

## A3: High-Fidelity Prototype and Summative Evaluation

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## High-Fidelity Prototype

To launch our high-fidelity prototype in Figma, click on this [Figma Link](#), then click on the drop-down arrow next to the “Present” button in the top right corner (see the red arrow below); select “Preview”, then click on the “Present button” (see the red square below) as shown in Figure 1.1. If the preview window popup is too small, the elements will dynamically adjust as you enlarge it.

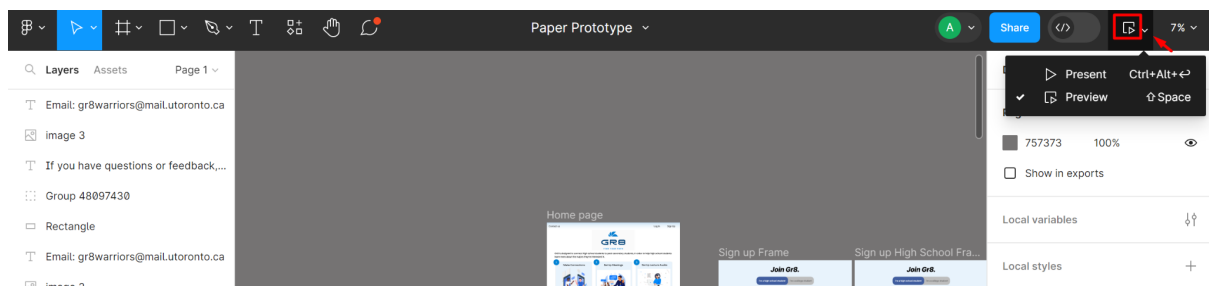


Figure 1.1: A visual indication on how to initiate the prototype flow

Note: For the flow from the college student’s perspective, we assume that the student sets a profile introduction, then selects their meeting availability before they specify their auditable lectures. This would not be the case for the actual product, but was done to prevent an unnecessarily large number of possible states in Figma, especially since the high school student users, as our primary stakeholders, are a greater focus for us than college student users.

### Addressing Issues From A2

One issue that we discovered during our think-aloud sessions from A2 was that the Profile page was overlooked by high school students after they connected with a college student. They instead tried to set up meetings and lecture audits from the “Meetings & Lectures audited” page as seen in Figure 1.2, indicated by the red rectangle.

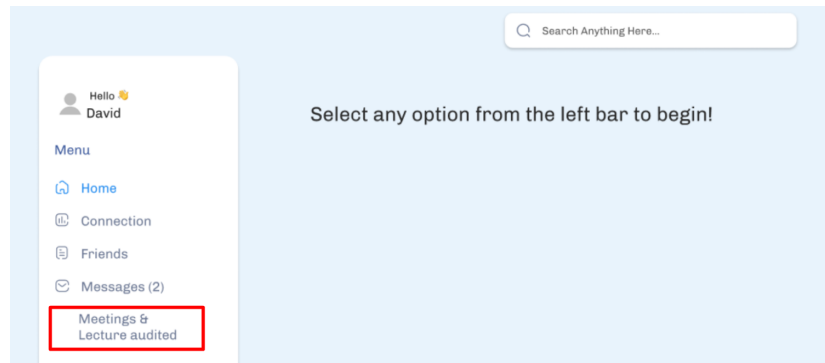


Figure 1.2: An excerpt of our Figma prototype's sidebar in A2

We made three improvements to our design to address this issue: first, we added a “FAQ” page which contains a “How do I get started?” section in case the user is confused. Then, we added a section to the “Meetings & Lectures audited” page that displays the user’s friends and their profile buttons to allow users to navigate to their friends’ profiles. Now, they can set up meetings and lecture audits without disrupting their navigation flow as they no longer need to switch to another page to access their friends’ profiles. Finally, we redesigned the user dashboard page. Since the dashboard would be the first page that a high school user will see upon sign up, it should introduce the user to some key functionalities. Specifically, we added two blocks to the page, beneath the less emphasized introductory text, to briefly explain how to make connections and set up meetings or lecture audits as illustrated by the red rectangle in Figure 1.3.

