

MACLIB

Study Spaces Simplified

Group #2

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4HC3: Human Computer Interfaces

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Report 3: Research and Prototype

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Contents

Research Report.....	3
Project Concept.....	3
Vision Statement.....	3
Stakeholders.....	3
Assumptions	3
Field Study Report - Mini Report.....	3
Summary of Questionnaire Results.....	4
Summary of Interview Results.....	14
Task Analysis	15
HTA Graphical Representation	16
Persona.....	16
Alex.....	16
Scenarios	17
Story Scenario	17
Conceptual Scenarios.....	17
Requirements.....	17
Stakeholder Requirements.....	17
Environmental Requirements	18
Functional Requirements	18
Technical Requirements	19
Usability Requirements	19
Storyboard and Prototype	20
Storyboard.....	20
Prototype.....	23
Goal and Vision.....	23
Design Decisions	23
Functionality Scope.....	23
Look and Feel	24
Interaction Design	24
Prototype Showcase.....	25
Figma Files	25

Figma Live Prototype (Use Full Screen – F11).....	25
Prototype Video with Commentary.....	25
Prototype Interview.....	25
Prototype Interview – Pegah Sargolzaei	25
Prototype Interview – Negeen Halabian	26
Interview Analysis.....	26
Appendix.....	27
Consent Forms.....	27

Research Report

Project Concept

Vision Statement

A library information and security center, which assists in finding and choosing a desirable study location for different types of users while contributing to the safety and security of the said locations.

Stakeholders

- Students

Students are the primary stakeholder. They are the people who are primarily using the libraries. Also, the core idea of the application is centered around their convenience for finding a desirable study spot.

- Campus Security

Security enforcers are a secondary stakeholder. Even though they are not the users of this product, they are affected by the output of some of the features incorporated into it such as the reporting functionality (for instance when assault happens).

- University Officials

University officials are a Tertiary stakeholder. They are not actively involved with the different processes going on inside this product. However, the success or the failure can affect them, in that if the product is successful one of the prominent goals of every university which is providing safe study spaces for students has been contributed to and vice versa.

- Developers and Designers

Developers and designers are the facilitating stakeholder. They are the people who help in the creation and the maintenance of the product.

Assumptions

- Students will usually show up if they reserve a seat.

Field Study Report - Mini Report

For the purpose of the field study the research instruments chosen for the purpose of the field study were questionnaires and interviews. The questionnaire was sent to a total of 25 students while 3 interviews were conducted with students.

Summary of Questionnaire Results

Question #1: What program are you in?

Participants were asked to input the name of their field of study into a text box (i.e., String).

Result #1: When participants were asked what program they are in, the results came out to be:

Options	Results
Engineering	10
Life Science	5
Health Science	5
Social Science	4
Psychology	1

Upon inspection of the results for the first question of the questionnaire it is evident that the vast majority of participants are studying within the engineering program, more specifically they account for 40% of the total number of participants. Following this, life science and health science were tied for the second largest representation for the programs of participants, each at 20% individually and 40% when combined. Next, 4 out of 25 of the participants were in social science, this represents 16% of the total number of participants. Finally, only a single questionnaire respondent was in psychology, this represents 4% of the total participant population size.

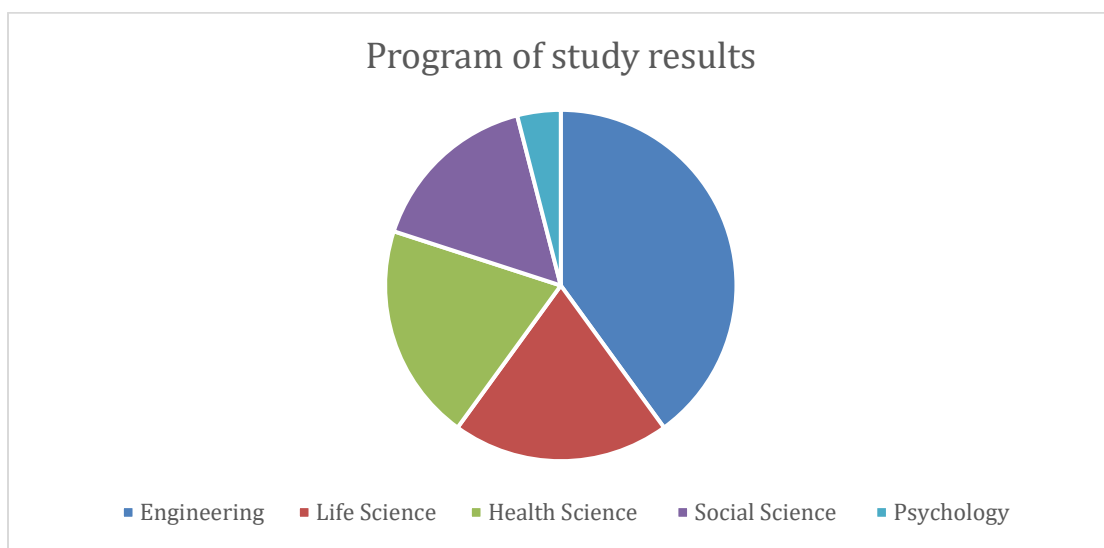


Figure 1: Results of student programs of questionnaire participants

Question #2: What is your current program level?

Participants were asked to select their year of study from a pull-down menu containing integers ranging from 1 - 5.

Result #2: When participants were asked about their year of study, the results are:

Options	Results
Year 1	2
Year 2	3
Year 3	8
Year 4	6
Year 5+	6

From the data in the table shown above it can be seen that the majority of the questionnaire respondents were senior students (80% of the total number of respondents were students in their 3rd year or higher of study). Also, all 10 participants who said they studied in the engineering program accounted for 50% (10 out of 20) of the students who were in their senior years of study (years 3-5). Meanwhile, the remaining 50% of the number of students in their senior years included life science (4 out of 20 which translates to 20%), health science (3 out of 20 which translates to 15%), and social science (3 out of 20 which translates to 15%). Students in year 2 included 2 students from health science and 1 from life science. Finally, the 2 questionnaire respondents who identified themselves as being in their first year of study included 1 student from social science and 1 from psychology.

