

# Fostering Community and Confidence for Women in STEM

CSC318H1: The Design of Interactive Computational Media

Chyna Hui	chyna.hui@mail.utoronto.ca
Cindy Ly	cindykim.ly@mail.utoronto.ca
Lucy Ma	lucyxinyu.ma@mail.utoronto.ca
Maggie Chen	maggiemc.chen@mail.utoronto.ca
Umayrah Chonee	umayrah.chonee@mail.utoronto.ca
Tina Zhang	yizhoutina.zhang@mail.utoronto.ca

TA: Brenna Li

Group: Pixelateers

March 13th, 2023

**Table of Contents**

<b>Design Alternatives</b>	<b>3</b>
Design 1 - AI matching	3
Design 2 - Mentoring	5
Design 3 - Live Database	8
<b>Paper Prototype of Design System</b>	<b>11</b>
Lo-Fi Demo	11
Explanation	11
Rationale	14
Advantages	17
Disadvantages	18
<b>Storyboards</b>	<b>19</b>
High-level Storyboard 1	19
High-level Storyboard 2	20
Screen-level Storyboard 1	21
Screen-level Storyboard 2	22
Screen-level Storyboard 3	23
<b>Evaluation of Low-Fidelity Prototype</b>	<b>24</b>
Description of Study Protocol	24
Think-Aloud	24
Heuristic Evaluation	24
Summary of Key Findings	25
Think-Aloud	25
Heuristic Evaluation	27
<b>Lessons Learned and Implications for Design</b>	<b>29</b>
<b>Contribution Table</b>	<b>31</b>
<b>Appendix</b>	<b>33</b>
A. Think Aloud Study Protocol & Consent	33
B. Heuristic Evaluation	35
B1. Study Protocol & Consent	35
B2. Heuristic Evaluation Form	37
C. Video Recordings of Think Aloud Sessions	38
D. Evaluation Participants	38
D1. Experts Used For Evaluation	38
D2. Our Team Members that Served as Experts	38
E. Group Meeting Notes	39

## **Design Alternatives**

### Design 1 - AI matching

### **Sketches**

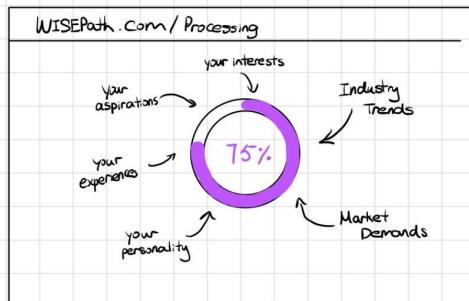
### Design Concept I : WISEPath

WISEPath.com / who-are-you	
<p><b>WELCOME !</b></p> <p>Options :</p> <p>1) Share your résumé 2) Tell us about yourself!</p> <p><input type="button" value="Upload"/> <input type="button" value="Questionnaire"/></p> <p>Ready to explore your future?</p> <p><input type="button" value="YES!"/></p>	 <p>USERNAME</p> <ul style="list-style-type: none"> <li>Age</li> <li>Degree</li> <li>Career</li> </ul>

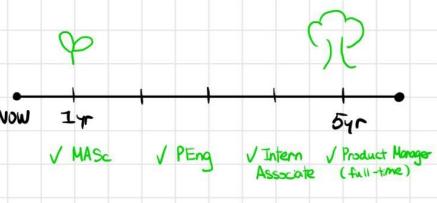
Upon login, system prompts user to input personal information, either through resume upload (which computer identifies keywords from) or a questionnaire.

WISEPath.com / recommendations	
<p><b>Education</b></p> <ul style="list-style-type: none"> <li>Masters of Science (2 years)</li> <li>Masters of Engineering (1 year)</li> </ul> <p><b>Career</b></p> <ul style="list-style-type: none"> <li>Data analyst - Co-op - 4 months</li> <li>product manager - part-time - 12 months</li> </ul>	   

Computer outputs a set of recommendations for next steps, and user may up/down vote options which further fine tunes the algorithm.



The computer identifies strengths, weaknesses, interests, and other personal data and performs an analysis in combination with contextual information (eg industry and market trends).

WISEPath.com / timeline	
<p><b>TIMELINE OVERVIEW</b></p> 	

Timeline overview to help facilitate long term planning and drawing connections between education and job prospects.

This design concept uses an AI-driven process to provide personalised career path recommendations to help women find meaningful and fulfilling opportunities in STEM. The algorithm takes in user input through a questionnaire that collects information on the user's educational background, work experience, interests, and achievements. After the algorithm analyses the input data to identify strengths, weaknesses, and areas of interest of the individual, the software is informed with contextual information such as the trends in the industry, market demands, and job opportunities to recommend various career paths and education in STEM fields, along with the required skills and qualifications. The user can choose to upvote or delete recommendations to provide feedback to the algorithm, which will help to improve the relevance and accuracy of the recommendations. The overarching goal of the software is to facilitate the process of identifying career opportunities in STEM that women may not have

considered otherwise and help women navigate their career paths to make informed decisions regarding their career development.

### *Advantages*

#### 1. Personalization of Recommendations While Keeping Breadth:

The user is able to guide the AI model with upvotes and downvotes, making the algorithm much more personalized to the user. Therefore, while the AI is able to maintain the breadth of information that it has collected from all the resources online, it is able to give suggestions specific to the user.

#### 2. Exposure to Opportunities Outside of Network

Since the AI model is able to go through the resources available throughout the internet, it works great to expose the user to all the different opportunities that exist; this can help address the concern user's have that their limited network prevents them from discovering new opportunities.

### *Disadvantages*

#### 1. Less Advantageous for Minority Groups

An AI model is less likely able to address the specific needs of women who are in minority groups, as such models generally don't have enough information to be able to give adequate, accurate, and personalized information.

#### 2. Lack of Community Building

There is no community building of the user with other women in STEM, whether that includes other students, or other women further in their career. From our primary research, women in STEM found the sense of community to be lacking, and would want to have more opportunities to comfortably connect with others. Therefore, this is a noticeable disadvantage with this design alternative.

## *Unique Feedback from Users*

### 1. Privacy:

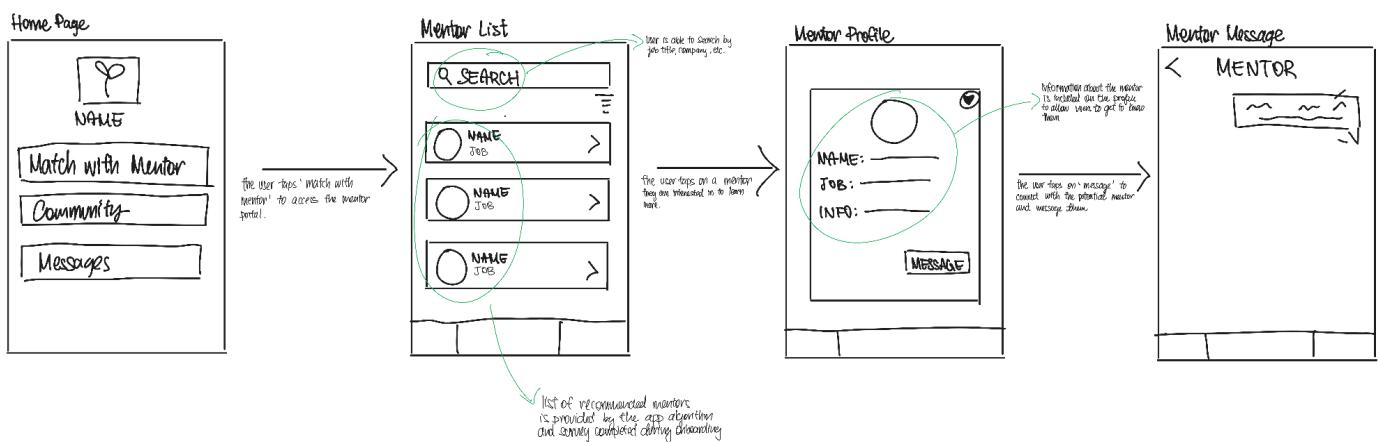
One user expressed concerns about the privacy of data: since the model will be providing specific information based on the user's background and circumstances, there should be robust measures that protect the privacy of the user.

