum Interaction | The design should let the user to finish the task with minimum interaction |
| Personalize | The design should allow user to be able to control the results he wants to see. |
| Quick Access | The design should contain shortcuts for user to access the desire content quickly. |
| Clarity | The design should contain clear metaphor, clear positioning, and clarification of confusing elements. |
| Privacy | The design should avoid features that can potentially threaten user privacy. |

System Requirements v4.0

The requirements 1 to 9 are all the same, and requirement 10 is added to reflect the user need – “Wanting to know the reliability of information”

| No. | Major Feature | Secondary Feature | Rationale |
|----------|---|--|---|
| 1 | Quick check on nearest study spots | Key interface needs to show list of study spots sorted by distance | The application will be used by a person who don't want to waste time by going to the place that is far away from him. |
| 2 | Information about availability at the chosen spot | The information should be updating in real-time | The application will be used by a person who wants to know how much space is available for him to study so he can avoid. |
| 3 | Specification of the study spot | The specification should help user to decide whether the place is suitable for him. | The application will be used by a person who wants make better decision about choosing the study spot so they can have productive time. |
| 4 | Map of the UQ Campus | The map should represent the UQ campuses and pin point the location of the study spot. | The application will be used by a person who wants to get to the study spot as soon as possible. |

| | | | |
|----|---|---|---|
| 5 | Navigation to the study spot | The map should show user's location, study spot location, and fastest route to the study spot. | The application will be used by a person who wants to get to the study spot as soon as possible. |
| 6 | Search for known study spot | Voice typing for faster search | The application will be used by a person who wants to quick check the availability of the specific study spot |
| 7 | Filter unwanted results from the list | The interface should show hide/unhide option for study spots with features such as 'available seats', 'group/individual spots', 'computer availability', and 'accessibility'. | The application will be used by a person who wants to get relevant results. |
| 8 | Access study spot from activity log | Each user should have unique activity log | The application will be used by a person who wants to check where he went in the past. |
| 9 | Access bookmarked study spot | The design should allow user to bookmark the study spot or remove bookmark from the study spot | The application will be used by a person who wants to quick check the information about study spot he bookmarked. |
| 10 | Check the reliability of seat acquirement | Key interface should inform user about how reliable the study spot information is to acquire the seat | The app will be used by a person who wants to know how much he can rely on the app to get a seat in a study spot |

UX Profile v2.0

The UX profile includes user experience goals, which are high-level objectives of our system to supposedly get user satisfaction and enjoyment. Those goals are specific, measurable, actionable, relevant and trackable. So, it is good for the system to have UX profile that can measure and track user experience, which we can improve in the following iterations.

In this cycle 3, the UX goal 1 to 8 are the same from previous one, but with a little changes. In addition, UX Goal 9 and 10 are added to comply with user values "Wanting clarity" and "Wanting to know reliability of the information".

| No. | UX Goal | Measures | Content and Features/Functionalities |
|-----|---|---------------------------------|---|
| 1 | I want to find the study spots around me as well as the | Number of clicks on links for – | <ul style="list-style-type: none"> Multiple study spots around user location |

| | | | |
|---|--|---|--|
| | specifications to determine whether it fits my purpose and available to me. | <ol style="list-style-type: none"> 1. Navigate directly from the list screen 2. To see more information <p>Survey Question: “This page contains enough information for me to choose the study spot” “I don’t have to look for more info to choose the study spot”</p> | <ul style="list-style-type: none"> • Information about the study spot • Information about available seats • Distance information that is relevant to user’s current location • *All shown in a single page |
| 2 | I want to find out more about the study spot so I can visualize the study spot even before I am there. | <p>Survey Question: “I can visualize the actual study spot by looking at more info” “Pictures help me to decide which study spot should I go”</p> | <ul style="list-style-type: none"> • Image of the study spot to help in visualization • Comprehensive information about the study spot that could give user more knowledge to visualize |
| 3 | I want to control which type of study spots I like to see in the main screen | <p>Number of clicks on “Filter” button</p> <p>Survey Question: “It is useful that I can hide some results that I don’t want to see” “It is interesting to see filter button in the main screen”</p> | <ul style="list-style-type: none"> • Feature to filter out the study spots according to user’s specification • Filter icon in main screen to be more interesting to look at |
| 4 | I want to quick check the study spot I usually go for available seats | <p>Number of clicks on “Favorite List”</p> <p>Survey Qs: “I can look up the availability of the favorite study spot faster than browsing for it” “I can easily mark the study spot as favorite”</p> | <ul style="list-style-type: none"> • Feature to bookmark the study spot • Quick access to the bookmarked spot • Search Function • Voice Search Function |
| 5 | I want to use my favorite map application to navigate to the study spot | <p>Survey Qs: “The use of third-party map is easier than learning a new map interface”</p> | <ul style="list-style-type: none"> • Feature to open up the third-party map app • Feature to send user-selected study spot location from our app to the third-party app |
| 6 | I want to know which study spots I visited in | <p>Number of clicks on “Activity Log”, “Clear Activity Log”</p> | <ul style="list-style-type: none"> • Store user location history offline |