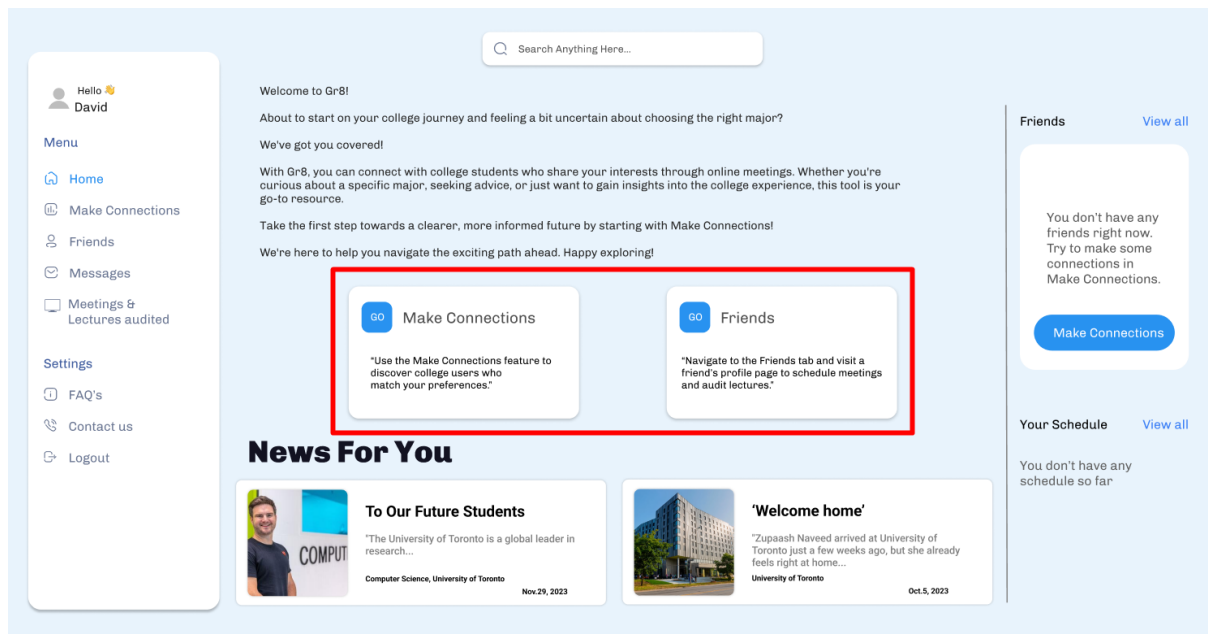


Figure 1.3: Dashboard for the high school user upon sign up

When the college student users were trying to select their meeting availability and lecture schedule during our think-aloud evaluations, they commented that the exit button was not visible enough for them to click on it intuitively. This led them to navigate to another page or return back to their profile instead of simply closing the current page after the task was complete. To address this issue, we made the button bright red and larger, making it easier to see.

Another concern brought up by some evaluators was that, after making a connection, it was unclear whether the user was actually friends with this connection or not, even though the text in the “Send request” button was changed to “Profile”. To make this change more apparent, we added a friend icon (see figure 1.4) to the user’s friends, both on the “Make Connections” page after the connection has been accepted and on the connected user’s profile page.