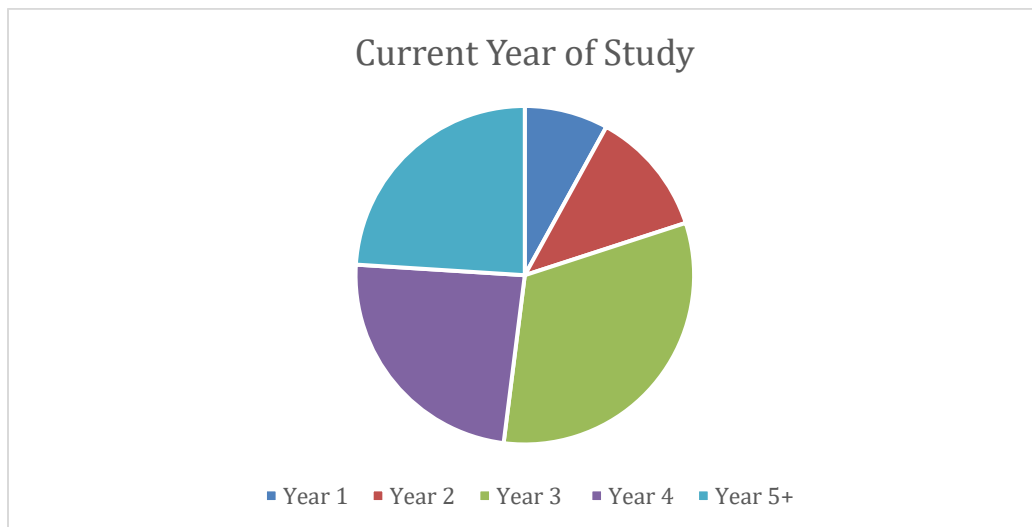


Figure 2: Year of study of participants

Question 3: What is your gender?

Participants were asked to select their gender from a list of options. Options included female, male, prefer not to say, or other (if this option was selected participants were asked to specify in a text box).

Result #3: When participants were asked about their year of study, the results are:

Options	Results
Male	12
Female	5
Other	0
Prefer Not to Say	8

The data table above shows that from the total number of respondents of the questionnaire, a vast majority of them were males, 48% to be exact. The next largest group was composed of individuals who chose not to identify their gender, this made up 32% of the total number of respondents. This result may indicate that questionnaire respondents may not feel that this is relevant for the purposes of our application or simply feel uncomfortable sharing such information. Finally, only 20% of the total number of respondents were females and were found to be all from social science and psychology (4 students in social science and 1 in psychology).

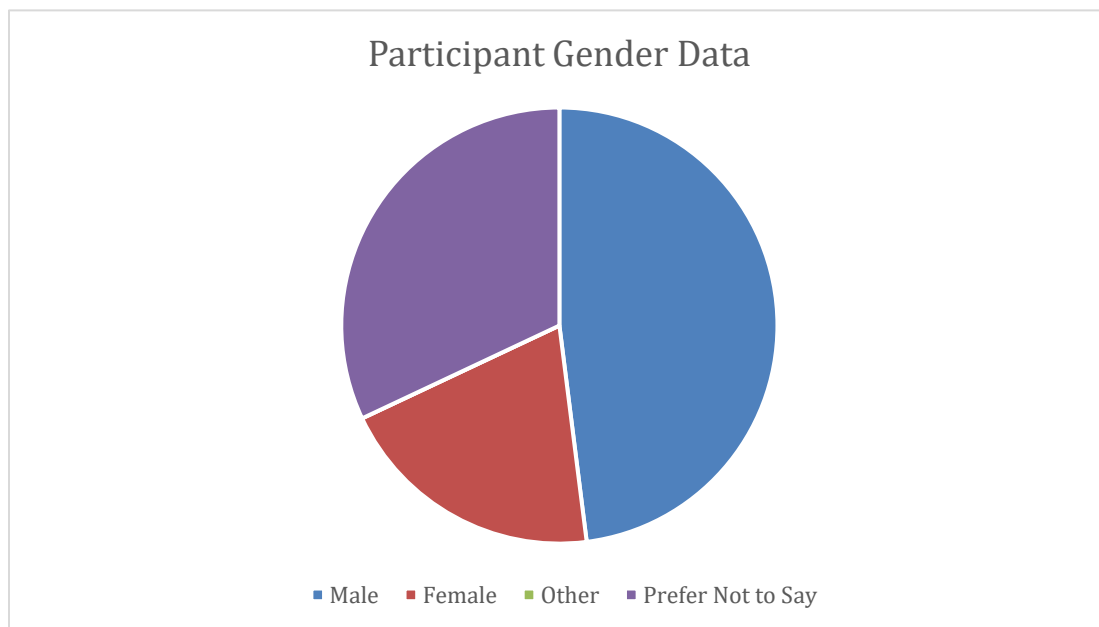


Figure 3: Breakdown of participant questionnaire

Question 4: Do you perform your studies in person or remote?

Participants were asked to select how they perform their studies from a list of options. Options included remote, school, or hybrid.

Results #4: When participants were asked about their studying methodology, the results are:

Options	Results
Remote	20
School	0
Hybrid	5

The results of the questionnaire showcase that an overwhelming majority of students use remote learning as their method of study (80% of the 25 students who responded to the questionnaire). The remaining 5 respondents who follow a hybrid study methodology were entirely from engineering and were all senior students in their 5th year of study. The hybrid study methodology could have been a result of in person labs, however this is not completely evident.

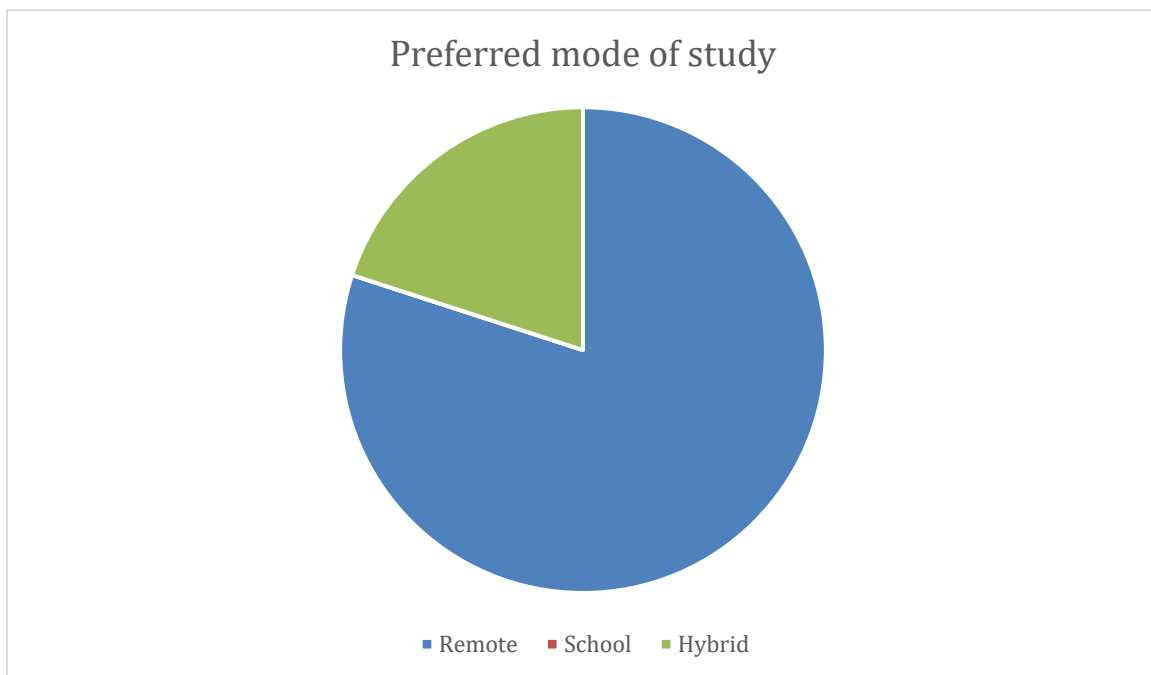


Figure 4: Preferred mode of student study

Question 5: How often do you study at McMaster?