| | | | |
|----|--|--|---|
| | the past to re-visit the old spot. | Survey Qs: “This page contain enough information to know where I was at the point of time in the past” “On this page, it is easy to find the place I went in the past” | (changed from storing in online user account to storing in user device) <ul style="list-style-type: none">• Present activity log to the user |
| 7 | I want to avoid going in front of the study room that I can’t get in because the building is only for certain faculty. | Number of time user change the default setting. Survey Qs: “I want to hide the study spots I can’t access” | <ul style="list-style-type: none">• Option to hide the study spots that user can’t access (changed from default since user no longer predefine their user info) |
| 8 | I want to use the design that is not boring and dull | Survey Qs: “The design is somewhat interesting” “I think the design is attractive” | <ul style="list-style-type: none">• Distinguish content with colors and shapes |
| 9 | I want to see the explanation about uncommon metaphors, so that I don’t have to guess the meaning of them | Number of clicks on “Help” button. Survey Qs: “The explanation help me to understand color metaphor” | <ul style="list-style-type: none">• Help option• Mini user manual |
| 10 | I want to know the reliability of information so I can make better judgement when choosing the study spot | Survey Qs: “The color coding help me in choosing study spot” | <ul style="list-style-type: none">• Color coding to provide how sure it is for user to get a seat in a certain study spot |

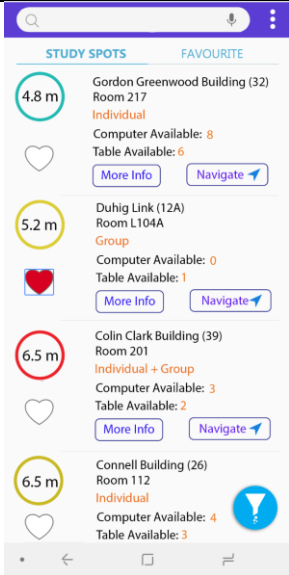
Prototyping

High Fidelity Prototype

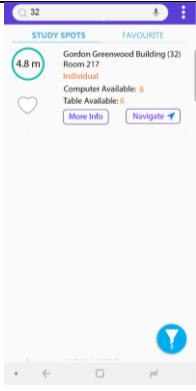
A high-fidelity prototype represent very closely to the working software in terms of details, functionality and interaction flow. This level of prototype are very useful in evaluating UI, UX and core functionalities of the intended system.

In this section, we will explain in detail about our high fidelity prototype in relation with our conceptual design and UX profile. The prototype use dummy data that reflects the real data but not dynamic like real data.

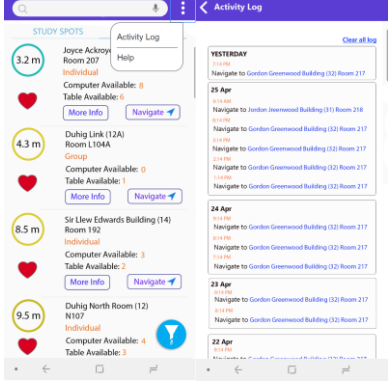
Study Spots List

| UI | Functionality | Rationale |
|--|---|--|
|  | <p>As soon as user open the app they can see the list of study spots sorted by the distance with their availability status as well as type of the spot. In addition, user can see the distance and colored circles which indicate the probability of user getting a seat in that study spot if they start to go at that time.</p> | <ul style="list-style-type: none"> • User can quick check on the nearest study spot. • User can know the availability status at a glance. • User can check whether the study spot type is suitable for their needs. • User can know how much they can rely on the study spot availability. <p>(These are all comply with Conceptual Design -> System Requirements -> 1,2,3,10) (Also comply with UX Profile -> UX Goal -> 1,8,10)</p> <p>Design Guidelines</p> <ul style="list-style-type: none"> • Performance (The main screen pop up as soon as user open the app -> Fast, No Loading Screen, No log in require) • Accuracy (Show how many computers, tables are available accurately) • Minimum Interaction (Can navigate to a place in one click) • Clarity (Clear positioning of menu button, clear use of favourite icon) |

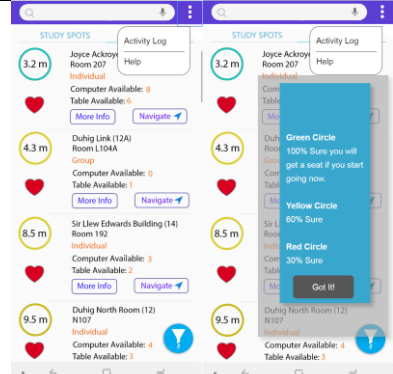
Search

| UI | Functionality | Rationale |
|---|---|---|
|  | <p>User can search by typing building name or number in the search bar on the top of the main screen. They can also use</p> | <ul style="list-style-type: none"> User can search for desire spot <p>(Comply with Conceptual Design -> System Requirements -> 6) (Also comply with UX Profile -> UX Goal -> 4)</p> <p>Design Guidelines</p> <ul style="list-style-type: none"> Quick Access (Search bar helping to quickly access to the study spot) |