### 2. Changing Preferences/Goals:

A user wondered if there was a way to revert the model back to a certain stage of "learning" about the user: for example, if the user was still interested in marine biology, but no longer wants to pursue a governmental research position, is there a way that the model can "forget" this about the user, or would the model have to relearn the change of preferences?

## Design 2 - Mentoring

### Sketches



This design concept consists of a personalized matching algorithm that will give users a list of compatible mentors based on their background, education, experiences, and interests to connect with. A theme from our research indicated that participants who identified as women in STEM found networking and connecting with colleagues in male-dominated workplaces to be

intimidating. The mentorship design concept aims to alleviate the stresses experienced in this process by fostering a sense of community thus, empowering women in STEM. Additionally, this design concept also targets the pain-point identified in our research that individuals often could not relate deeply to their mentors' experiences and backgrounds. To promote the formation of quality relationships, this design concept addresses the need to go beyond connecting individuals of the same gender, but prioritize the unique backgrounds of each individual.

### *Advantages*

#### 1. Personalised Guidance:

Our primary research indicated that participants who participated in formal mentorship programs sometimes found their mentors to be non-identifiable individuals. This solution gives mentees the opportunity to personalise their mentorship experience based on their background, education, and goals. Due to the flexible nature of our mentorship platform, users will also be able to connect with multiple mentors at a time, allowing them to gain support from various individuals.

#### 2. Diversity & Accessibility:

Our solution recruits diverse mentees and mentors to create a rich community of unique individuals, fostering a safe space for Women in STEM. In addition, the nature of our mentoring system will be more flexible and informal, therefore, mentees can connect with mentors at any time as long as they have access to a smartphone.

### *Disadvantages*

#### 1. Limitation in The Amount of Mentors:

The feature requires a large and diverse mentor database to effectively match users to a compatible mentor, which could be difficult to achieve in the beginning stages of app development.

#### 2. Incentivizing Mentors:

This solution relies heavily on the continued participation of secondary stakeholders willing to participate as a mentor. This will require time and effort from them which can be difficult to maintain long-term.

### *Unique Feedback from Users*

#### 1. Quality vs. Quantity:

One user mentioned they were worried about being able to form deep and meaningful relationships with their mentor, given that mentors could connect with multiple mentees at a time. They explained that the mentor they are interested in connecting with could have a busy schedule especially with so many mentees, and would be unable to spend a lot of one-on-one time with each mentee.

#### 2. Connecting With Non-recommended Mentors:

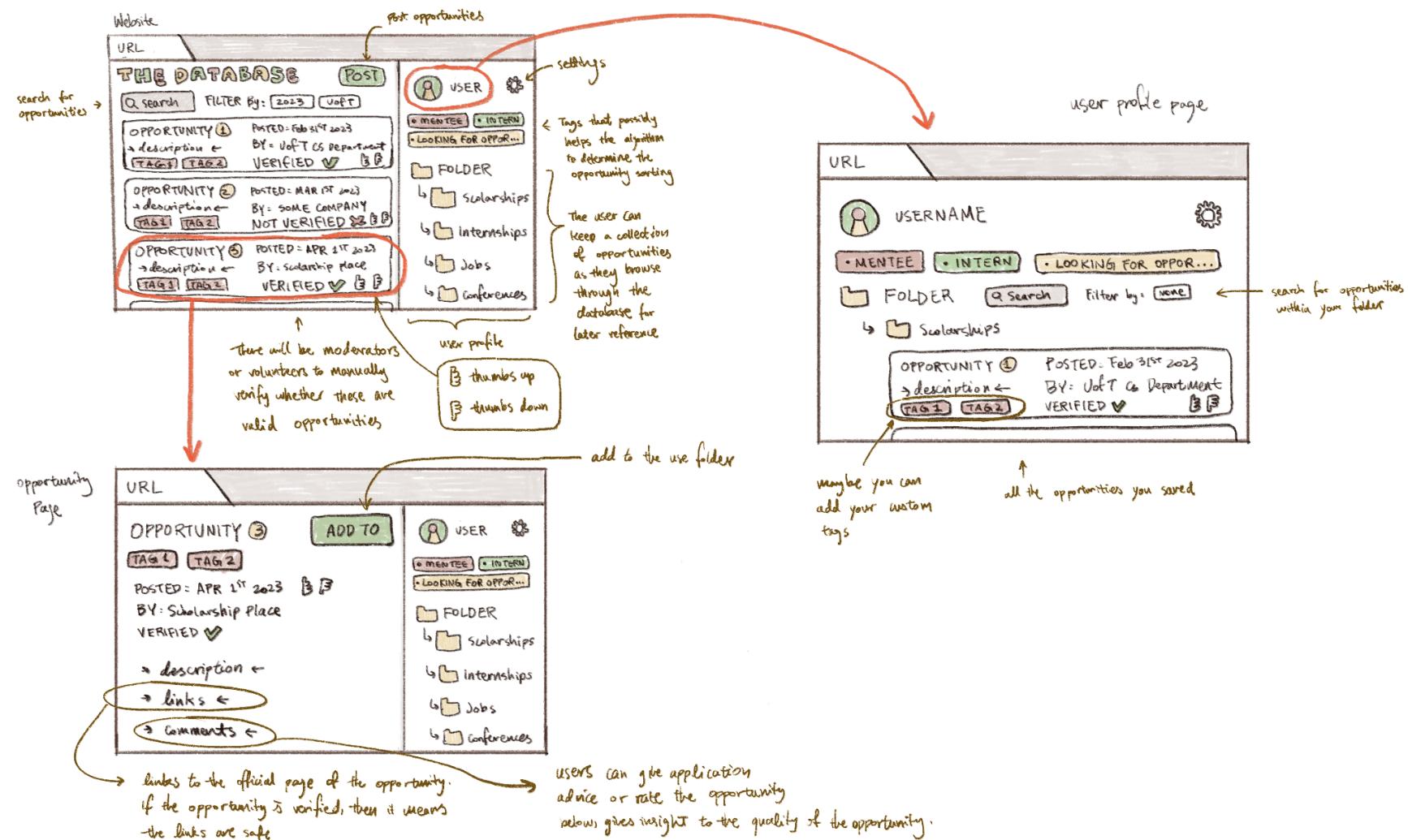
Another user expressed they would like the option to connect with mentors outside of their recommended matches. This user shared that they are currently in STEM but are unsure of their future path therefore, they would like to discuss with various professionals in differing STEM fields as part of figuring out what career path would be best for them.

### Design 3 - Live Database

This design concept is a live database that contains useful information and opportunities for women in STEM such as scholarships and fellowships, competitions, events, job opportunities, and available fundings. This database is constantly being updated and acts as a hub where our primary stakeholders are able to easily find opportunities, and our secondary and tertiary stakeholders are able to post about and share those opportunities. Our primary stakeholders are able to filter through opportunities by inputting specific keywords, industries, research interests, dates for events, education levels, and other relevant information. This design

concept aims to address a key finding from our field studies – that career opportunities in STEM depend on connections formed through networking, which is a pain point for women in STEM as they find it difficult to network. Therefore, women are not as exposed to different opportunities as compared to others. As such, this database aims to make it easier for women to find available opportunities.

## Sketch



### *Advantages*

#### 1. Centralised and Relevant Resource Hub:

Users are able to find relevant resources and opportunities such as scholarships, competitions, events, job opportunities and fundings all in one place without having to comb through numerous social networking sites (i.e LinkedIn, Glassdoor...etc.). They are also able to search for specific opportunities that are relevant to what they want to pursue by using, for example, keywords.

#### 2. Benefits Opportunity Offerers:

Mentors, individuals working in industry, or other users who want to present opportunities for our primary stakeholders - women in STEM -, can do so on this hub. Instead of trying to find different platforms to post the opportunities, it is easier to do so on the live database which will be used by targeted users who are women in STEM.

### *Disadvantages*

#### 1. Safety and Legitimacy:

Users who are primary stakeholders, more specifically women in STEM seeking opportunities, might be doubtful of the postings on the platform. Even if there are moderators to check the validity of the opportunities, users could still be doubtful.

#### 2. Familiarity With the Platform:

Users have to actively seek to learn how to use the platform and get familiar with it. This could defer users from wanting to use the hub.

### 3. Information Overload

The number of postings presented to a user who is seeking opportunities might be too much for the user to handle, especially when the algorithm does not accurately filter the postings. As such, it can get tiring for the user to look through all the opportunities in trying to find the most relevant ones.