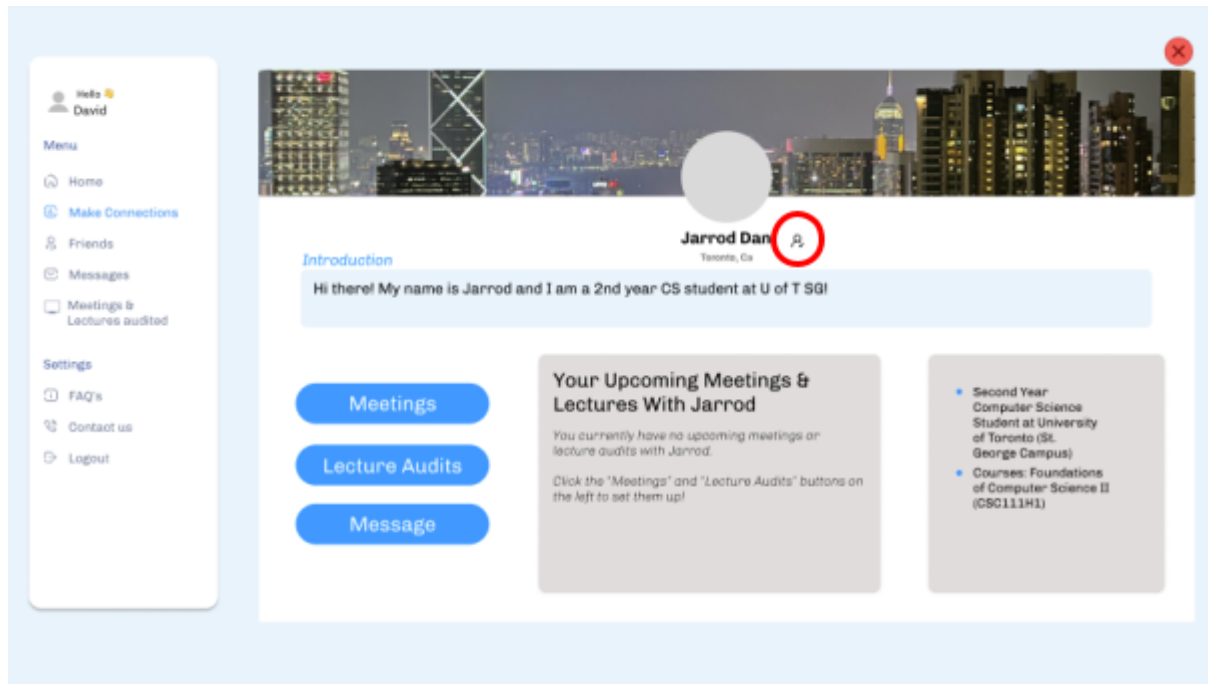


Figure 1.4: Icon indicating that the user is friends with the user whom the profile belongs to

**Satisfaction of A1 Job Stories**

We revised our job stories from A1 (see [Appendix](#)) in order to take into account the feedback we received from our TA. Specifically, our original job stories were not formulated correctly, as they mostly took the form of a set of assumptions in regards to contexts and outcomes. We have rewritten them as such:

1. **When** I am choosing a career path, I feel that I am influenced by the careers of my parents, so I **want** a less biased way of choosing a career **so** I can choose a career that is right for me.

This job story is addressed in our prototype through the fact that high school users explore programs of study by interacting with people they do not already know. As a result, they gain an influence towards whom they are not personally biased as they would be towards their parents or even friends, and who is in turn not personally biased towards themselves. This especially holds since these students can try participating in introductory

college lectures to see what the field they are considering is actually like on a post-secondary level instead of relying on the opinions of people in the profession.

2. **When** I choose a program of study, I **want** to choose one in which I will succeed **so** I can graduate with the skills I need to succeed professionally.

Using our system, high school students can partake in real university lectures in their programs of interest. This allows them to get a better understanding of how much they personally align with the program or programs that they are considering, better allowing them to select one they will succeed in, as they can effectively attempt to learn some basic content in advance.

3. **When** I seek out guidance regarding career choices, I **want** to feel cared for and like the advice I am being given is being personalized for me **so** I can feel confident that it is accurate and trustworthy.

This is addressed by our system as high school students are paired with college students, making their experience one-on-one and thus inherently more personal. Since college students are also closer to high school students in age than guidance counselors, for example, their advice and experiences are also more relatable and relevant.

4. **When** I am studying for a class, I **want** to get a high grade regardless of my actual understanding of the course **so** my GPA can be high enough to get me into my desired post-secondary program.

The purpose of including a variation of this job story in A1 was mainly to highlight the disconnect that often occurs between high school students and their actual understanding of their courses, due to the constant pressure to perform well academically. Because our system creates an environment in which they can freely explore different programs and attend lectures without worrying about grades and assignments, the problem posed by this job story is solved in the context of allowing students to delve into potential post-secondary programs

without being academically penalized if they end up disliking a specific course or subject.

This way, high school users can focus solely on building an understanding of their subjects of interest on a post-secondary level, and more importantly figuring out whether they enjoy these subjects enough to pursue them further.

5. **When** I pursue a post-secondary program, I **want** to choose one that I will enjoy **so** I don't end up switching programs, which is costly and delays my graduation.