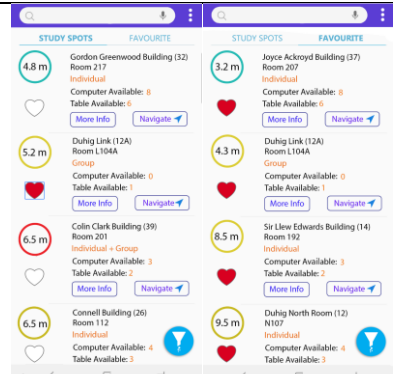
Activity Log

| UI | Functionality | Rationale |
|--|---|---|
|  | <p>User can click on menu option that located at the top right corner of the main screen, separated from the search bar. Then they can access the activity log by clicking of the “Activity Log” menu item.</p> | <ul style="list-style-type: none"> User can find and access the study spot where they went before in the past. User can clearly see the menu option and not confuse <p>(Comply with Conceptual Design -> System Requirements -> 8) (Also comply with UX Profile -> UX Goal -> 6)</p> <p>Design Guidelines</p> <ul style="list-style-type: none"> Quick Access (User can access a study spot from their history) |

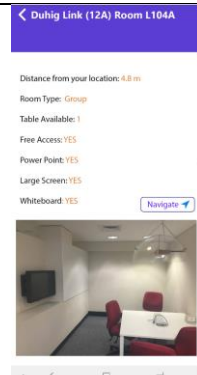
Help

| UI | Functionality | Rationale |
|---|---|--|
|  | User can click on menu option that located at the top right corner of the main screen, separated from the search bar. Then they can learn about the meaning of the color by clicking of the “Help” menu item. | <ul style="list-style-type: none"> User can find out about the meaning of the meaning of the circle color by non-distractive way. (Comply with UX Profile -> UX Goal -> 10) |

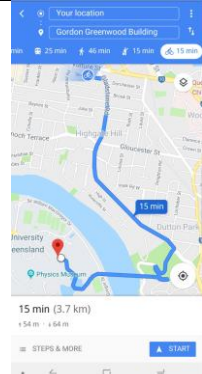
Favourite

| UI | Functionality | Rationale |
|--|---|---|
|  | User can click on heart icon near a study spot to mark that spot as a favourite. Then user can access that spot later from the favourite tab. | <ul style="list-style-type: none"> User can quick access to their favourite spot. (Comply with Conceptual Design -> System Requirements -> 9) (Also comply with UX Profile -> UX Goal -> 4) Design Guidelines <ul style="list-style-type: none"> Quick Access (access quickly from favourite tab) |

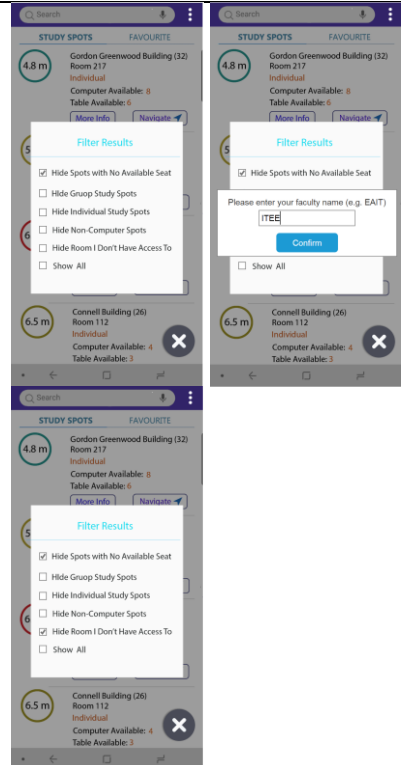
More Info

| UI | Functionality | Rationale |
|---|---|---|
|  | User can click on “More Info” button in the main screen to learn more about the study spot. User can see the services offer as well as the picture of the spot. | <ul style="list-style-type: none"> User can see the specification of the study spot. User can visualize before they arrive to the study spot. (Comply with Conceptual Design -> System Requirements -> 3) (Also comply with UX Profile -> UX Goal -> 1,2) Design Guidelines <ul style="list-style-type: none"> Comprehensiveness (Provide full spec) |