#### *Unique Feedback from Users*

1. “Could have something that says how many other people are interested in a position or how many views it has. This database does not seem to be specific to women in stem. What prevents a man from making a profile and getting jobs? Maybe have something on the profile for pronouns, location would be nice too.”
2. “Why does the platform this database runs on have to be a website? This might make it confusing for university students since we already have so many job boards and career related websites such as the UofT’s award pages and Clnx. Using a different platform such as an application might be better. The design of the folders area is a bit redundant, you can probably just have a button that says ‘add a folder’ so the user can add folders themselves.”

## **Paper Prototype of Design System**

### Lo-Fi Demo

Link:

[https://drive.google.com/file/d/1ISON1YI\\_ZY96gsX9M4DeiLwPHkZUBUcE/view?usp=sharing](https://drive.google.com/file/d/1ISON1YI_ZY96gsX9M4DeiLwPHkZUBUcE/view?usp=sharing)

### Explanation

#### *Login Page - Profile Setup*

Upon sign in, the user may choose a username, password, and agree to terms and policies in order to register for a personal account. The user may then indicate a preference for using the app primarily to seek and/or provide mentorship. The user will then be prompted with topic suggestions for areas of interest in STEM, which the user may select as many as she would like. The user will be prompted with a questionnaire that aims to survey the user's interest and goals. The information collected here will act as the first input into the algorithm to generate recommendations that may be relevant for the user.

### *Welcome Page - Matching*

Once the user profile is set up, the user will be taken to a welcome page with recommendations for mentors/mentees to reach out to based on the user inputted information including the questionnaire. As a user seeking mentorship, she may request for mentorship from the list of profiles recommended or further explore using filters to fine tune the suggested results. The user may review a particular mentor's profile, and choose to request for mentorship or return to the home page to browse other profiles. Upon receiving a mentorship request, a pop-up notification will be displayed from the top of the screen, where the user/potential mentor may approve or deny the request.

### *Company Profiles*

In addition to providing information on mentor/mentee profiles, company profiles including basic information such as name, geographical location, and main services will also be available for reviewing. Companies may request for badges that signify a company's resources, opportunities, and support systems available for women in STEM. Examples that may earn such badges include mentorship programs, maternity benefits, and gender equality initiatives such as Google's "Grow With Google for Women in STEM" summer initiative that trains women engineers and engineering students in cloud technology. These badges promote gender diversity

and inclusion in the workplace to become a key indicator of a company's social standing. The badges also aim to encourage major corporations to invest in supporting the growth and development of women in STEM.

### *Forum*

The forum acts as a community gathering for women in STEM to share advice, experiences, and insight with each other. Users can post, comment, vote, discuss, and connect with other users to encourage community building and networking. Posts have tags that allow users to filter forum discussions by topics and search for keywords that are relevant to the information she is seeking. The user may start a discussion topic board, asking a question or proposing a topic for discussion. Then, community users can comment on the board replying through threads. The user may delete the discussion board at any time point. The user may click on user's profile in the forum to view their basic profile information, where there is a messaging button available which will redirect the user to the main messaging page (elaborated below) where the user on the receiving end may preview the message and a conversation can only begin if the user approves the request. All users are expected to respect the privacy and safety of others, and there will be users who are recruited to manage the community as moderators. Users are expected to abide by the platform-wide rules agreed by the user upon sign-up of an account, and the community rules are enforced by moderators explicitly as well as users through up/downvotes implicitly.

### *Messaging*

The messaging dashboard contains 3 tabs: Direct Messages, Mentorship Requests *Received*, and Mentorship Requests *Sent*. The Direct Messages tab includes all messages from users on the platform, whether they are mentors, mentees, or peers discovered through the forum community. The Mentorship Requests *Received* tab allows the user to approve or deny requests. The Mentorship Requests *Sent* tab allows the user to review all requests sent with a status of

“Pending” response. If a user approves a mentorship request, the request will be moved from the Received tab to the Direct Messages tab, where a conversation between the pairing may begin.

### Rationale

#### *Matching*

The mentor and mentee matching feature begins with a survey which identifies the user’s key characteristics, such as their demographic, educational background, and what they are looking for in a mentor or mentee, such as a specific career field. Firstly, the mentor and mentee matching feature itself stems from pain points that were discovered during our field studies. One of the reasons preventing participants from having mentors came from the lack of identifiable role models. More specifically, many participants expressed there was a lacking presence of women in STEM spaces such as classrooms, experiential learning opportunities and leadership positions. Therefore, this feature helps to connect women in STEM to role models who would act as their mentor. Evident in our field studies, communities and mentors that offer help, encouragement, and support and share the same interest greatly help in furthering one’s career in STEM. In addition, the survey is used to provide a personalised experience and is used by our filtering algorithm to recommend more compatible mentors and mentees to our users. This comes from a finding in our field studies that suggests that mentors who did not share similar experiences with a mentee were not as helpful to them. Even when the mentor is in a similar field as the mentee, other factors such as their career path, demographics, and background play an important role in the advice and mentorship they offer. We should note that this feature fulfils the third design requirement: “The system must take a user’s demographic and background into consideration because women need role models who have experienced a similar growth trajectory.”

Furthermore, this feature also allows men to be role models and mentors for women in STEM. As was found in the field studies, many STEM fields are perceived as being male-dominated

and women find it difficult to establish relationships and connections with men. Additionally, our field study discovery showed that women experience or observe hostile and disrespectful attitudes from men, and the resulting dynamic creates a barrier for women to network with men in the field. With this feature, we attempt to bridge this gap and offer women in STEM a safe space to broaden their network with not only women, but male role models as well. Thus, fulfilling the fourth design requirement: “The system must encourage collaboration between both males and females to bridge the gender gap in STEM through facilitating collaboration and communication in a safe space.”

Moreover, this feature allows women in STEM to be connected to multiple mentors in comparison to other platforms or mentorship programs that usually only allow one. This flexibility provides women with more opportunity to find the mentor that is the most helpful to them.

### *Forum*

The forum or “chat room” feature of the platform is a space for women in STEM to connect with each other, expand their network and build a community. The need for this feature on this platform stems from the pain point of women feeling like they are looked down upon, underestimated, or condescendingly talked to on the basis of identity. Therefore, this feature provides a safe space where women are able to communicate with each other, especially fellow women in STEM. They are able to have discussions with others who have gone through similar situations and gain advice on how to overcome specific barriers that only pertain to women in STEM. We should note that this feature fulfils the first design requirement that was identified in the first phase of the project: “The system must provide encouragement to women studying in STEM to reduce imposter syndrome and promote confidence in order to better navigate male-dominated workspaces.”

This feature is also motivated by a key finding from our field studies, where access to career opportunities in STEM seems to depend on connections formed through networking. If we couple this finding with the pain point of a lack of female role models and presence in STEM, this feature acts as a solution. This forum can be used to identify like-minded individuals who would like to work together on projects that will help further their career. This is especially relevant to STEM because students are often encouraged to work on side-projects and to participate in events like hackathons to build their resume. Therefore, this feature motivates women to act on the opportunities that are available to them. We should note that this feature fulfils the second design requirement that was identified in the first phase of the project: “The system must allow women in STEM education to find other women in STEM education and/or industry who have faced similar barriers.”

### *Company Profile*

The ‘Company Profile’ feature included in the prototype of our app poses a solution to pain-points identified by our stakeholders in our preliminary research. A badge is displayed next to relevant companies that have been identified as a company that actively works towards creating a safe and inclusive environment for women in the workplace. By tapping on the badge, users are able to access a more detailed view. This can include relevant company initiatives, or demographic information about the number of female employees, such as those in senior positions. The purpose of this feature is to increase transparency in the relationship between employers and potential applicants. The transition from school to work is a process that has many obstacles that individuals face, with female identifying individuals facing an even greater amount. Work culture was identified as a major factor that was taken into consideration when applying for roles and because the STEM field is male-dominated, research participants found this to be intimidating to approach. By promoting companies that are attempting to prompt change in their culture, users are empowered to make informed decisions about the company and

environment they choose to work in which satisfied our first design requirement. This feature additionally poses as encouragement to other companies to promote change within the organisation and be recognized for it when being presented to potential new employees. This feature can be considered as a start to addressing the ways in which companies are attempting to address the systemic social problem that is gender-based issues within the STEM field.