We found in our A1 questionnaire (see [Appendix](#)) that the two factors that resulted in the most uncertainty regarding choosing majors were reported to be lack of experience and a lack of understanding of the field of study. In other words, high school students are far too detached from their future college experiences, making it very difficult for them to accurately guess which major they will enjoy. Our system mitigates this problem because it allows high school students to gain a hands-on understanding of their programs of interest, making their future major decision more informed.

### **Satisfaction of A1 Functional Requirements**

Our functional design requirements in A1 (see [Appendix](#)) generally lacked specificity. Hence, our updated functional requirements, which more clearly describe the needed functionality, are as follows:

1. The system must be physically accessible to all North American high school students.

Since we have created a free, online system, this requirement is satisfied. For a real product, this would also require globalization and accessibility features, such as different language settings and contrast filters, but, for the purpose of a high-fidelity prototype, an online solution is satisfactory.

2. The system should yield major suggestions based on the high school students' existing interests and talents.



If a high school student already has in mind their programs of interest, our system satisfies this design requirement by allowing them to search for and connect with college student users by their majors and, more specifically, by their courses, if they are interested in specific sub-fields.

Since high school students may or may not know the program of study they want to pursue, our prototype also satisfies this requirement for students who are not sure about their program of interest by embedding a news section into the dashboard to provide them with relevant knowledge. This requirement could be further improved by embedding a condensed version of university program brochures, job requirements, and other tools to inform the users as much as possible.

As listed under [Potential Changes](#), another improvement which would further satisfy this functional requirement is a discussion board, on which high school student users could find inspiration from other users' shared stories and interests.

3. The system should be easy for high school students to navigate, and not require extensive technical or academic knowledge.

By reducing the barriers to using our system as much as possible, such as having an intuitive user interface and providing visual guidance and cues, we were able to satisfy this requirement and improve the appeal of our system to help our target users. An example of such visual cues is our pop-up functionality; when users successfully schedule a meeting, for example, they see a popup that confirms they did so successfully.

This requirement can be strengthened by directly coordinating with college counselors to show more relevant information to benefit high school students, work with a graphic designer to improve the system's aesthetics, and conducting regular feedback sessions to continuously enhance the user experience.

4. The system must provide high school students with the opportunity to discover programs of study that they were previously unaware of or did not consider.

As found in our A1 formative studies and background research, high school students are often exposed to only a very limited pool of career options, namely the careers of their parents and other family members. By connecting them with a plethora of college students in a wide variety of fields, we satisfy this requirement, as students are now able to seek out and gain experience in any field, as long as there is at least one college student user in that field using the website.

As mentioned in the first design requirement explanation, this is further satisfied through the news feature, and would be improved with the addition of a discussion board where students could become exposed to fields that they had not been aware of at all.

5. The system should accommodate most possible programs and fields of interest that high school students may have.

In practice, we would hope that there are enough college student users on the platform to cover all popular fields of study. In the case that a high school user searches for a program or other preference with no exact match, however, our system shows them similar results to ensure that they still have resources to refer to and explore.

The similar results functionality could also tie in to design requirement 4, if similar results are always shown even if there are exact matches for the user's queries, as this would encourage the high school student user to branch out from their field of interest into similar fields which they may also like.

### **Insights from Pilot Studies**

1. Our TA went over our initial iteration of the high-fidelity prototype, and one of his insights was that there was too much empty space on several pages, including the landing page and college student profile. This made these interfaces look unappealing

and also failed to utilize valuable space. Hence, we added many elements to these pages; to the landing page, we added some visual elements since no other functionality is accessible from the landing page. In order to make these elements useful as well, we decided to create a visual introduction to the website's functions as seen in Figure 1.5.