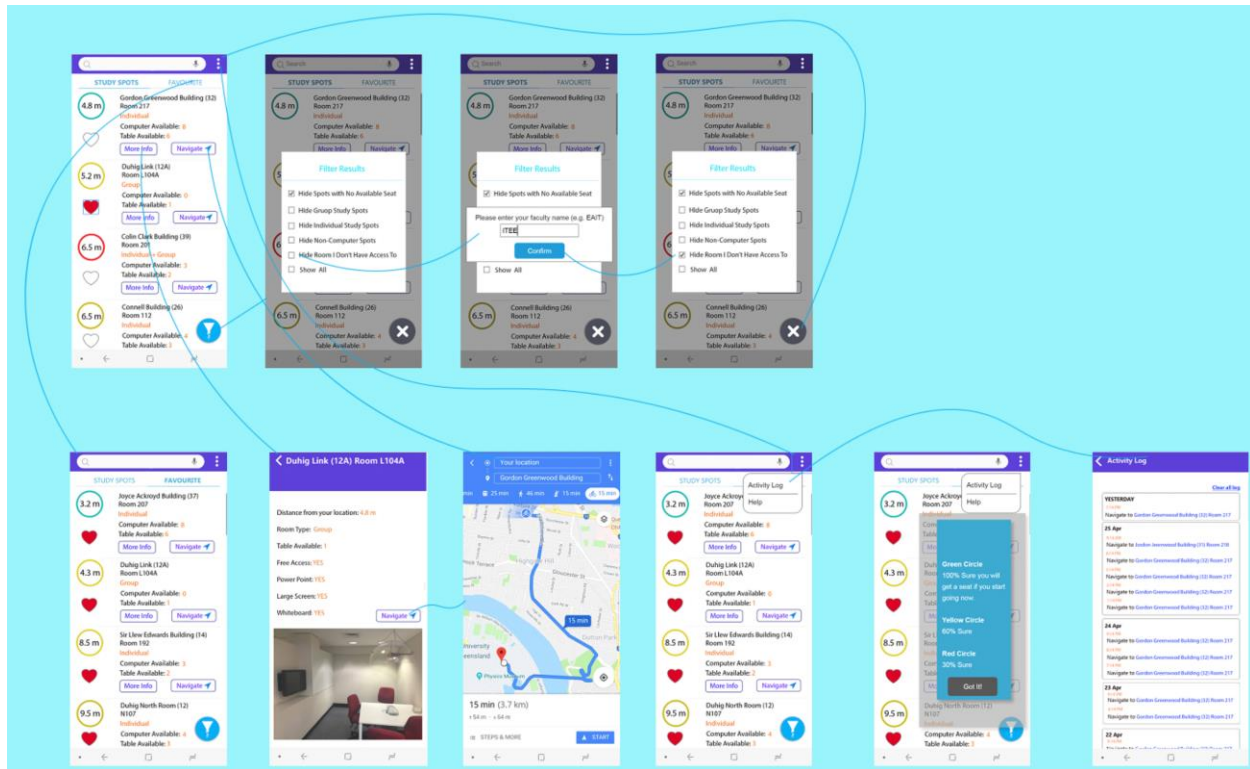
Navigation

| UI | Functionality | Rationale |
|---|---|---|
|  | <p>User can click on “Navigate” button in the main screen to view the path to the study spot using third party Map app.</p> | <ul style="list-style-type: none"> User can navigate to the study spot. User can use their personal map app. <p>(Comply with Conceptual Design -> System Requirements -> 4,5) (Also comply with UX Profile -> UX Goal -> 5)</p> |

Filter

| UI | Functionality | Rationale |
|--|--|---|
|  | <p>User can click on funnel icon in the main screen to get the filter option. They can hide study spots from the main screen that are not relevant to them by clicking on check boxes. In addition, they can hide the study rooms that they don't have access to, but they need to fill their faculty name if they want to use this feature. The cross icon will save the filter setting and close the dialog.</p> | <ul style="list-style-type: none"> User can choose to see relevant study spots only (Comply with Conceptual Design -> System Requirements -> 7) (Also comply with UX Profile -> UX Goal -> 3,7) <p>Design guidelines</p> <ul style="list-style-type: none"> Personalize (options to hide study spots that are not relevant to user, hide buildings that are not accessible by user's credential) Privacy (no user information is collected. Just the faculty name) |

Interaction Flow



Prototype Link and QR Code



<https://mscktq.axshare.com>

Evaluating Prototype

According to the interaction design lifecycle model, it is time to evaluate our high fidelity prototype. We use Expert evaluation as well as User evaluation to gain insight about usability issues and user experience before the production of release 2.

Expert Evaluation

In this section, we did the expert evaluation for our system since this type of evaluation methods are better than testing with the actual end users to inspect usability issues. This is because experts are more knowledgeable in application domain and usability, and there are fewer ethical and practical issues to consider when using the experts.

The evaluation is done with the help of fellow HCI students who are experts in usability. We contacted and invited Team Madara and Team AI (8 people total) to evaluate our system. (appendix #1) We asked them to use two evaluation methods to evaluate our system, Pluralistic Walkthrough and Heuristic Evaluation.

Pluralistic Walkthrough

Purpose: The reason for choosing Pluralistic Walkthrough is that it focuses strongly on user's task at a detail level, which means we can detect critical usability issues early on before releasing the system.

Method: We referred to the chapter 15 of "Interaction Design beyond HCI" to do this walkthrough.

"In a pluralistic walkthrough, each of the evaluators is asked to assume the role of a typical user. Scenarios of use, consisting of a few prototype screens, are given to each evaluator who writes down the sequence of actions they would take to move from one screen to another, without conferring with fellow panelists. Then the panelists discuss the actions they each suggested before moving on to the next round of screens. This process continues until all the scenarios have been evaluated" (Bias, 1994 cited in Preece et al., 2015).

First, we present the PowerPoint slide to show the screen elements from our system (appendix #8). Then we briefly explained what our system is about, and we gave out the scenarios to walkthrough.