### Advantages

1. One of the advantages that our prototype offers is extensive network building. Not only are there ways to communicate with mentors, but there are ways to discover communities centered around topics of interest, initiatives, and more. From the research phase, it was commonly stated that women in STEM felt that opportunities or events were lost because of this lack of network, so our solution broadens the horizons of who they can reach and what they are exposed to to address this pain point.
2. Another advantageous feature of our prototype is the matching process on our app. Recommended mentors based on an initial survey of past experience and background of the mentee will appear as its own page, and mentees can determine who they would want to connect to. This allows much more freedom and gives the mentee more choice on who they would want to connect with and how many, as opposed to the rigidity often seen in mentorship programs, where mentees are assigned to just one mentor, without knowing any of the mentor's past experiences.

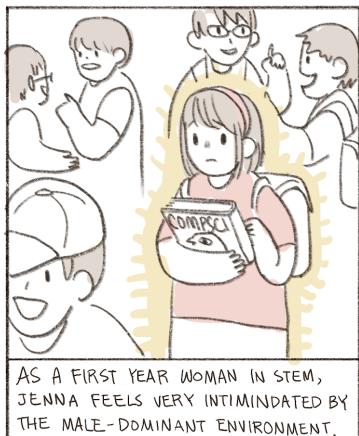
### Disadvantages

1. The value of the app depends on what the user makes of it. This is often the case with many different apps, such as LinkedIn, but is still a limitation that should be addressed.
2. As our solution would be centered around the mentorship relationship, there is less support for private and direct mentee to mentee connections, if it is desired.

Communication is still encouraged in the forums, but the purpose of the app is more centered around aiding mentees in forming relationships with mentors.

## Storyboards

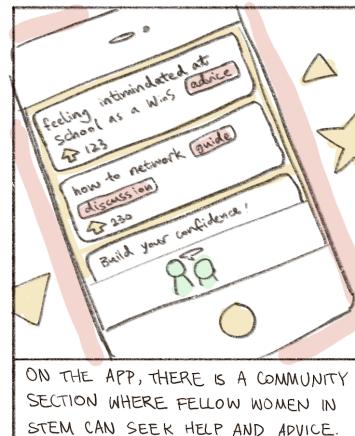
### High-level Storyboard 1



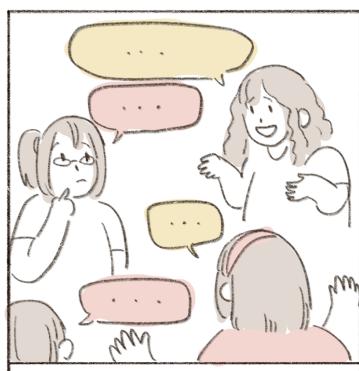
AS A FIRST YEAR WOMAN IN STEM, JENNA FEELS VERY INTIMIDATED BY THE MALE-DOMINANT ENVIRONMENT.



THROUGH SCHOOL NEWSLETTER, SHE DISCOVERED THE WOMEN IN STEM SUPPORT APP.



ON THE APP, THERE IS A COMMUNITY SECTION WHERE FELLOW WOMEN IN STEM CAN SEEK HELP AND ADVICE.



JENNA STARTED TALKING TO OTHERS ON THE FORUMS, AND REALIZED A LOT OF OTHER PEOPLE SHARE HER PROBLEMS AND EXPERIENCES.

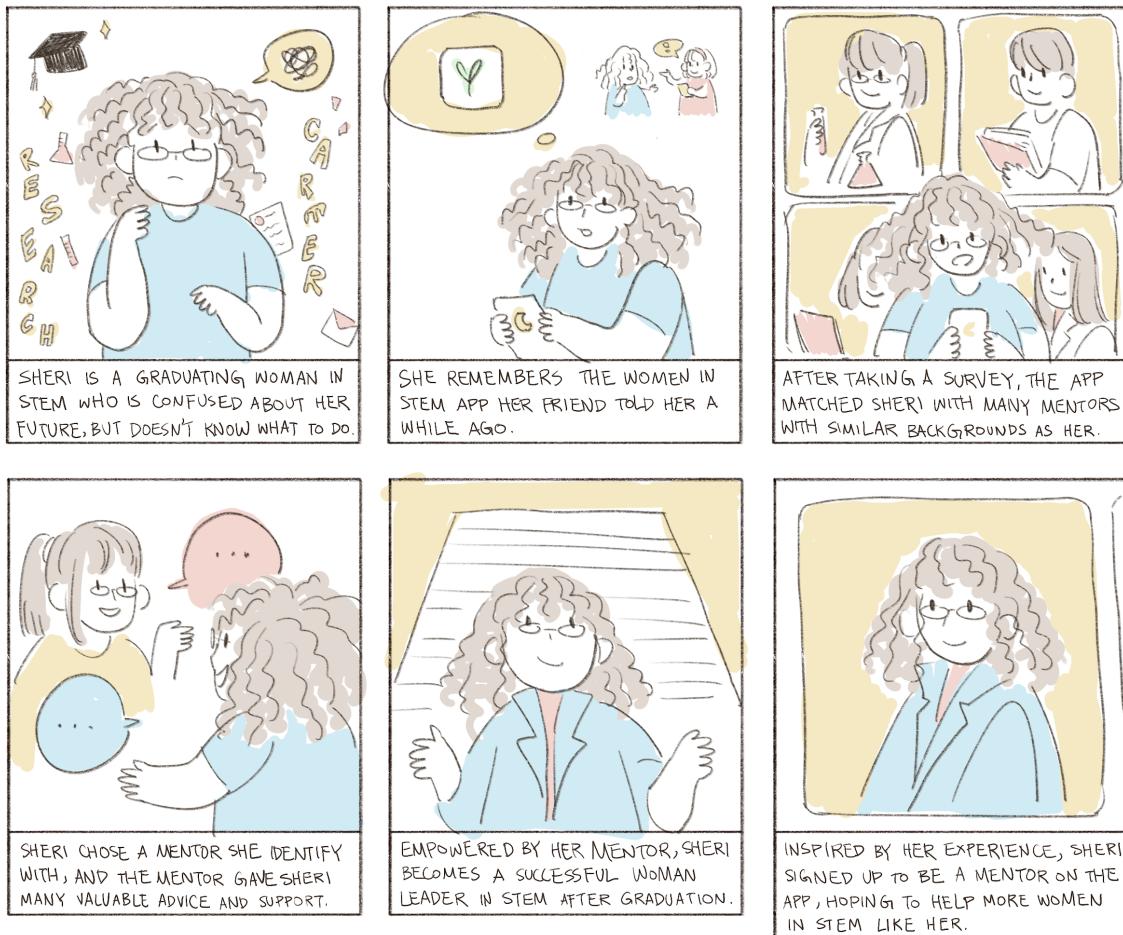


EMPOWERED BY THE ADVICE AND EXPERIENCES OF OTHERS, JENNA IS ABLE TO FEEL MORE AT EASE IN HER SCHOOL, AND MAKE FRIENDS.