Participants were asked to select how often they study at McMaster from a list of options. Options included never, rarely (handful of times a year), A handful of times per month, 1-3 times per week, 4-7 times per week.

Results #5: When participants were asked about their frequency of studying on campus, participants answered as follows:

Options	Results
Never	15
Rarely (Few times a year)	2
Infrequently (Few times a month)	5
Frequently (Few times a week)	3
Always (Daily)	0

The table above showcases that the majority of questionnaire respondents never study at McMaster (60%), while 20% of respondents reported having studied on campus infrequently (a few times a month). The same group of respondents who studied infrequently on campus were also the same group of respondents who used a hybrid study methodology. This could be attributed to being on campus before or during a lab during which the students studied on campus. The group of respondents who studied on campus were almost entirely composed of engineering students in their third year of study. All other possible options contained students from a mix of all programs previously mentioned. IT was concluded the reasoning for students not studying at McMaster could be attributed the difficulty of finding a study space without wasting time.

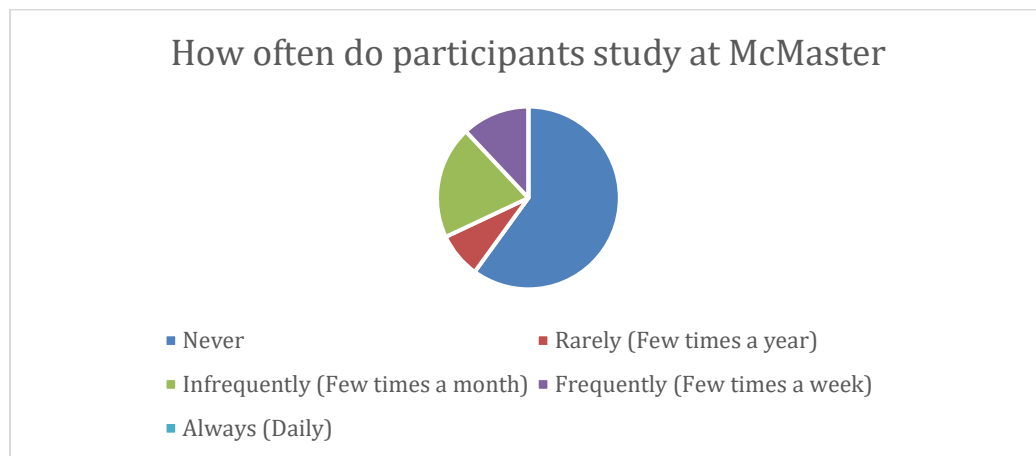


Figure 5: Frequency of students studying at McMaster

Question 6: Which study areas do you visit the most?

Participants were asked to select which study areas on campus they visit the most from a list of options. Options included Thode, Mills, Health Sciences, Innis, Hatch, or Other (if participants selected this option, they were asked to specify in a text box).

Results #6: When participants were asked about their favorite area (i.e., Library) to study, the results came out to be:

Options	Results
Thode	7
Mills	4
Health Science	8
Innis	1
Hatch	4
Other (Please Specify)	1

The vast majority of respondents identified their favorite study area to be the Health Science library. The list given below outlines specifically how many students from each program of study prefers which study spot.

- Thode: 6 engineering (2 in 3rd year and 2 in 4th year), 1 social science (in their 3rd year of study)
- Mills: 3 social sciences (2 in their 3rd year, 1 in their 1st year), 1 health science (in their 3rd year)
- Health Science: 4 engineering (2 in their 5th year, 2 in their 4th year), 3 health science (2 in their 4th year, 1 in their 2nd year), and 1 life science (in their 3rd year)
- Innis: 1 health science (in their 2nd year)
- Hatch: 4 life science (3 in their 3rd year and 1 in their 2nd year)
- Other: This option was specified as the student center/cafe

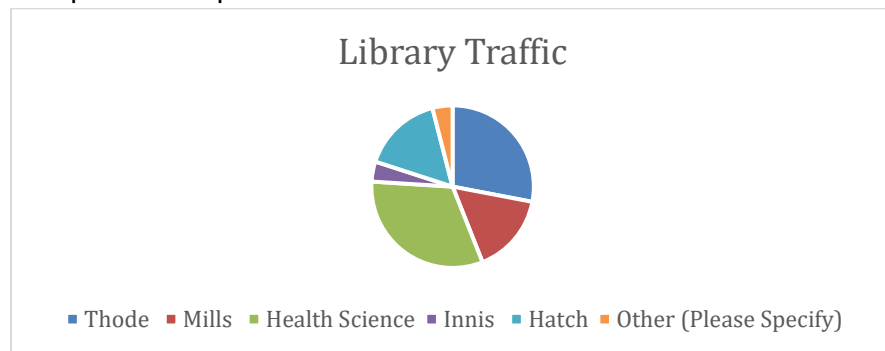


Figure 6: Distribution of traffic of students at McMaster

Question 7: What type of study spaces do you use the most?

Participants were asked to select what type of study spaces do you use the most from a list of options. Options include: quiet study, common area, individual study, study room, doesn't matter.

Results #7: When participants were asked about their preferred study space, they answered:

Options	Results
Quiet Study	6
Common Areas	5
Individual Study	2
Study Rooms	4
N/A (Doesn't Matter)	3

The results of the questionnaire found that the results were distributed amongst the available options (no one option had been vastly dominant over another option). In particular focus is the study room and common area study spaces. More specifically, all 4 of the respondents who chose study rooms were engineering students in their senior years of study, while the common area respondents were health science and life science students (3 health science and 2 life science students).