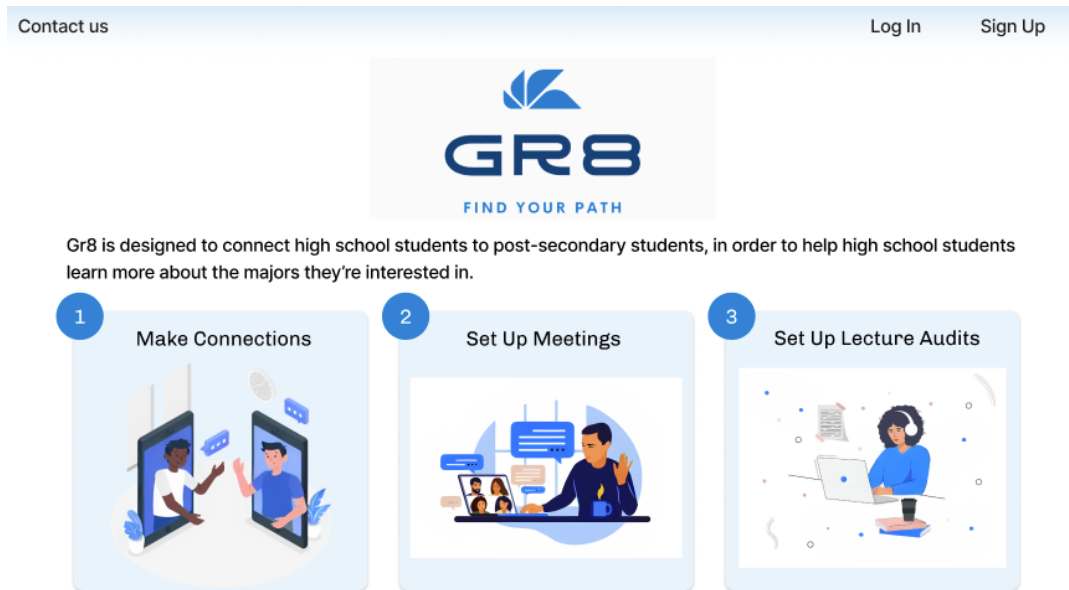


Figure 1.5: Homepage of our improved prototype

We also added far more elements to the college student's profile. In the original high-fidelity prototype, it only contained the college student's name, a list containing their major, university and courses as well as a button for setting up a meeting and a button for auditing a lecture. Now, the interface also contains a button for messaging the student as well as a list of the user's upcoming meetings and lecture audits with that student.

In addition, this makes the interface easier to navigate since users can now join meetings and lecture audits from their connections' profile pages as well. We also added an introduction section which the college student can customize to make the

interface appear more personal and friendly as seen in Figure 1.6.

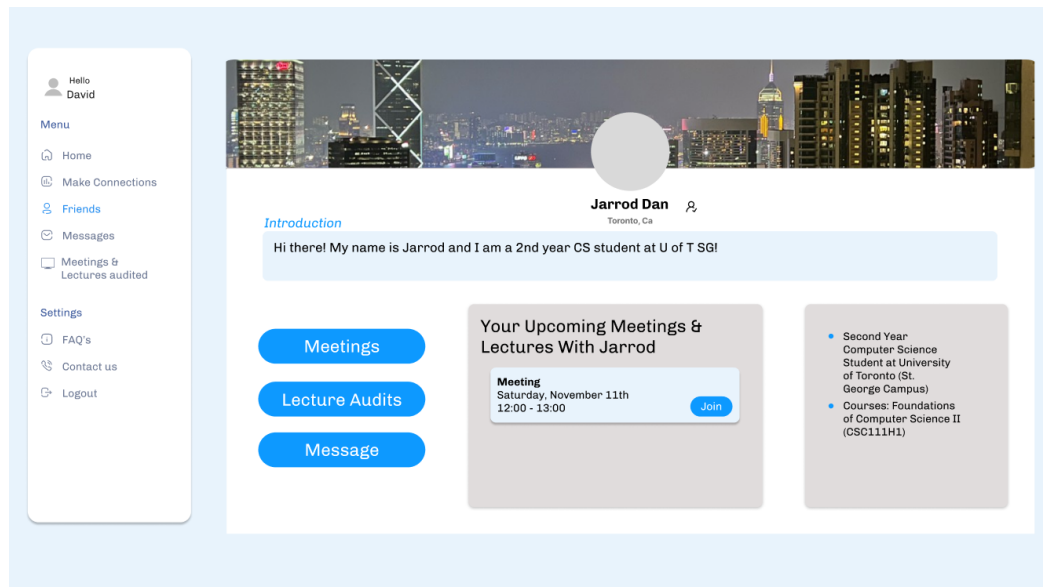


Figure 1.6: The college student's dashboard on our prototype

2. Another insight we gained came testing the prototype among ourselves before we proceeded to conduct the usability testing can be seen in Figure 1.7. We realized that, as we explored the interface, the FAQ page contained information that a user would likely find irrelevant, like the creators of the website and why it was created. If a user were to navigate to the FAQ page, it would likely be because they were confused about where something is located, so we decided to change the page so that it featured

answers to questions that were more likely to be asked.