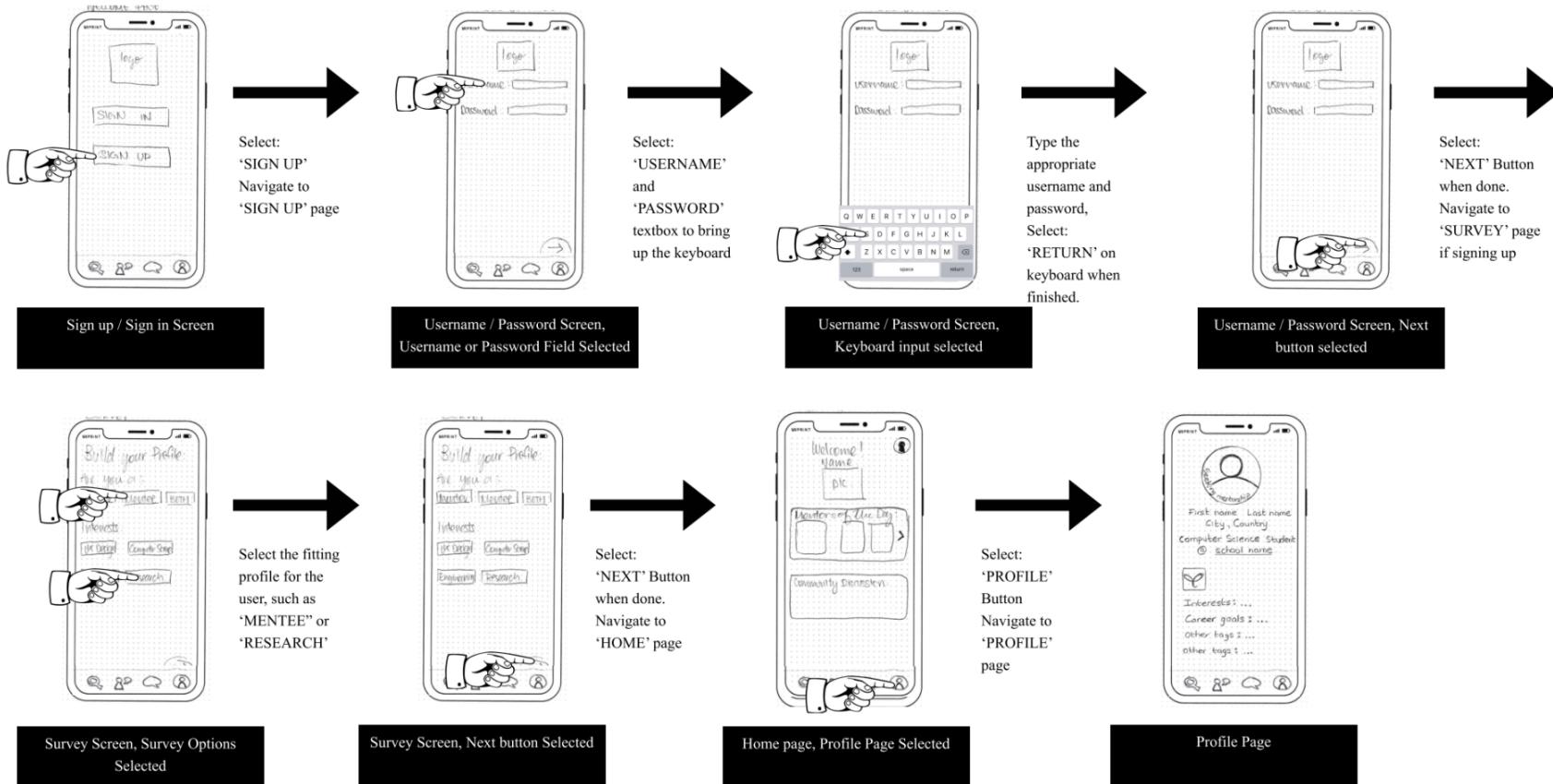
KNOWING THERE IS A COMMUNITY THAT CAN SUPPORT HER THROUGH THESE PROBLEMS, JENNA FEELS CONFIDENT AND OVERJOYED.