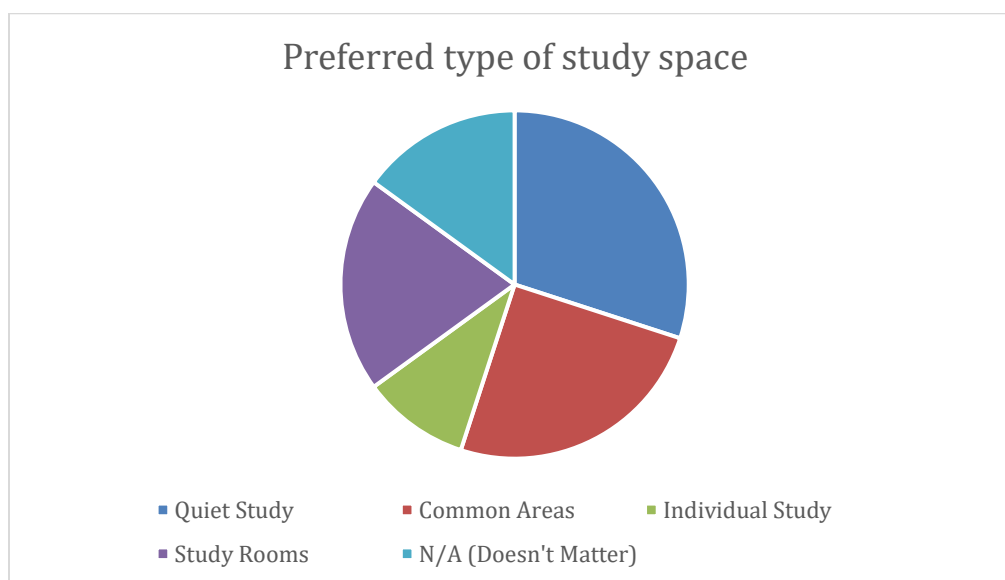


Figure 7: Preferred type of study space for students

Question 8: Rate the difficulty of finding a study spot at Mac?

Participants were asked to select the rate of difficulty of finding a study spot at McMaster from a scale from 1 - 5, with 1 being the easiest and 5 being the hardest.

Results #8: When participants were asked about their experience in finding a study spot on campus, the ratings came out to be:

Options	Results
1 (Easy)	2
2	3
3	2
4	8
5 (Hard)	10

The data collected in the questionnaire suggest that a vast majority of respondents have a hard time finding a study spot at Mac (18 out of 25 respondents or 72% of total respondents). Out of the 18 students who said they found it hard to find a study space at Mac, 10 were from engineering (6 who rated the difficulty as 4 and 4 who rated it as 5), 5 from health science (2 who rated the difficulty as 4 and 3 who rated the difficulty as 5), and 3 from life science (all 3 rated the difficulty as 5). The 2 respondents who rated the difficulty of finding a study spot as 3 (neutral) were from life science, 3 respondents from social science rated the difficulty as 2 and finally 1 social science and 1 psychology student picked a difficulty level of 1.

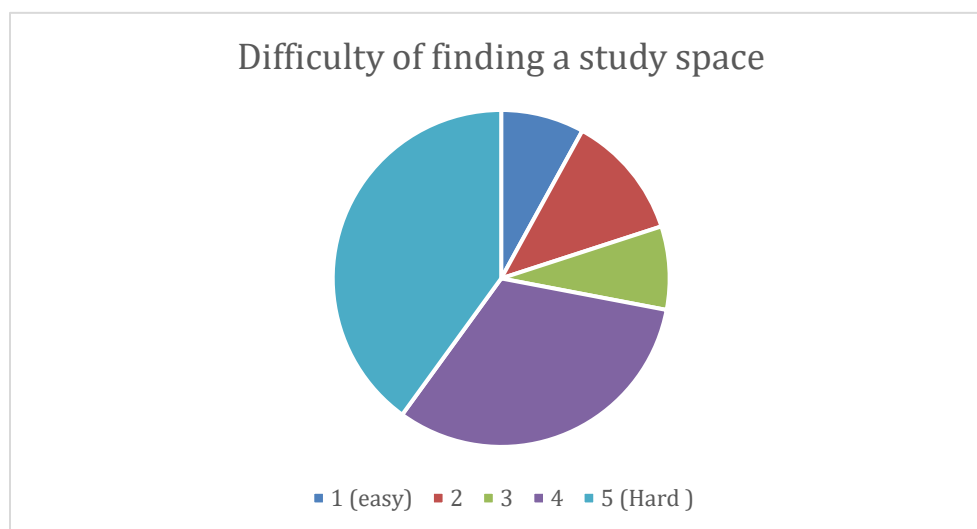


Figure 8: Difficulty of finding a study space on campus

Question 9: Do you study in groups?

Participants were asked to select whether they study in groups from a list of options, options include: Yes, No, & Maybe.

Upon inspection of the results, it was found that 50% of respondents reported yes to studying in a group, 20% reported no to studying in a group, and 30% of respondents reported maybe.

Results #9: When participants were asked to specify if they study in groups or not, they answered as follows:

Options	Results
Yes	10
No	5
Maybe	10

Upon inspection of the results, it was found that 40% of respondents reported yes to studying in a group, 20% reported no to studying in a group, and 40% of respondents reported maybe. Respondents who reported yes or maybe to group studying were from engineering, health science, and life science.

Question 10: Are you aware of where to reserve a study space?

Participants were asked to select whether they are aware where to reserve a study space, options include yes or no.

Results #10: When participants were asked about their ability to reserve study spaces on campus - more specifically if they knew how to reserve study spaces - they answered as follows:

Options	Results
Yes	17
No	6

The respondents who answered no were both students in their first year of study, 2 students in their second year, and 2 students in their third year of study.

Question 11: Do you reserve study rooms?

Participants were asked to select whether they reserve study rooms, options include yes or no.

Results #11: When participants were asked if they reserve study rooms, their responses are broken down as follows:

Options	Results
Yes	13
No	12

Question 12: If yes, how often?

If participants answered “Yes” to Question #11, they were asked to specify how often they reserve study spaces.

Results #12: The students who were found to have reserved study rooms specified answers ranging from: often, when I have group projects, sometimes, and always.

Question 13: If no, why?

If participants answered “No” to Question #11, they were asked to specify why they do not reserve study spaces on campus.

Results #13: The students who did not reserve study rooms specified answers ranging from: I don’t study in a group, I never know when rooms are free, it takes too much time, and I prefer more casual and common areas.

Question 14: What are the biggest challenges to studying on campus?

Participants were asked to enter what their biggest challenges are when it comes to studying on campus. Participants were asked to type out their response into a text box.

Results #14: When participants were asked to specify what challenges they face with respect to studying on campus, they said:

Based on the responses collected from the questionnaire, participants cited a number of reasons that they believed were their biggest challenges to studying on campus. Below is a list of the reasons.

- Campus is too distracting.
- Too much noise in the library and you can never get a private study space.
- I can never find a good study spot.

- Whenever I find a spot to study there are no charging spots or other amenities I need.
- I don't like campus.
- It takes too much time to find a place to study.
- The library is usually full so I don't even bother trying.
- I commute so I can't really study on campus.
- Use time on campus for other activities.

Summary of Interview Results

During our quest for obtaining constructive feedback for our app, MacLib, we conducted a formal interview for 5 students currently attending McMaster University. The 5 interviewees are: Steven, Yousef, Jain, Kamal, and Qi. Please note that MacLib started off as an internal name, and it was not disclosed to the interviewees or participants. The participants were given a general overview and asked general questions so we, the developers and designers, can get an accurate or approximate idea of what students need and want.