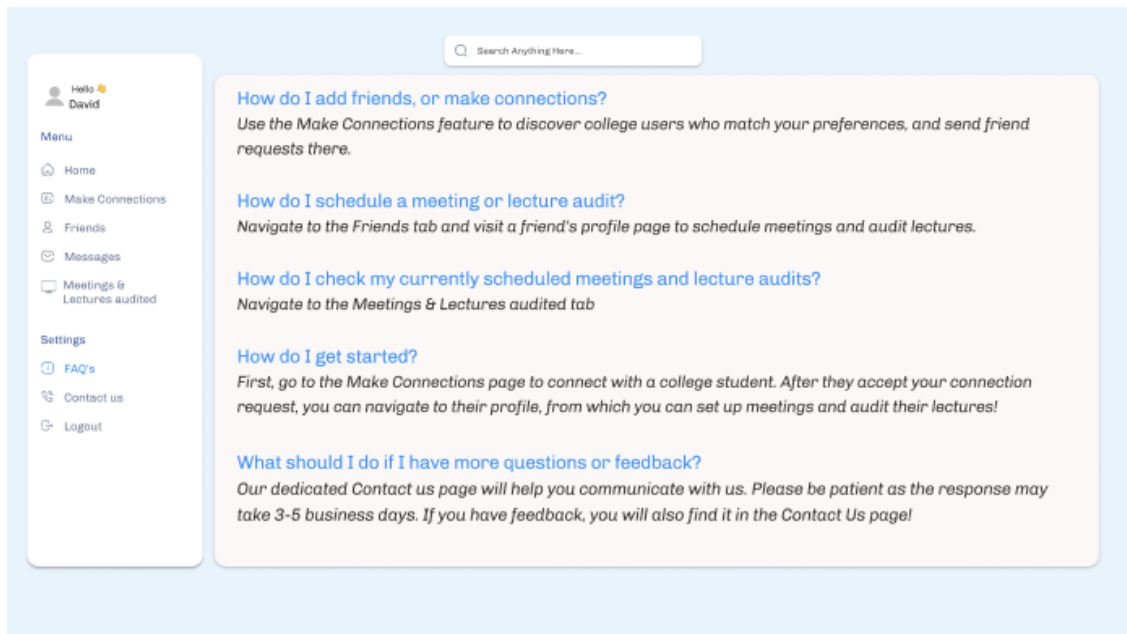


Figure 1.7: FAQ Page

The insight that we gained from discovering this issue and making this change was general; everything that we put on our interface needs to have a reason to be there. Instead of trying to fill up space for purely aesthetic reasons, we realized that we had to be more mindful with the way we use space to maintain clarity.

## Evaluation Protocol

We selected some high school and college students from among our acquaintances, friends, and relatives in order to evaluate our system from both of these user perspectives.

Due to time and transportation constraints for some participants, we held Zoom meetings, sent the high-fidelity prototype Figma link to them, and asked them to share their screens and record the whole evaluation process. After obtaining their consent, we requested the participants to turn on their cameras so that we could observe their facial expressions as one of our evaluation protocols. We read each task out aloud after the participants finished the previous one and also sent a text version in the chat box as a reminder. For offline evaluations, we just read each task out aloud to the participants, and then we sat nearby to record data (refer to [Data Collection Methods](#) below).

The tasks provided to them were very similar to the tasks used in our heuristic and think-aloud evaluations, as we found that we were able to both simulate a realistic user flow and gather information about many design defects at once using these tasks. Namely, the tasks given to the participants were as follows.