## High-level Storyboard 2



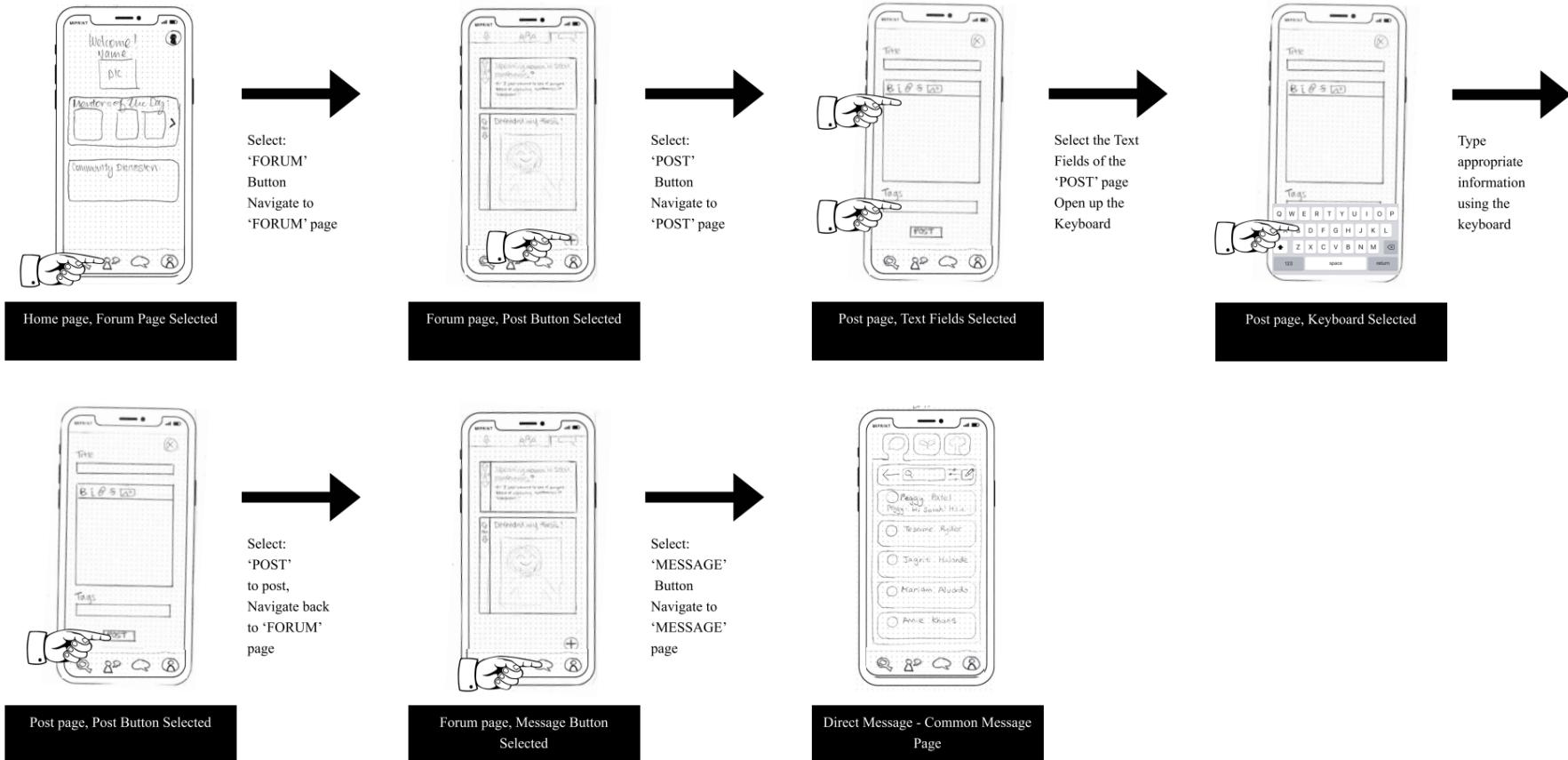
## Screen-level Storyboard 1

### SIGN UP, FILL IN SURVEY, AND VIEW PROFILE



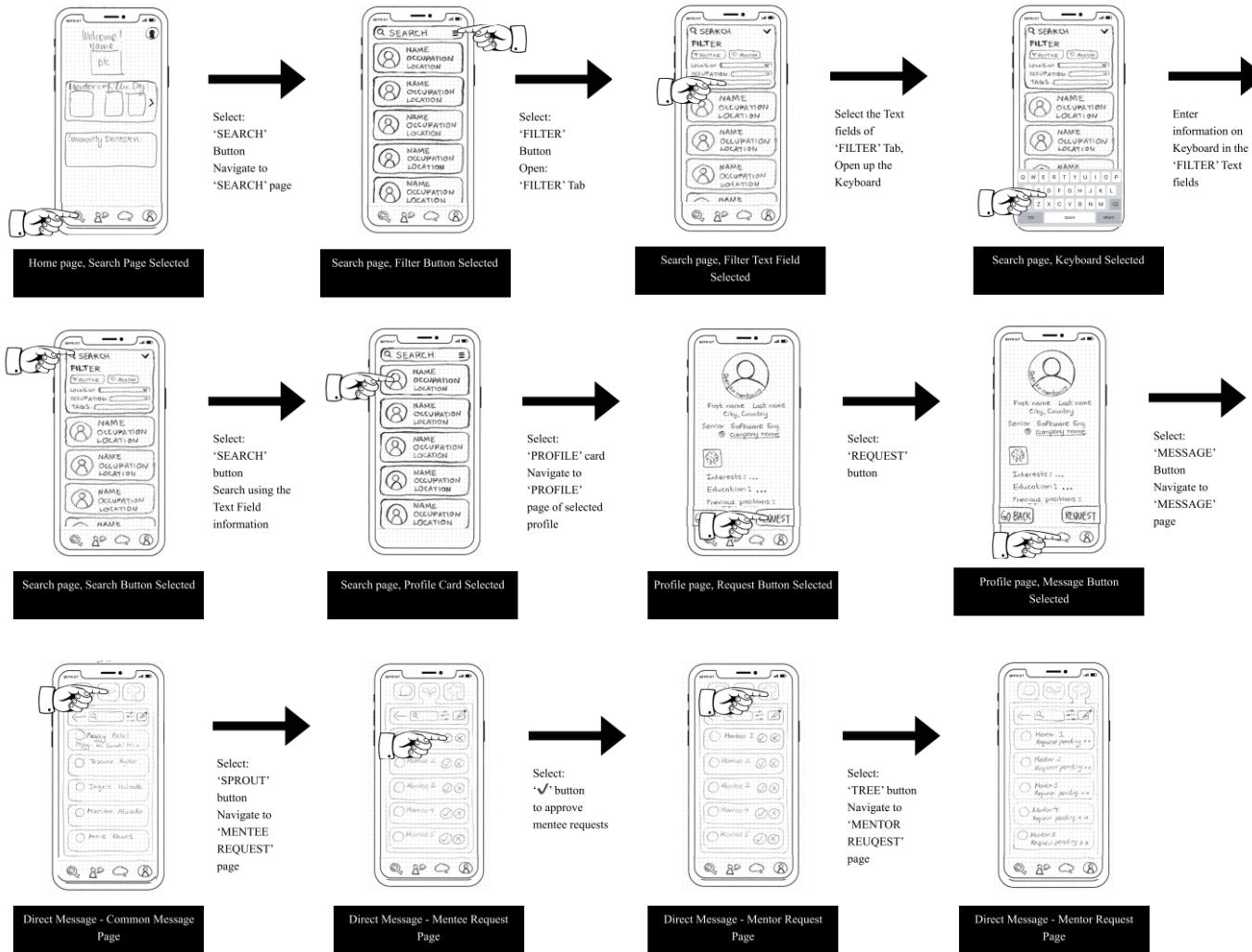
## Screen-level Storyboard 2

### **POST ON FORUM, VIEW PRIVATE FORUM DMS**



## Screen-level Storyboard 3

### FINDING MENTORS, SENDING AND RECEIVING MENTOR REQUEST



## **Evaluation of Low-Fidelity Prototype**

### Description of Study Protocol

#### *Think-Aloud*

The think-aloud evaluation was conducted with six female participants to align with our target users ([Appendix C](#)). A study protocol was provided to each participant outlining the purpose and process for the evaluation of our project ([Appendix A](#)). Additional information such as risks, confidentiality clause, and data to be collected was also included for participants knowledge. A consent form ([Appendix A](#)) was presented to each participant to sign prior to the evaluation outlining the above information. Consent to be recorded was also reconfirmed at the start of the evaluation. Two team-members participated in the think-aloud session, one facilitating and interacting with the participant and prototype, and the second observing and taking notes. The participant was presented with different tasks; creating an account as a new user, finding and connecting with a mentor, access a community discussion and creating a post, viewing messages, viewing pending mentor requests, and accessing the users profile. After providing the task, the participant verbally described their thought process and actions ‘tapping’ on various buttons on the paper prototype as the facilitator provided the next screen until they completed all the tasks. The think-aloud sessions were also recorded in video format for internal reference ([Appendix C](#))

#### *Heuristic Evaluation*

Five participants were recruited to conduct a heuristic evaluation on our low-fidelity paper prototype. The study protocol and consent form for the evaluation was given to each participant to read and sign prior to the study ([Appendix B1](#)). Three participants were colleagues from CSC318, one industry professional, and the final, an external UX student.

One participant who did not complete a think-aloud evaluation was provided a brief explanation of the application and flows using the paper prototype by a team member. Next, the Heuristic Evaluation Form ([Appendix B2](#)) was provided to the participant to complete on a computer while going through the paper prototype. The form prompted the participant to identify as many good and bad features in the prototype as they can. Additionally, each feature was instructed to be matched to a heuristic and rated based on the given [severity rating scale](#). The participant then had the freedom to navigate through the flows of the paper prototype and enter their respective ratings into the form.

### Summary of Key Findings

#### *Think-Aloud*

##### 1. Likeable Concept & Aesthetics:

After participants had finished the think-aloud session, the facilitator asked them to share their overall opinions on the app. Most participants mentioned they liked the concept of the app and found certain components to have a lot of potential to be useful. For example, a participant shared they liked the ‘Mentor of the Day’ widget on the homescreen which highlights mentors who have done exceptional work. They believed that this is a nice way for mentors to be recognized for their hard work and it also incentivizes them to continue mentoring. On the other hand, participants also expressed they liked the aesthetics of the app and thought the design was clean. For instance, a few participants liked the Sprout and Tree analogy and thought it added a playful touch to the app.

Gaining positive feedback is important during the design process as it validates the concept of our app and gives us an indicator about what is working well.

By using this feedback, we can gain a better understanding on what our demographic likes and what components we should continue forward with.

## 2. Inability to Recall or Understand Icons:

Participants showed signs of hesitation when asked to navigate to the Messages or Forum page. It was later revealed by these individuals that they were unsure of which menu bar icon to select as both were very similar. Instead, the majority of users would tap on the ‘Community Discussion’ widget on the homepage in order to access the Forum page. The purpose of this widget is to highlight certain discussion posts that the user might be interested in. While users are able to access the Forum page through this widget, we would also like users to be able to differentiate between the Messages and Forum icon in the menu bar. Another issue participants encountered was figuring out what the Sprout (mentee requests) and Tree (pending mentor requests) icons meant. As these are non-conventional icons, participants were unfamiliar with them, leading to hesitation and confusion when the facilitator asked them to carry out a task that would require interaction with these icons. In some cases, facilitator intervention was required in order for the participant to move forward, proving that this was a significant pain point in navigation.

These pain points are significant to our current design as it indicates that more work needs to be done to ensure intuitive navigation throughout the app. For example, the menu bar is a component that will consistently appear on all pages, making it the keystone to navigation. By implementing the appropriate changes, this will increase user freedom and efficiency of use. Furthermore, we can focus on making all icons easier to recognize, so that users can focus on the functionality of the app without compromising their cognitive load.

### 3. Friction Within Information Architecture:

Most participants indicated some degree of confusion during the Messages tasks. When asked to find the page where they can view their mentorship requests from mentees, they stated that they did not expect to also be a mentor as well since they initially only chose to be a mentee during the onboarding process. As a result, participants showed hesitation, with some being unable to carry out the task entirely. One participant stated that they expected “some sort of toggle to switch in between [the] accounts” of a mentor or mentee. This indicates that there are some pain points within the app’s information architecture (IA).

The idea behind this function was to allow peer to peer mentorships, further fostering a sense of community. However, the think-aloud evaluations indicate that the current flow of our IA does not seem to be intuitive for users and distracts from the primary purpose of the app which is to allow target users, mentees, to find a compatible mentor. Therefore, we will have to consider making changes to the current interface architecture while keeping in mind the community values that our app is based around.

## *Heuristic Evaluation*

### 1. Clean & Intuitive Design:

The platform is implemented in a clean manner and has a minimalistic, yet aesthetic design. The platform is also efficient and easy to use. For instance, its efficiency can be demonstrated through being able to filter through a list of mentors using specific keywords instead of browsing a long list of recommended mentors.

It is imperative for our platform to be easy to use so that it is accessible to a large audience. We do not want this platform to be yet another barrier for women in STEM. This feedback confirms our design choices.

## 2. Unfamiliarity with Icons:

It is difficult to understand the sprout and tree icon that was used to denote mentees and mentors because they are not conventional icons, nor are they seen on other platforms. Therefore, the screens where users can manage requests from mentors or mentees are not intuitive and are confusing.