Scenario 1 – Utilize search bar to navigate to building 32 room 217

Scenario 2 – Mark Duhig Link L104A as favourite and go to favourite tap, find out the detail of that room

Scenario 3 – Check the activity log, go back, and find out the meaning of the color circles

Scenario 4 – Navigate to the nearest study spot with 8 available computers

Scenario 5 – Hide study spots that are not accessible by user

Finally, we follow the method mentioned above. After all scenarios had been evaluated, the experts tell us about their suggestions and possible issues in interaction flow and design.

Results: “We found that the interaction flow is simple and straight to the point. The design is easy to look at and somewhat attractive. However, there are some use of words that you can improve like “Hide Room I Don’t Have Access To” which is a little bit vague and can be misunderstood. We also want to point out that user may never click on “Help” button since they think they got all the features. They may not know color coding is a feature in the app. Another point we want to make is that your design does not have logo or app name in any screen. Overall, we think your app is useful and easy to use.”

(Raw data can be found in appendix #3)

Heuristic Evaluation

Purpose: To determine whether our UQSpot app meets a (minimum) standard of usability.

Method: We continue to do the heuristic evaluation after doing the pluralistic walkthrough. We use the same scenarios as before, but now experts have access to interactive high-fi prototype. We gave out evaluation sheets to each expert and ask them to do the following –

- Use scenarios to walk through the user interface
- Mark usability issues on a form
- Categorize usability issues using Nielsen’s heuristic principles
- Rate severity of usability issues.

After that all experts work together to prioritize problems for designers and developers to solve.

Result: UQSpot Heuristic Evaluation Summary Table

| Screen Description | Usability Issue | Heuristic category | Probable effect on user | Severity Rating |
|---|---|---------------------------------|---|-----------------|
| Search | After searching how to return to main list? | User control and freedom | User might confuse/ can’t continue | 3 |
| Overall Navigation | Missing breadcrumb navigation | User control and freedom | User may not sure where they are at the point. | 0 |
| Filter (Hide study spot I don’t have access to) | Unclear wording | Match System and the Real world | User may confuse about what it means. | 1 |
| Help | Better wording could be used here. | Help and Documentation | User may never click on help button because they won’t know | 1 |

| | | | | |
|----------------------|--|-----------------------------|---|---|
| | | | color coding is a feature | |
| Study spots list | Scrolling is not working. | Visibility of system status | Might not be able to browse the list | 4 |
| Study spots list | What will be displayed when user refresh the list? | Visibility of system status | User might not know the information is updated or not | 4 |
| Study spot more info | What will be displayed when user click on picture? | Visibility of system status | User might not see clearly if he can't zoom in. | 3 |

(Raw data can be found in appendix #4)

User Evaluation

In expert evaluation, there are some disadvantages such as expert missing important user problems, identifying trivial problems, or having false alarms. Also, UX goals are not measured in expert evaluation, so we did a user evaluation with 5 participants using high-fi prototype. (appendix #5, #6)

UX Survey v2.0

The UX survey is used to measure and track our goals in UX Profile. In cycle 2, we got low rating on “favourite” feature and “account” feature (log in, log out). But, in this cycle 3, everything looks very well except for visualizing the study spot. We asked the participants why they somewhat agree on this, and they said they can't visualize the place by looking at one photo. There should be many photos or may be a VR experience.

| Feature Name | Question | P1 | P2 | P3 | P4 | P5 | AVG |
|---|---|----|----|----|----|----|-----|
| Study Spots List (Main Screen) | This page contains enough information for me to choose the study spot | 4 | 4 | 4 | 4 | 4 | 4 |
| | I don't have to look for more info to choose the study spot | 4 | 4 | 4 | 4 | 4 | 4 |
| More Info about each study spot | I can visualize the actual study spot by looking at more info | 3 | 3 | 3 | 3 | 4 | 3.2 |
| | Pictures help me to decide which study spot should I go | 4 | 3 | 4 | 4 | 5 | 4 |
| Filter feature | It is useful that I can hide some results that I don't want to see | 4 | 5 | 4 | 3 | 3 | 3.8 |
| | It is interesting to see filter button in the main screen | 3 | 4 | 4 | 4 | 4 | 3.8 |
| Mark as favourite feature | I can look up the availability of the favorite study spot faster than searching for it | 4 | 4 | 5 | 4 | 5 | 4.4 |
| | I can easily mark the study spot as favorite | 4 | 4 | 4 | 4 | 5 | 4.2 |
| Map | The use of third-party map is easier than learning a new map interface | 3 | 4 | 3 | 3 | 4 | 3.4 |
| Activity Log | This page contain enough information to know where I was at the point of time in the past | 4 | 4 | 3 | 4 | 5 | 4 |
| | On this page, it is easy to find the place I went in the past | 4 | 3 | 4 | 3 | 4 | 3.6 |
| Default hiding for inaccessible spot in filter | I want to hide the study spots I can't access | 4 | 5 | 5 | 4 | 5 | 4.6 |
| Overall Design | The design is somewhat interesting | 4 | 4 | 4 | 4 | 4 | 4 |
| | I think the design is attractive | 4 | 3 | 4 | 3 | 4 | 3.6 |
| Help Feature | The explanation help me to understand color metaphor | 4 | 4 | 4 | 4 | 3 | 3.8 |
| Reliability Color Coding | The color coding help me in choosing study spot | 4 | 5 | 5 | 3 | 4 | 4.2 |
| (Notes: 1= Strongly Disagree, 2=Disagree, 3=Somewhat Agreee, 4=Agree, 5=Strongly Agree) | | | | | | | |