When the interviewees were asked about their studying arrangements, all but 1 did not have a strict or thorough study regimen. The only interviewee with a semi-structured studying routine was Yousef. The remaining candidates agreed with Steven's remark when he said, *"It's difficult to have a structured studying regimen when I have to juggle dozens of things at once. And I cannot go to the same spot everyday, because there's no guarantee that it'll be available. In addition, there's no way to reserve an individual study space - only group spaces"*.

When the participants were questioned about how much time they waste due to mindlessly roaming around for finding empty study spaces, virtually all of them agreed with Jain that, *"Finding study spaces isn't an issue during the beginning of the term. The problem arises during midterms and finals, when everything is occupied, including random corners that are nearby electrical outlets"*. Jain concluded that, *"Finding good study spaces when it is needed the most is very difficult"*.

When the interviewees were questioned about the accessibility of reserving group study spaces for large projects, we received two different answers. Steven, Qi, and Kamal said, *"Due to the ongoing pandemic, we've resorted to holding virtual group meetings via Zoom, MS Teams, or Facebook Messenger. Not all students are on campus during these trying times, so we opt for virtual meetings to accommodate everyone. It works pretty well; most of the time"*. On the other hand, Yousef and Jain shared the same opinion with each other, but different from the other participants. Yousef and Jain exclaimed that, *"The process for reserving group study spaces is very convoluted and unintuitive. Every library has their own system and reservation portal. It's bad enough that the information isn't easily accessible, but the online portal is a nightmare to use. We generally avoid using these systems due to the added complexity. If there was an app that centralized everything, then it would add tremendous value"*.

When all participants were presented with an idea of a centralized study reservation system, they were genuinely surprised as to why this has not been implemented yet. All of them agreed that, *"This is something [we] would definitely use. It adds tremendous value by streamlining the process of reserving study spaces. If I can reserve a table at the library while I finish up a lecture, I won't have to waste time roaming around mindlessly, looking for a place to study"*. The only concerns were voiced by Steven and Yousef. They were unsure if the study reservation

system was web-only, or available as an app through the app store. Both of them agreed that, *“It would make more sense to deploy the study reservation system as a standalone mobile app, rather than a web-app”*. Yousef highlighted the limitations of web-apps, explaining that, *“Web-apps are slow and very limited with respect to what they can and cannot do”*. We agree with their sentiments, because one of the main goals of creating a study reservation system is to cut down on time wasted looking for study spaces.

Across all interviews for all 5 participants, we noticed that virtually all interviewees share the same concerns, *“Finding study spaces during dire times is cumbersome, and, oftentimes, acts as a time sink”*. During the interview, Qi made a very interesting comment. He said, *“During busy times, I’ve wasted more than 20 mins looking for a suitable study area. Usually, I’ll have an hour of free time between lectures. If 20 mins is wasted for finding a suitable spot, and another 10 minutes for setup and teardown, then effectively I only have 30 mins left of studying. And, it takes a few minutes to get into the vibe of studying. But that vibe is quickly interrupted due to an upcoming lecture”*. After hearing Qi’s concerns, we realized that the biggest ‘selling point’ of our study reservation system will be its ease of use and streamlined design - because as a student, time is of the essence. After hearing our interviewees express their concerns, we revised our original implementation ideas to better suit their needs. This is demonstrated in the mockup(s), below.

Task Analysis

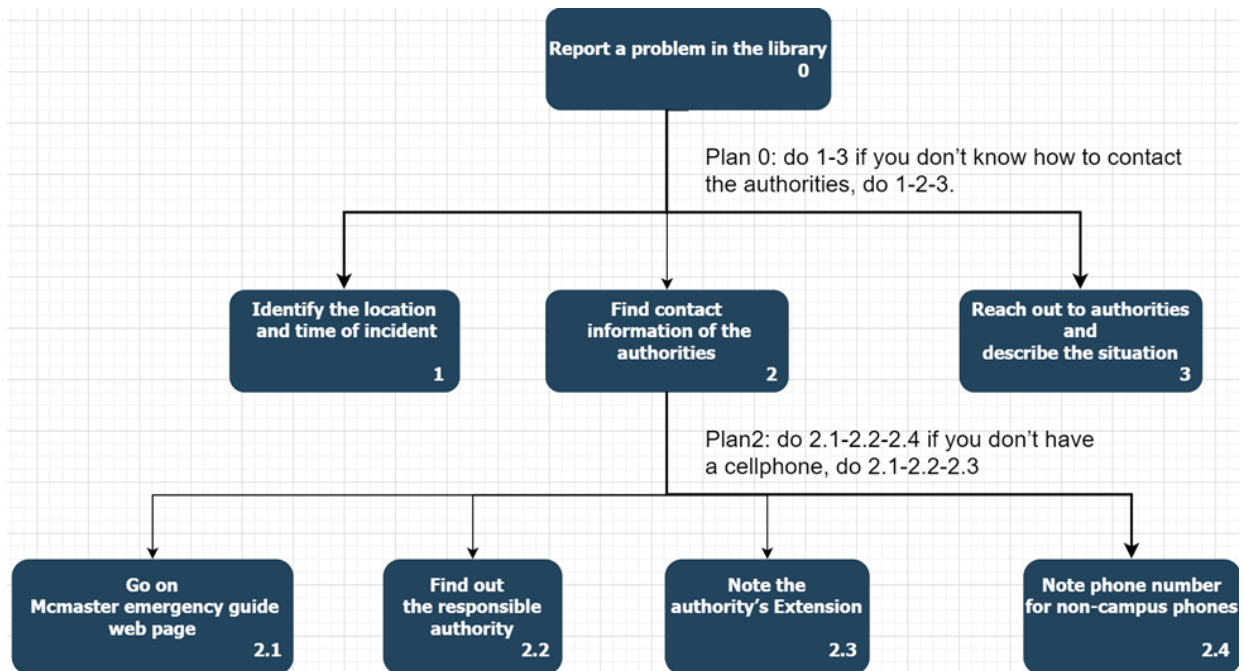
0. In order to report a problem in the library

1. Identify the location and time of incident
2. Find contact information of the authorities
 - 2.1 Go on Mcmaster emergency guide web page
 - 2.2 Find out who’s the responsible authority
 - 2.3 Note the authority’s Extension
 - 2.4 Note phone number for non-campus phones
3. Reach out to authorities and describe the situation

Plan 0: do 1-3 if you don’t know how to contact the authorities, do 1-2-3

Plan2: do 2.1-2.2-2.4 if you don’t have a cellphone, do 2.1-2.2-2.3

HTA Graphical Representation



Potential areas of problem are finding the contact information of the authorities as well as remembering the time of an incident for future reference (remembering the location is usually a non-issue as humans have good spatial memory). Our design can help make the process of reporting problems faster and more convenient by allowing users to skip step number 2 (Find Contact information of the authorities) in the HTA. The application as demonstrated in the prototype has an easily accessible chat environment for safety and security related concerns that could connect users with an operator quickly. In addition, the application records the time of every message inside the chat environment so that people won't need to rely on their memories later.