It is crucial for our users to be able to easily identify the icons that are used on the platform so that navigation on the platform is intuitive. This feedback points out that we need to either find different icons to differentiate between mentees and mentors, or we should include a quick tutorial for users at the start of their journey with the platform that would introduce them to these two icons specifically.

## 3. Lack of Flexibility of Use:

There is a lack of back buttons or a home button to navigate the different screens on the platform.

It is important for users to be able to navigate back to the homescreen to view their dashboard as this serves as the foundation of the user's experience. It is also important for users to be able to go back to previous pages instead of going all the way back to the home screen while they are within the secondary pages of a specific feature. These two features were overlooked while designing the low-fidelity prototype. This feedback indicates our current design would need to be updated to support these features.

#### 4. Lack of Error Prevention Screens:

There is a lack of error checking throughout the platform. For instance, checks like “Are you sure you want to do X?”.

Error checking is paramount on such platforms so that users do not accidentally make changes or take actions in error. This is specifically important in features like the forum, discussion board, or while trying to request mentors for mentorship. We do not want users to accidentally create, delete, or comment on posts accidentally. Therefore, our current design would need to be adjusted to include an error checking interface at various points.

#### 5. Inefficiency of Coupled Functions:

Having the mentor and mentee view coupled together for all users can be confusing: “If I signed up as a mentee, why am I getting or able to see mentee requests?” Moreover, there was the mention that this way of design might distract from the core idea of the “matching” feature, which is to match mentees with mentors.

This feedback stabs at a core design choice that was made, which is whether we want to couple the views for the mentor and mentee together, or have separate interfaces for each. This choice comes into play because a user can be both a mentee and a mentor. This finding suggests that the current design that was chosen, which is coupling both in the same view, is not efficient. Therefore, we should look into either decoupling the views or finding a way to make the view more intuitive if we decide to keep both views together.

## **Lessons Learned and Implications for Design**

### *Think-Alouds*

Feedback is crucial in the design process to understand what works well and the preferences of the target demographic. Positive feedback on the app's concept and aesthetics informs the design criteria of necessary features that must be implemented. Another lesson learned is that non-conventional icons and confusing menu bars can create significant pain points for users, negatively affecting the user experience in navigation and task completion. Finally, information architecture that does not align with user expectations can lead to confusion and interruption in the navigation of the software's features, negatively affecting user engagement.

Changes to the current design should include creating recognizable icons to make the navigation experience intuitive. For example, the Messages and Forum icons need to be more distinct from each other in the menu bar, and should use more conventional symbols such as a single message bubble versus multiple speech bubbles to indicate a community discussion:

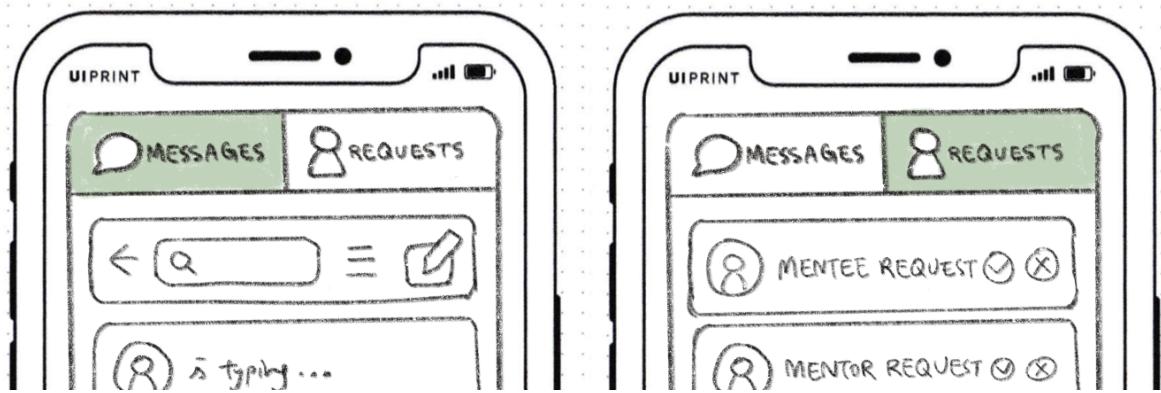
Messages



Forum



To better differentiate between mentor and mentee requests, the use of non-conventional icons such as a sprout versus a tree should be removed and replaced with a single tab containing both incoming and outgoing requests.



Also, while the design aims to engage women in STEM to support each other through peer-to-peer interactions, the interface with functionalities that support communication between users need to be more straightforward and focused, since giving the user a surplus of options leads to confusion. To accomplish this, the design team should prune some features of the software to allow the user to select to become either a mentor or a mentee when signing up for an account using the software to prevent role confusion as experienced in the Think-Aloud.

### *Heuristic Evaluation*

Lessons learned from the feedback received from the heuristic evaluation include the importance of having a clean aesthetic and a minimalistic design that is also intuitive and efficient. Additionally, it is crucial to use conventional icons and include error checking to avoid user mistakes. It is also essential to provide feedback to the user through confirmation screens and error messages. Furthermore, the design should include navigation buttons like a home button and back buttons for easy navigation.



Based on these findings, changes to the current design should include finding conventional icons or providing a tutorial to users to differentiate between mentees and mentors. The design choice of coupling the mentor and mentee views should be re-evaluated to ensure that it is intuitive and not confusing to users. Error checking should be implemented to avoid user mistakes, and confirmation screens should be included to provide feedback to the user. The design should include features that allow users to confirm their actions to avoid confusion and make it easy to identify system status.

## Contribution Table

Member	Task	Estimated Time (hr)
Chyna	Prototype Evaluation and Facilitating	2
	Writing-Design Alternative (Mentorship)	1
	Writing-Design Feature Rationale (Company Profile)	1
	Writing-Evaluation Description (Think aloud, heuristic)	3
	Appendix Organization	0.5
	Proof-reading	0.5
Cindy	Presentation 2A	1
	Presentation S2A	1
	Writing: Design Alternative 2	1
	Think-Alouds (5) + Demo Video	4
	Think-Aloud Notes & Transcript Processing	1
	Writing: Summary of Key Findings (Think Aloud)	1.5
Lucy	Writing: Protocol & Consent	1
	Proofreading	1
	Appendix Organization	0.5
	Presentation S2A	2 hr
	Writing: Design Alternative 1	1 hr
	Paper Prototype	2 hr
Maggie	Writing: Rationale behind paper prototype explanation all features	2 hr
	Writing: Lessons Learned and Implications for Design	2 hr
	Proofreading	1 hr
	Paper Prototype	1.5 hr

	Writing: Design Alternative 1 (Disadvantages/Advantages and Unique Feedback)	1 hr
	Writing: Paper Prototype Advantages and Disadvantages	0.5 hr
	Conducting and Participating in Think Alouds	2 hr
	Presentation Slides	1 hr
	Proofreading	1.5 hr
Tina	Paper Prototype	1.5 hr
	Presentation Slides & Presentation	1 hr
	Storyboards (High-level + Screen-level)	3 hr
	Think Alouds & Heuristics	1 hr
	Proofreading	1 hr
	Sketches	1.5 hr
Umayrah	Paper prototype designing	1.5 hr
	Writing: Design Alternative 3 (Mentorship) and advantages and disadvantages	1 hr
	Writing: Rationale for “matching” and “forum” features	1.5 hr
	Writing: Summary of key findings for heuristic evaluations	2 hr
	Helped with conduction of 2 think-alouds - taking notes	0.5 hr
	Presentation slides	1 hr
	Proofreading	1 hr

## Appendix

### A. Think Aloud Study Protocol & Consent

## Research Protocol - Women in STEM App

1. **Project Title:** Think Aloud Evaluation on a Personalized Matching & Networking App for Women in STEM.
2. **Investigators:** Chyna Hui (chyna.hui@mail.utoronto.ca), Cindy Ly (cindykim.ly@mail.utoronto.ca), Lucy Ma (lucyxinyu.ma@mail.utoronto.ca), Maggie Chen (maggiemc.chen@mail.utoronto.ca), Umayrah Chonee (umayrah.chonee@mail.utoronto.ca), Tina Zhang (yizhoutina.zhang@mail.utoronto.ca)
3. **Purpose:** The purpose of our research is to test a low fidelity app that aims to provide support to women-identifying students in STEM education. This app aims to connect women with industry professionals, and other peers within a safe and inclusive space.
4. **Process to be followed:** After asking participants to read and sign our consent form, we will conduct a think aloud evaluation on chosen participants who fit the criteria of our target users. The facilitator will ask participants to interact with the system, while voicing their thoughts aloud. This process will be filmed with consent from the participants.
5. **Participant selection:** Participants will be women who are currently studying in a STEM field wishing to pursue STEM as their career path.
6. **Relationships:** Our relationship to the participants may be described as follows: friends, acquaintances, and peers.
7. **Risk and benefit:** There will be minimal risk to the participants, for example that they feel that they have wasted their time. The only benefit will be to contribute to the education of the investigators. Participants are free to withdraw before or at any time during the study without the need to give any explanation.
8. **Consent details:** We will brief the participants about the purpose of the study, and explain the attached consent form to them, and ensure that they consent to participate and sign the consent form.
9. **Compensation:** Participants will receive no compensation.
10. **Information sought:** The information to be sought is how usable our low fidelity prototype is. We aim to see user patterns and utilize insights to further improve on our prototype.
11. **Confidentiality:** Information will be kept confidential by the investigators. Names or other identifying or identified information will not be kept with the data. The only other use will be to include excerpts or copies in the assignment submitted, but names and other identifying or identified information will not be submitted.