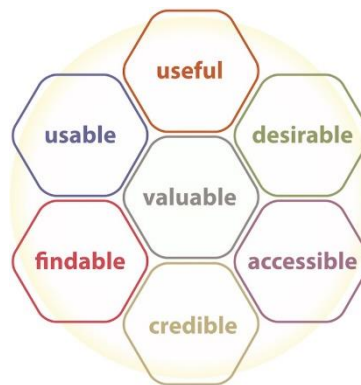
SUS v2.0

The System Usability Scale (SUS) is used to reliably measure usability of the high-fi prototype. In cycle 2, we got average 73.75. Now, in cycle 3, the number increase to 80 which is a good sign for our usability. However, Q.8 has higher score than before because of the slow server and some errors in search. (Our prototype software does not support simulating search feature.)

| No. | System Usability Questions | P1 | P2 | P3 | P4 | P5 | |
|-----|---|------|----|------|----|----|----------------|
| 1 | I think that I would like to use this system frequently. | 4 | 3 | 1 | 4 | 4 | |
| 2 | I found the system unnecessarily complex. | 1 | 1 | 1 | 1 | 1 | |
| 3 | I thought the system was easy to use. | 4 | 4 | 5 | 5 | 4 | |
| 4 | I think that I would need the support of a technical person to be able to use this system | 1 | 1 | 1 | 1 | 1 | |
| 5 | I found the various functions in this system were well integrated. | 3 | 4 | 5 | 4 | 4 | |
| 6 | I thought there was too much inconsistency in this system. | 1 | 2 | 2 | 1 | 1 | |
| 7 | I would imagine that most people would learn to use this system very quickly. | 5 | 3 | 3 | 3 | 4 | |
| 8 | I found the system very cumbersome to use. | 3 | 2 | 3 | 3 | 2 | |
| 9 | I felt very confident using the system. | 4 | 3 | 5 | 5 | 4 | |
| 10 | I needed to learn a lot of things before I could get going with this system. | 1 | 1 | 1 | 1 | 1 | |
| | SUS Raw Score | 33 | 30 | 31 | 34 | 34 | Average |
| | SUS Final Score | 82.5 | 75 | 77.5 | 85 | 85 | 80 |

UX Progress

We have done a lot of evaluations throughout the design lifecycle and now it is nearly the end. So, we want to use UX Honeycomb created by Peter Morville as a checklist of our UX progress, and see where we are and what we need to improve.



<https://intertwined.org/user-experience-honeycomb/>

- ➔ According to our last SUS testing, we got 80 which means our app has excellent usability. (Usable)
- ➔ According to our pluralistic walkthrough result, our app is useful. (Useful)
- ➔ There is a UX goal question in a UX Survey which asked about overall design, and all the participants agree it is interesting and attractive. (Desirable)
- ➔ We didn't identify any user needs about accessibility, so there was no evaluation for it. We need improvement on this area. (Accessible)
- ➔ We did the ethical disclaimer (appendix #6), and we will take responsible for things that is in the disclaimer. (Credible)

Establishing Requirements

After everything we have done, it is time to revisit the user goals, needs, values, and context of use. The following are the requirements up to this point -

User Goals: To save time and be productive

Context: When finding study spot in UQ/ When they want to study/ When they want a quiet place

User Values:

- Wanting to study in peaceful environment
- Wanting to study in university
- Wanting to know more information about a place
- Reducing hassles from their busy schedule
- Being worried about putting too much effort and wasting time unnecessarily
- Wanting to get personalize experience
- Wanting to see relevant information
- Wanting clarity
- Wanting to protect privacy
- Wanting to know the reliability of information

User Concerns/ Interest:

- Performance and Accuracy
- Being able to know information in advance
- Being worried about not having productive day

Future Recommendation: What needs to be improved to meet the user needs?

Search Feature: The purpose of the search feature is to save time when finding the study spot. However, due to the limitation of prototyping software, it is causing confusion to the user by not displaying full list when user delete the search word. This does not help in meeting user needs for clarity. Should be fixed in release 2.

Study Spot List: The purpose of the study spot list is to provide user with relevant information about study spots. However, the dynamic parts of the list such as refreshing, scrolling are missing because of the limitation of software. Should be fixed in release 2 where actual coding will be used.

Image: The purpose of the image is to allow user to visualize the study spot before arriving to there. This could be extend to full potential by using VR technology or videos or simple photo album.

Wording: The app is designed by foreign students, so the language in the app could contain errors and might lead to confusion. Future designers should fix the wording if possible.