Persona

Alex

- Student
- 20 years old
- Basic savings
- Takes the bus to come to the campus
- Lives with other students away from parents
- Wants to study at the library sometimes
- Often plans to do his group assignment in the library with teammates

- Sometimes goes to the library to socialize and meet peers who can help him
- Roller coaster schedule, at times he's very busy with work while other times not so much
- Sleep deprived during test seasons, needs coffee and sugar to stay efficient

Scenarios

Story Scenario

Alex and his friend were sitting in his first-year calculus lecture taking notes as they usually do. Just before the lecture ended, the prof gave a friendly good luck on tomorrow's midterm. They were not prepared for the midterm, and they quickly realized they have to start studying as soon as possible. As soon as the lecture ended, they quickly rushed to the nearest library to find a study space. They open the door to the library only to realize that on the surface the library seemed packed, with very little seating to be found. Determined to begin studying, they split up and scan the library for a place to study. They each circle around every floor, but still nothing could be found. After spending about 40 minutes searching for study space, they gave up on that library. Frustrated, they leave the library and grab some food to eat. Afterwards, they made their way to a different library across campus. This library was still quite busy, but they were able to spot an empty table as soon as they entered. Annoyed after wasting more than an hour to find a study spot, they finally begin to study.

Conceptual Scenarios

Finding the nearest available study space: In order for someone to find the nearest spot to study at McMaster, a student must search the closest building to them. If a building has no available study spaces, they must either wait for one to open, or attempt to search the next building. The exception to this is a study space with study room reservations.

Reserving a study room: A student who would like to reserve a study room at McMaster must first go to the study spaces web portal, select an appropriate room. They choose an available date and time and receive confirmation. If there are no study rooms available in the study space and would like to book a room in another space, they must go to another portal associated with that space and repeat.

Requirements

Stakeholder Requirements

SR1.1	The user must know how to operate a mobile application
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Rationale	Our application will run on a mobile device as all of the students surveyed (question 15) carry mobile devices on them.
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SR1.2	The user must be a student at McMaster University
Rationale	The application will only operate on McMaster University study spaces as the problem is identified at McMaster. To prevent unauthorized reservations, the user should be a student at McMaster.

Environmental Requirements

ER1.1	Requires designated study spaces for reservation throughout McMaster
Rationale	Our research indicates that currently McMaster only allows reservations of study rooms. To support our application, McMaster must additionally define designated study spaces (i.e. tables, seats) specifically for reservation.

ER1.2	McMaster staff shall enforce the use of reserved study spaces
Rationale	Currently building staff are responsible for resolving reserved study room conflicts. These same staff shall also resolve any conflicts with study spaces within our application in order to ensure its integrity.

Functional Requirements

FR1.1	The system shall allow the user to view available study spots across campus
Rationale	Based on the results of question 8 in our questionnaire, it has been determined that there is a high difficulty finding study spaces. The requirement aims to mitigate this issue and provide some of the core functionality of our application. Additionally, currently there are many portals to reserve study spaces depending on the building, the application solves this by acting as a single point to reserve any study spot.

FR1.2	The system shall provide a means to reserve study spaces
Rationale	Study space reservations is a core feature of our application. With our questionnaire results, we determined that there is a large difficulty in finding a study space (question 8) and that 50% of students study in groups (. With this in mind, study space reservation shall provide individuals a way to reserve spaces for themselves or a group.

FR1.4	The system shall allow the user to contact authorities in the case of an emergency
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Rationale	The majority of students are unaware of how to contact McMaster authorities if there is an incident (question 15), the application shall integrate this feature.
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FR1.5	The application shall allow the user to build a profile
Rationale	To support our safety feature and to ensure that the user is authorized to reserve a study space.

Technical Requirements

TR1.1	The system shall allow the user to import their health data via Apple Health
Rationale	To streamline the user's health profile creation, the application shall allow health data to be imported via Apple Health. Our research indicates that 60% of students carry iPhones (question 15) in which the Apple health application is standardized.

TR1.2	The user shall be able to login through Google or Facebook
Rationale	To streamline the user profile creation, the application should integrate with Google and Facebook single sign on. Every student has a google account provided by McMaster which means every student can register easily.


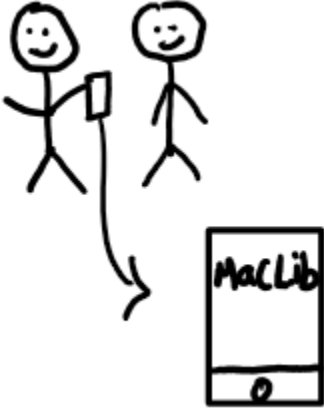
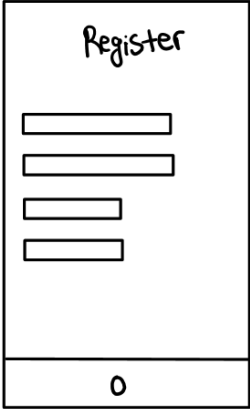
Usability Requirements



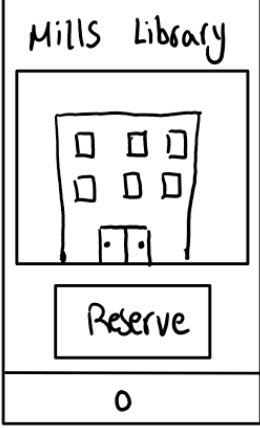

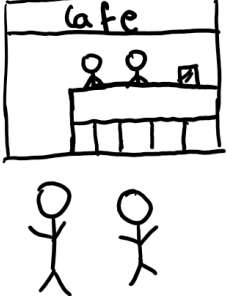
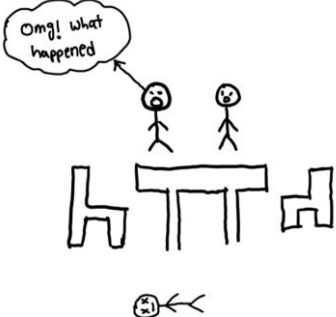
UR1.1	The interface shall highlight all key data of a study space on one screen
Rationale	Key study space data such as available seating, amenities and reservation capacity is information that the user would want to see at a glance in order to make an informed decision. Our research results from question 14 suggest that some of the biggest challenges with studying at McMaster is that it is too difficult to find a good study spot, and that oftentimes there are no charge stations or other amenities available.

UR1.2	A registered user shall be able to navigate to the study space reservation page within 10 seconds on average.
Rationale	One of the key aspects of our application is to make it easier and faster for students to reserve study spaces. Research suggests that currently it is too difficult and time consuming to space across campus (question 8), a limit on navigating to the reservation page will help resolve this.