### Usability Study Tasks for High School Participants

1. Make an account.
2. Connect with a college student.
3. Set up a meeting with this student.
4. Set up a lecture audit with this student.
5. Check the details of your upcoming meetings and lecture audits.

### Usability Study Tasks for College Participants

1. Make an account.
2. Set your profile introduction.

3. Set your meeting availability.
4. Set your available lectures for auditing.

### **Data Collection Methods**

We decided to employ a wide variety of data collection methods in order to ensure that we are getting as much feedback from each participant as possible. We recorded the following information for each participant's evaluation (see [Appendix](#) for the evaluation form):

1. Number of errors and total steps made (quantitative and objective)

In our previous evaluations, a common issue was participants navigating to the wrong page for a certain task. For instance, in our heuristic evaluations, participants almost always attempted to set up meetings from the Meetings page and make connections from the Friends page. Similarly, in our think-aloud evaluations, several participants hesitated to navigate to their friends' profiles to set up meetings and lecture audits (see [Appendix](#)).

Because of this, we decided to track how many times our participants navigate to the incorrect page, considering this the number of errors, and how many navigations they make in total, the total steps made, for each task, in order to see whether we have solved these issues in our high-fidelity prototype.

Additionally, we calculated the error rate for each task (number of errors divided by the total number of steps taken) to understand the difficulty of completing the task. If the error rate exceeds an acceptable range, it may suggest that there are some flaws in the system design. "Acceptable" is a subjective term, but, for our purposes, an error rate of 33% or above was considered high, as, based on the number of steps our tasks should require, this would mean more than one or two erroneous navigations, and likely a stream of uncertainty.

2. Time required per task (quantitative and objective)

Although the number of errors made would shed some light on our system's ease of use, we recognized that it would still be possible for a participant to make a low number of

erroneous navigations while confusedly spending a long time thinking about what to do next. In order to account for this alternative expression of confusion, we decided to measure the amount of time that they spend on each task.

### 3. Comments, body language and facial expressions (qualitative and subjective)

An important component of this system's requirements is that it must be approachable and easy to use for its high school student users. This was highlighted as an especially important goal in our A1 Questionnaire (see [Appendix](#)) in which the majority (61.8%) of participants reported seeking advice or help with choosing a major either never, once, or very few times.

Hence, we wanted to keep track of what participants say about the system and how they react to it in order to ensure that it is not confusing or otherwise causing an adverse reaction, which would then mean that our system has the same issue as other resources, like high school guidance counselor systems, which high school students do not seek out. As a result, we created a response form (see [Appendix](#)) that included aspects about the system's information layout, effectiveness, and efficiency. Beyond that, we also asked some other questions that we considered important, such as any unnecessary features, where users felt confused or stuck, and their overall suggestions. We also plan to record participants' body language and facial expressions, like frowning, scratching one's head, laughing, as these also represent the participants' subjective experience while using our system.

### 4. Answers to the system usability scale (quantitative and subjective)

Similarly to the previous point, we wanted to ensure that our system is one that high school students would be motivated to use, unlike some existing solutions. However, asking them directly whether they would use the system in the future would firstly probably lead to biased answers, as our participants would likely not want to be harsh when speaking directly to us, and secondly would not be quantifiable as a system usability scale is.



Therefore, we applied the System Usability Scale, or shorthand for SUS (see [Appendix](#)). We believe this approach led to more impartial and unbiased responses from participants, as they selected a number from 1 to 5 that best aligns with their thoughts (1 represents strongly disagree, and 5 represents strongly agree). Another advantage of the SUS is that the ideal answer for odd and even questions differs, helping to minimize potential question-order bias.

## **Study Results**

### **Demographics**

We recruited a total of 5 high school students and 2 college students for our system usability evaluations. Among these high school students aged between 16 - 18, there are four female students and one male student. One is in the 11th grade while the remaining four are in their final year, the 12th grade. The 12th-grade students have already started the college application season and are considering which universities to apply to and what majors to choose, perfectly aligned with the initial intent and functionality of our system design. In terms of college students, we have one female student and one male student, and both are in their fourth year of study.

For the purpose of anonymity, the five high school participants will be referred to as A, B, C, D and E. These letters are not related to their actual names and will be used consistently for each participant.

Similarly, the two college student participants will be referred to as “College participant 1” and “College participant 2”.