Conclusion

In conclusion, the conceptual design have been evolved during the three cycles, a high fidelity prototype have been created to meets the requirements of the board, and it is evaluated with experts as well as users to assess all aspects of UX including our UX goals. Then we identified future recommendations for the design to maximize the potential to meet all the user needs. Based on the works of the third iteration, it is clear that UQSpot mobile application can highly cater to the needs of UQ students looking for a place to study. Our team believes that a fully functional app can be implemented and released to the production as a next step.

Reference

Joyce et al. (2016) "Mobile application usability: heuristic evaluation and evaluation of heuristics" In *Advances in Human Factors, Software, and Systems Engineering*

Chapter 15, Preece, J., Rogers, Y., & Sharp, H. (2015). *Interaction design beyond human-computer interaction* (Fourth ed.). Chichester, West Sussex: John Wiley & Sons

Appendix

#1 Evaluation Protocol

| | |
|------------------------|---|
| Evaluation Name | Expert Evaluation |
| Aims | 1. To identify critical usability issues early on 2. To determine whether an application meets a (minimum) standard of usability |
| Dates and Places | May 24 in UQ, St Lucia Campus, 12A - L104A |
| Creators | Group K |
| Participants | Team Madara -> Annice Yang, Kyle Bao, Min Zhong, Tommy Ye Team AI -> Owen, Tianyi, Violet Wang, Yulia |
| Protocol | |
| Prepare Materials | Laptop Prototype Screens PowerPoint High-Fi Prototype Link (which can be accessed by anyone) Consent forms Evaluation sheets |
| Consent | Ask fellow HCI students (experts) to sign consent forms. |
| Procedures | 1. Pluralistic Evaluation 2. Heuristic Evaluation |
| Pluralistic Evaluation | <ul style="list-style-type: none">• Brief introduction of the system• Presentation of the screens in the system• Gave out scenarios• Explain walkthrough method• Take notes of experts' suggestions |
| Heuristic Evaluation | <ul style="list-style-type: none">• Heuristic method explained• Usability issues summary |
| Closing | Give thanks for participating. Collect all the evaluation sheets back. |

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AUSTRALIA

[illegible][illegible]

Scenario 1: $1 > 5$
Scenario 2: $1 > 3 > 2$
Scenario 3: $1 > 4 > 9 > 1 > 4 > 10$
Scenario 4: $1 > \text{finish}$
Scenario 5: $1 > 6 > 7 > 8$

$S_1: 1, 5$
 $S_2: 1, 3, 2$
 $S_3: 1, 4, 1, 4, 10$
 $S_4: 1$
 $S_5: 1, 6, 7, 2$

scenario 1:
 Page 1 \rightarrow Page 11 \rightarrow Page 15
 (type in version 1.0)

scenario 2: Page 1 $\xrightarrow{\text{life on page}}$ Page 12 $\xrightarrow{\text{more info}}$ Page 2.

scenario 3: Page 1 \rightarrow Page 6 \rightarrow Page 7 \rightarrow Page 1

scenario 4: Page 1 wa

scenario 5: Page 1 \rightarrow Page 6 \rightarrow Page 7 \rightarrow Page 8

B1: $\{1, 2\} \subseteq \text{Clique}(G) \rightarrow 0$
 S1: $\text{map}(\{ \text{Clique}(G) \text{ nodes } \} \rightarrow \{ \text{Clique}(G) \text{ nodes } \} \rightarrow 2$
 B1: $\{ \text{Clique}(G) \text{ nodes } \} \rightarrow \{ \text{Clique}(G) \text{ nodes } \} \rightarrow \{ \text{Clique}(G) \text{ nodes } \}$
 $\{0 \in \{ \text{Clique}(G) \text{ nodes } \} \}$
 S1: $\{ \text{Clique}(G) \text{ nodes } \} \rightarrow \{ \text{Clique}(G) \text{ nodes } \}$
 S1: $\{ \text{Clique}(G) \text{ nodes } \} \rightarrow \{ \text{Clique}(G) \text{ nodes } \}$

Scenario 1 – Police search bar to navigate to building 32 room 203
Scenario 2 – Mark Buckingham Press 3,3344 as Sonoma and go to Sonoma tag, find out the detail of that room
Scenario 3 – Check the activity log go back, and find out what the color circle means
Scenario 4 – Mark out to the nearest police station with 4 available connections

[illegible]

Scenario 3 – Check the south tag, go back, and find out what the right side means

| Kategorie Name: | | Unit / Sub Unit | Thematic category | Subject related to | Number of pages |
|-----------------|---------------------------|--------------------------------------|---|--------------------|-----------------|
| 3 | main source Exercise 3 | Unit 1: Knowledge about the world | help me improve English and writing | English | 1 |
| 5 | main source Exercise 3 | Unit 1: Knowledge about the world | help me improve English and writing | English | 1 |

Scenario 4 – Meditate to the nearest road, start with 8 available connections.