Storyboard and Prototype

Storyboard

<p>Shot #1</p> 	<p>Shot #2</p> 	<p>Shot #3</p> 
<p>Action: Student is in lecture, prof reminds class about midterm coming soon, Student turns to his friend Alex and says they should go to the library after class to study.</p> <p>Dialog:</p> <p>Prof: “Just as a reminder, the midterm is going to be next week”</p> <p>Jordan: “Hey Alex, I think we should go to the library after class to study for the midterm”</p> <p>Alex: “Jordan, I think that is a great idea, but it takes forever to find a study spot at the library”</p>	<p>Action: Jordan introduces Alex to the MacLib application</p> <p>Dialog:</p> <p>Jordan: “Funny you mention that Alex, the hottest new app on campus is MacLib. It’s really convenient, you can book a study space at any library on campus in advance so you don’t have to worry about not finding a spot when you get there”</p> <p>Alex: “Oh that’s amazing, can you show me how it works?”</p>	<p>Action: Jordan show Alex how to register for the app</p> <p>Dialog:</p> <p>Jordan: “Yeah sure Alex, it's super easy to use. First the app will ask you if you’re a mcmaster student so you click yes and it shows you a disclaimer. Then you set up your profile, you can either import with apple health or enter it manually. If you don’t feel comfortable just skip it! Once you’re in the app it shows you your study stats and you can then click the reserve button where it will show you all the libraries on a campus map with.</p> <p>Alex: “cool but this is pretty standard in every app”</p>

<p>Shot #4</p> 	<p>Shot #5</p> 	<p>Shot #6</p> 
<p>Action: Shows study stat page and the app options (search, reserve, etc)</p> <p>Dialog:</p> <p>Jordan: “hold on I haven’t even shown you the best part, the booking part! We can use this feature to book empty spots in the library”</p> <p>Alex: “oh that’s amazing! Can you book two spots for me and you in Mills library so we can study?”</p> <p>Jordan: “yes for sure! But first let me check if there are empty spots”</p>	<p>Action: Show map, library and reservation</p> <p>Dialog:</p> <p>Jordan: “Great! It looks like there are empty spots. Now we can go through the reservation process.”</p> <p>Alex: “Amazing!”</p>	<p>Action: Jordan reserves a spot in the library using MacLib app</p> <p>Dialog:</p> <p>Jordan: “I think we can click reserve, and we can go to the library now.”</p> <p>Alex: “Okay, let’s move on.”</p>
<p>Shot #7</p> 	<p>Shot #8</p> 	<p>Shot #9</p> 
<p>Action: Alex and Jordan go to the library. Alex is surprised the app really worked. They sit down and begin to study</p>	<p>Action: While studying Alex and Jordan get hungry so they get up and go to the cafe in the library, but they were so hungry they forgot their stuff on the</p>	<p>Action: Alex and Jordan come back to their spots and find that their stuff has been stolen and an individual who fainted is laying on the floor.</p>

<p>Dialog:</p> <p>Alex: “Wow, that’s cool. I think we can start studying now.”</p>	<p>table.</p> <p>Dialog:</p> <p>Jordan: “I am hungry, I think I will go grab something to eat from the cafe. Would you like to come with me?”</p> <p>Alex: “Yes, I am actually hungry as well. Let’s go!”</p>	<p>Dialog:</p> <p>Alex: “Where is our stuff? I am sure we left them here.”</p> <p>Jordan: “Yes, I remember I left my stuff here as well.”</p> <p>Alex: “No way! I think someone stole our stuff.”</p>
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<p>Shot #10</p> 	<p>Shot #11</p> 	<p>Shot #12</p> 
<p>Action: Alex begins to freak out since the stuff was very expensive, Jordan also panics but remembers that MacLib has a report feature for crimes and emergencies like this. Jordan proceeds to report the theft as well as the medical emergency.</p> <p>Dialog:</p> <p>Alex: “NOO! I think my phone has been stolen as well!”</p> <p>Jordan: “Oh no! Oh, I remember something! MacLib has a feature which can help you report crimes such as this one. I am going to report this incident now”</p>	<p>Action: Alex and Jordan are sad, but life goes on. They are about to lose hope after 1 week passes but suddenly, they are contacted by campus security and told their stuff has been found and the criminal has been caught.</p> <p>Dialog:</p> <p>Campus Security: “Hello Jordan, I can see that you reported an incident where someone stole your belongings in the library. I would like to inform you that your belongings have been found, and the criminal has been caught. I would also like to inform you that you can pick up your belongings from the library’s</p>	<p>Action: Jordan and Alex pick up their stuff from the library staff desk and are happy that an app like MacLib was able to save the day.</p> <p>Dialog:</p> <p>Library Staff: “Hi, how can I help you?”</p> <p>Jordan: “Hi my name is Jordan, I reported an incident where someone stole my belongings and my friend’s belongings, who is with me here. I received a phone call from the campus security and they told me that I can pick up my stuff from here.”</p> <p>Library Staff: “Yes, we received your belongings. Here you go!”</p>

	front desk.” Jordan: “Oh! Thank you very much!”	Jordan: “Thank you very much” Alex: “Thank you very much” Library Staff: “You are welcome”
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Prototype

Goal and Vision

MacLib’s vision and purpose is to bring safe study spaces to students across the world. The goal is to create a digital solution that can assist students in finding their desired study space as quickly as possible while creating direct gateways to authorities, putting their mind at complete ease. We believe that using the new technology, students can have real-time extensive information regarding different libraries. This information can vastly vary depending on the niche purpose of the application, nevertheless MacLib aims to aggregate the majority of available data into one seamless experience. This information can also be crowd sourced in real-time, requiring no extra infrastructure to harvest our core data. In addition to showing live information, students can easily check for the distance and direction in-app. Students can also use the direct messaging where they have the ability to share their complete medical profile with the authorities.

The entire prototype is powered by Figma. Figma is a popular prototyping web-based tool capable of producing real-life application interface with extensive design and interaction freedom. Although there are elements of our prototype which is common between various interfaces, MacLib’s has been completely built from scratch by the team. We took inspiration from many popular application UI such as Google Maps when definition the look and feel. We have provided the prototype both as a video and a direct link to the Figma live application where you can get a full experience. Note, if using the live app, browser must be in full screen (F11).

Design Decisions

One of our key design decisions was our approach to collecting sensitive data regarding the user. This data would work nicely with the safety feature of sending your medical profile to authorities but at no point should be accessible by the application. Our design decision was to keep the feature but add an honest and assuring disclaimer in addition to the ability of opting out of the questions entirely. We also decided to focus on integrating with reputable pre-existing health app such as Apple Health rather than a manual entry.

Functionality Scope

The core functionality of the MacLib is divided into four parts:

- Map view of study spaces with built in direction highlighter
- Present both a Quick and a Detailed view of live information regarding each Library
- Reserve a spot in the desired study space at a specific time and date
- Direct Messaging with authorities with ability of attachments

The secondary functionalities of MacLib include the following:

- Search various Libraries and Study Spaces by name
- Categorized Study Spaces for different purposes and usage
- User Profile that can be used to access Reservations from anywhere
- Collect and Send user's emergency information including Health to authorities

Look and Feel

MacLib's Look is designed around simplicity. At the first iteration, the application is limited in scope and is only designed for the McMaster University students. The entirety of UI has been designed from scratch by the team and is fairly consistent across the board. After extensive work, the team came up with a complete template that structured the look of the prototype. The blue theme was built using angular and curved shapes based on top of each other to create contrast and simplicity.