## **Consent Form: Supports for Women in STEM**

I hereby consent to participate in a research study conducted by Chyna Hui, Cindy Ly, Lucy Ma, Maggie Chen, Umayrah Chonee, Tina Zhang  
for an assignment in University of Toronto Computer Science 318, *Design of Interactive Computational Media*.

I agree to participate in this study, the purpose of which is to test a low fidelity app that aims to provide support to women-identifying students in STEM education.

I understand that:

- The procedure to be used is a think aloud evaluation.
- I will receive no compensation for my participation.
- I am free to withdraw before or any time during the study without the need to give any explanation.
- All materials and results will be kept confidential, and, in particular, that my name and any identifying or identified information will not be associated with the data.
- The evaluation session will be video-recorded for internal research purposes and deleted following the conclusion of the project.

### **PARTICIPANT**

Name (please print) \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

### **INVESTIGATOR(s)**

Name \_\_\_\_\_ Signature \_\_\_\_\_

## B. Heuristic Evaluation

### B1. Study Protocol & Consent

## Research Protocol - Women in STEM App

1. **Project Title:** Heuristic Evaluation on a Personalized Matching & Networking App for Women in STEM.
2. **Investigators:** Chyna Hui (chyna.hui@mail.utoronto.ca), Cindy Ly (cindykim.ly@mail.utoronto.ca), Lucy Ma (lucyxinyu.ma@mail.utoronto.ca), Maggie Chen (maggiemc.chen@mail.utoronto.ca), Umayrah Chonee (umayrah.chonee@mail.utoronto.ca), Tina Zhang (yizhoutina.zhang@mail.utoronto.ca)
3. **Purpose:** The purpose of our research is to evaluate our low fidelity app that aims to provide support to women-identifying students in STEM education. This app aims to connect women with industry professionals, and other peers within a safe and inclusive space.
4. **Process to be followed:** We will recruit participants from the class CSC318: Design of Interactive Computational Media and other experts in the field of UX Design. After asking participants to read and sign our consent form, we will ask participants to conduct a heuristic evaluation on our low fidelity paper prototype. Participants will be given a blank heuristic template to fill out and a list of Jakob Nielson's heuristics.
5. **Participant selection:** Participants will be classmates who are currently enrolled in CSC318: Design of Interactive Computational Media and other experts in the field .
6. **Relationships:** Our relationship to the participants may be described as follows: friends, acquaintances, and peers.
7. **Risk and benefit:** There will be minimal risk to the participants, for example that they feel that they have wasted their time. The only benefit will be to contribute to the education of the investigators. Participants are free to withdraw before or at any time during the study without the need to give any explanation.
8. **Consent details:** We will brief the participants about the purpose of the study, and explain the [attached consent form](#) to them, and ensure that they consent to participate and sign the consent form.
9. **Compensation:** Participants will receive no compensation.
10. **Information sought:** The information to be sought is how usable our low fidelity prototype is. We aim to use expert feedback to further improve on our prototype.
11. **Confidentiality:** Information will be kept confidential by the investigators. Names or other identifying or identified information will not be kept with the data. The only other use will be to include excerpts or copies in the assignment submitted, but names and other identifying or identified information will not be submitted.

## **Consent Form: Supports for Women in STEM**

I hereby consent to participate in a research study conducted by Chyna Hui, Cindy Ly, Lucy Ma, Maggie Chen, Umayrah Chonee, Tina Zhang for an assignment in University of Toronto Computer Science 318, *Design of Interactive Computational Media*.

I agree to participate in this study, the purpose of which is to test a low fidelity app that aims to provide support to women-identifying students in STEM education.

I understand that:

- The procedure to be used is a heuristic evaluation.
- I will receive no compensation for my participation.
- I am free to withdraw before or any time during the study without the need to give any explanation.
- All materials and results will be kept confidential, and, in particular, that my name and any identifying or identified information will not be associated with the data.

### **PARTICIPANT**

Name (please print) \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

### **INVESTIGATOR(s)**

Name \_\_\_\_\_ Signature \_\_\_\_\_

## B2. Heuristic Evaluation Form

### **Heuristic Evaluation**

Identify as many good or bad issues in the low-fidelity prototype. Each feature should be matched to at least one heuristic and assigned a severity rating.

#### Severity Rating Scale:

0 = Not a usability problem

1 = Cosmetic problem (fix if there's extra time)

2 = Minor usability problem (low priority to fix)

3 = Major usability problem (high priority to fix)

4 = Usability catastrophe (must be fixed before release)

#	Problem	Severity Ranking	Heuristic #	Broad Heuristic

### **Jakob Nielson's 10 Usability Heuristics**

- Visibility of system status
- Match between system and real world
- Aesthetic and minimalist design
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Recognition, diagnosis, and recovery from error
- Help and documentation

## C. Video Recordings of Think Aloud Sessions

Note: Recordings for participant 1 & 2 are unavailable

- a. [Participant 3](#)
- b. [Participant 4](#)
- c. [Participant 5](#)
- d. [Participant 6](#)

## D. Evaluation Participants

### D1. Experts Used For Evaluation

Expert	Qualifications	Rating
Vaishnavi Tunuguntla	CSC18 Student - Team: SEVEN	2
Noah Subedar	CSC18 Student - Team: SEVEN	1.5
Erica Eng	CSC18 Student - Team: SEVEN	2
Jia Wei (Julia) Wong	UXD Undergrad Student UX Specialist @ UHN <a href="#">LinkedIn</a>	2
Carolyn Ly	UXD Masters Student Sr. UX Consultant @ IBM <a href="#">LinkedIn</a>	2

### D2. Our Team Members that Served as Experts

Team Member that was Expert	Team We Were Experts For	Rating
Maggie	SEVEN	2
Chyna Hui	SEVEN	2

## **E. Group Meeting Notes**

March 6th, 2023

Talked about:

Mentorship Application

Survey when signing up

Mentee or mentor?

^ maybe badges/tags too

"Open to mentors"/"open to mentee"

Personal profile

See which question they answered, etc.

Mentorship

Matching mentors with mentees but focus on background, ethics, personal life similarities

Short snippet of advice, post events -> social circle

Addresses need to create sense of community

Company who support Women in STEM gets a badge, how many manager/higher positions that are held by women,

Tab for connecting with people, notes section for writing it down

**User experience map (what their experience would be navigating the app):**

1. Sign up for an account → mentee or mentor survey
2. Fill out profile like you would in LinkedIn
3. Under Community tab - can see other profiles similar to user's, companies with badges indicating their support for women in STEM
4. Under Mentorship tab → can see who's open to being mentored vs open to mentoring
5. Reach out to mentors via direct message
6. Reach out to companies via submitting resume

**Prototype Planning:**

Features

- a. Mentorship matching
  - i. Survey to ask about whether they are interested in mentoring/menteeing, background, goals...etc.
- b. Company Badges
- c. Peer connections
  - i. Forum (form a group/team for projects/opportunities, social support group/women specific issues talk group)

## **S2 Presentation Feedback**

- Focus on community building (can relate to mentorship)
- Building sense of community to support more diversity
- Spell out and connect requirements to design concepts explicitly