| Case Description | Language | Protein Complexity | Available Protein | Number of Proteins |
|---|--|---------------------------|-------------------|--------------------|
| after searching has 20,000 proteins from the database | has been filtered by hand to a clean list | Disordered flexibility | can't overlap | |
| are an issue due to multiple proteins within single | | | redundant | 0 |
| have used soft clones where they differ | homologous | | complexity | 0 |
| | (initial analysis) not within a list of the disordered number of proteins | | few cases | 1 |
| file | | | | |

Scenario 1 – Navigate search bar to navigate to building 22 room 217
Scenario 2 – Mark Dining Link Room: L2004 as favourite and go to favourite tag. Find out the total of that room
Scenario 3 – Check the activity log, go back, and find a what the color circle means
Scenario 4 – Navigate to the nearest study space with 8 available computers

| Event Description | Timing/Time | Resource Category | Resource Allocation | Notes |
|---|---|-------------------------|--|-------|
| Start/Setup | After 10:30 until the first period starts | 1st period & 2nd period | 1st period: 10:30-11:00 2nd period: 11:00-11:30 | 1 |
| the teachers in the first period | 11:00-11:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the second period | 11:30-12:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the third period | 12:00-12:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the fourth period | 12:30-13:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the fifth period | 13:00-13:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the sixth period | 13:30-14:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the seventh period | 14:00-14:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the eighth period | 14:30-15:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the ninth period | 15:00-15:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the tenth period | 15:30-16:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the eleventh period | 16:00-16:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twelfth period | 16:30-17:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirteenth period | 17:00-17:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the fourteenth period | 17:30-18:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the fifteenth period | 18:00-18:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the sixteenth period | 18:30-19:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the seventeenth period | 19:00-19:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the eighteenth period | 19:30-20:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the nineteenth period | 20:00-20:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twentieth period | 20:30-21:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twenty-first period | 21:00-21:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twenty-second period | 21:30-22:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twenty-third period | 22:00-22:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twenty-fourth period | 22:30-23:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twenty-fifth period | 23:00-23:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twenty-sixth period | 23:30-24:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twenty-seventh period | 24:00-24:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twenty-eighth period | 24:30-25:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the twenty-ninth period | 25:00-25:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirtieth period | 25:30-26:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirty-first period | 26:00-26:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirty-second period | 26:30-27:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirty-third period | 27:00-27:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirty-fourth period | 27:30-28:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirty-fifth period | 28:00-28:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirty-sixth period | 28:30-29:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirty-seventh period | 29:00-29:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirty-eighth period | 29:30-30:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the thirty-ninth period | 30:00-30:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the fortieth period | 30:30-31:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the forty-first period | 31:00-31:30 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |
| the teachers in the forty-second period | 31:30-32:00 | 1st period & 2nd period | 1st period: 11:00-11:30 2nd period: 11:30-12:00 | 1 |

Scenario 4 – Make sure the money goes out with all available resources.

[illegible]

Scenario 1 – Utilize search bar to navigate to building 32 room 253

[illegible]

Scenario 1 – Utilize search bar to navigate to building 32 room 217

Scenario 2 – Mark building 32 room 217 as recently visited to facilitate top, find out the details of the room

Scenario 3 – Check the activity log, go back, and find out what the color circle means

Scenario 4 – Navigate to the nearest study spot with available computers

[illegible]

Scenario 4 – Find a job by the nearest study spot with 3 available computers

| Section/Exemption | Subject/Topic | Materials/Computer | Facilities/Other in Use | Teacher | Student |
|--------------------|--|--------------------------------|--|---------|---------|
| ES: 1st-3rd pages | All indicated on table the page numbers. | Handy and always available | Computer | 8 | 8 |
| Math: 1st page | Anything is not, nothing | Handwriting of system (table) | cannot tell me, study with | | 4 |
| Math: 1st-3rd page | Indicate in an appendix if replace the end 1 | availability of system (table) | very narrow base of the information obtained | | |

[illegible][illegible][illegible][illegible][illegible]

#6 User Evaluation

| Evaluation Name | User |
|------------------|----------------|
| Aims | 1. To 2. To |
| Dates and Places | May |
| Creators | Gre |

ation

ify usability issues that
ure UX Goals

JQ, St Lucia Campus

| | |
|-------------------|-------------------------------------|
| Evaluation Name | Users |
| Aims | 1. To 2. To |
| Dates and Places | May |
| Creators | Grou |
| Participants | App |
| | |
| Prepare Materials | Lapt High Con: UX S SUS |

24

#9 Team Log

| Date | Place | Meeting notes |
|--------|-------------|---|
| 12 May | 78-208 | Qi -> Establishing Requirements, Kyaw -> Background, Xu -> Feedback and Changes |
| 19 May | 78-208 | Qi -> Conceptual Design , Kyaw -> UX Profile, High-Fi Prototype, Xu -> Prepare Evaluation (Protocol + Invitation) |
| 24 May | 12A - L104A | Expert Evaluation – Group, Qi -> Summarize |
| 27 May | On campus | User Evaluation – Group , Kyaw -> Summarize, Xu -> Establishing Requirements |
| 30 May | 78-208 | Finalize the Report - Group |