The feel of the prototype was designed based on the following categories:

1. Intro Pages

The intro pages were designed to entice and convince their user of their decision to download our application and spend their time using it. The intro will only apply to new users. This gives us the opportunity to further showcase our features. These pages are often shallow in content but can include larger text that can show the user how to use the application.

2. Functionality Pages

While the intro pages contain limited information, the Functionality Pages can contain large amounts of explicit and implicit information, requiring each to be thoughtfully designed and verified. The current functionality pages are divided in a low coupling but a high cohesion manner meaning while each page is independent in its purpose, they are heavily reliant on each other to deliver a seamless experience.

Interaction Design

MacLib's interactions are fairly limited. The key functionalities of MacLib also happen to be less reliant on user interaction, and mostly evolve around presentation of information. This helped us to keep our Interactive elements to buttons. Nevertheless, many of these buttons are not

explicitly highlighted such as the Quick Access Bar at the bottom of every page and so we rely on design and familiarity from the user's general conceptual model of smartphone applications to help the user understand. The app will also be using a built-in calendar as well as a drop down that will help with reservation.

Prototype Showcase

The following section represents the updated prototype which was recently changed as we got further feedback from interviews. The prototype is presented in multiple ways. We have a commentary which lasts around 10 minutes as well as the Figma files and live prototype. We strongly suggest using the Figma links as they deliver the experience as we intended. The Figma links do not require an account and please use full screen (F11) as otherwise the formatting won't work properly.

Figma Files

<https://www.figma.com/file/jWUFFkZpByEyC8KVpf56hO/MacLib-App?node-id=0%3A1>

Figma Live Prototype (Use Full Screen – F11)

<https://www.figma.com/proto/jWUFFkZpByEyC8KVpf56hO/MacLib-App?node-id=1%3A2579&scaling=min-zoom&page-id=0%3A1&starting-point-node-id=1%3A2579>

Prototype Video with Commentary

https://mcmasteru365-my.sharepoint.com/:v/g/personal/yazdinip_mcmaster_ca/ETVbZqkazNZGrKotGXLhQ4cB0gtOaxJS5Z7qDK04ygM5qA?e=CIJ22i

Prototype Interview

After a few iterations, we decided to hold a series of user interviews where we showcase our working prototype, asking for feedback in return. We have followed the Google Sprint 5 Act Model for interviews in which the user is first asked a series of context questions before showcasing the prototype. We have included two of these interviews which we found very insightful. Interviewees were asked to sign a consent form which can be found at the appendix.

Prototype Interview – Pegah Sargolzaei

https://mcmasteru365-my.sharepoint.com/:v/g/personal/yazdinip_mcmaster_ca/EeQG3Llu1oINmMWL-weuH28B7Ru-GrAnaXw9pIP1aLqYAAQ?e=WeCT7T

Prototype Interview – Negeen Halabian

https://mcmasteru365-my.sharepoint.com/:v/g/personal/yazdinip_mcmaster_ca/ERsCTwGmKC1h7yIVfyacS4B2xE48JLk4hN6fqVVcx4HvA?e=NvNXZW

Interview Analysis

Building on top of the interviews, we were able to find out some of the common behavior when using the app, the possible room for error and many smaller things that had gone unnoticed for the team. For starters, Negeen, quickly pointed out the disconnection between the login page and the landing page after you login, which in our earlier iterations used to be the Profile frame. Once negeen had logged in, she found herself looking at her profile, looking for a hint as to the next step. She mentioned that, “for a few seconds I was confused as I didn’t know what to quite do next.” We have since then changed the landing page to the MAP, where the user can get an understanding of the app and it’s main functionalities by taking a few seconds to identify the button and click a few buttons to understand the interaction design. The second point that Negeen mentioned was around the security aspect. She asked if there is a reason as to why we have chosen to provide direct messaging to 911 instead of the Campus Security. That was very well received idea that we acted upon very quickly, we have moved our API to connect users to Security Campus instead of police. This will be crucial step for the Campus Security as well, as there is currently no application that can establish a secure messaging with the campus security. This will also increase the effectiveness of the messages as well as the confidence of the students when enjoying their study session alone.

We also received extensive feedback from Pegah. She really helped us with her thinking process as she clearly went through each frame while talking about anything that was noticeable to her. She had a very keen eye for many of the small aesthetic mistakes that we had made. For starters she mentioned a few instances where our texts were a bit off position, our colors were inconsistent and even a grammar mistake. We have since then thoroughly cleaned the prototype of these mistakes. We then also found a few images with low quality and bad contrast which we changed for better readability. She also pointed out the flow of content, specifically on the Calendar page. She mentioned that the person might not immediately understand the purpose of the calendar and that we should have a bit of directive information to help the user. We have since then moved the structure of the page so it reads cleaner.

Appendix

Consent Forms

Consent Form: ~~MacLib~~ Prototype Interview

Name of Interviewer: Pedram Yazdinia, Group#2
4HC3: Human Computer Interfaces
University: McMaster University

1. EXPLANATION OF THE Interview and WHAT YOU WILL DO:

You are being asked to participate in a prototype user testing session. As a participant, you will be asked to use your first name only to use throughout the test to protect your privacy. You will work with a prototype of the application. You will be asked a series of questions to understand your thought process better. You must be at least 18 years old to participate in this session.

2. YOUR RIGHTS TO PARTICIPATE, SAY NO, OR WITHDRAW: Participation in this interview is completely voluntary. You have the right to say no. You may change your mind at any time and withdraw. You may choose not to answer specific questions or to stop participating at any time.

3. CONFIRMATION OF INFORMED CONSENT. You indicate your voluntary agreement to participate by telling the interviewer that you agree to participate in the interview. This consent form is yours to keep.

Name: Pegah Sargolzaei

Signature:

A handwritten signature in blue ink, appearing to be 'Pegah Sargolzaei', written over a light gray rectangular background.

Consent Form: MacLib Prototype Interview

Name of Interviewer: Pedram Yazdinia, Group#2
4HC3: Human Computer Interfaces
University: McMaster University

1. EXPLANATION OF THE Interview and WHAT YOU WILL DO:

You are being asked to participate in a prototype user testing session. As a participant, you will be asked to use your first name only to use throughout the test to protect your privacy. You will work with a prototype of the application. You will be asked a series of questions to understand your thought process better. You must be at least 18 years old to participate in this session.

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3. CONFIRMATION OF INFORMED CONSENT. You indicate your voluntary agreement to participate by telling the interviewer that you agree to participate in the interview. This consent form is yours to keep.

Name: Negeen Halabian

Signature: *negeen*