### **Positive Results**

In general, our high-fidelity prototype has shown significant improvements in efficiency and information layout, as we have integrated solutions to many previous issues into the design. Most participants were able to quickly get the hang of our system and start operating it, even without any prior exposure. The entire process was smooth and successful, and the time taken to complete each task was much shorter compared to the earlier paper prototype (on average between 3 and 4 minutes, or even faster). We discovered that adding some simple tutorials on the home page about how to use our system was really helpful. These guided tutorials effectively led participants towards the correct pages.

## Negative Results

In terms of what did not work well in the high school version, firstly, some of the past issues, even after our improvements, were still not adequately resolved. For example, in tasks 3 (“schedule a meeting with the college student you just connected with”) and 4 (“set up a lecture audit with this student”), the procedure is very similar, and the key is that the buttons related to those functions are inside the college students’ profile page as shown by Figure 3.1.

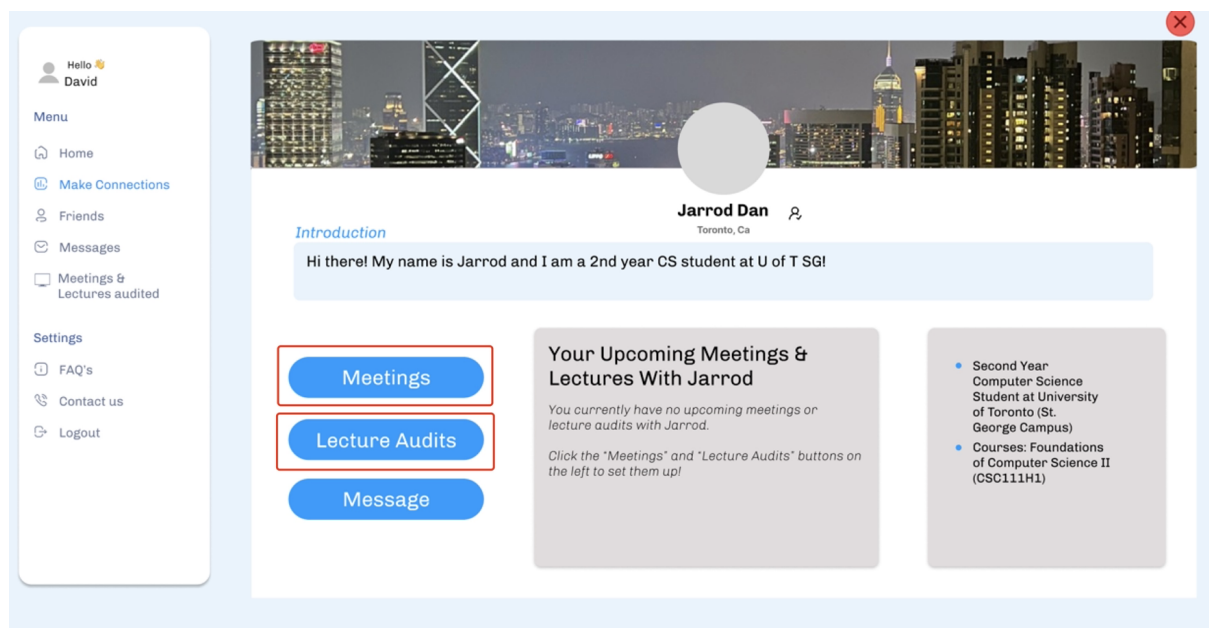


Figure 3.1: Studies for the college user, dashboard view

However, what is worth noticing is that lots of our participants still tended to ignore the Profile page (refer to [D high school.mp4](#), [C high school.MOV](#), [B high school.mov](#)) .

When they heard tasks 3 and 4, they immediately went to the Meetings & Lectures audited page that was intended for checking the details of the existing meetings. Many participants from previous evaluations did the same, which is why we had added a button on this page that also leads to the student’s profile as shown by Figure 3.2. The problem is that they still overlooked the profile button, assuming the correct button is located elsewhere. As a result, they navigated to other pages, leading to unnecessary steps (especially for C, she searched

through every other page). It is possible that they perceived the profile page as merely a display of students' information, without any real functionality within it.

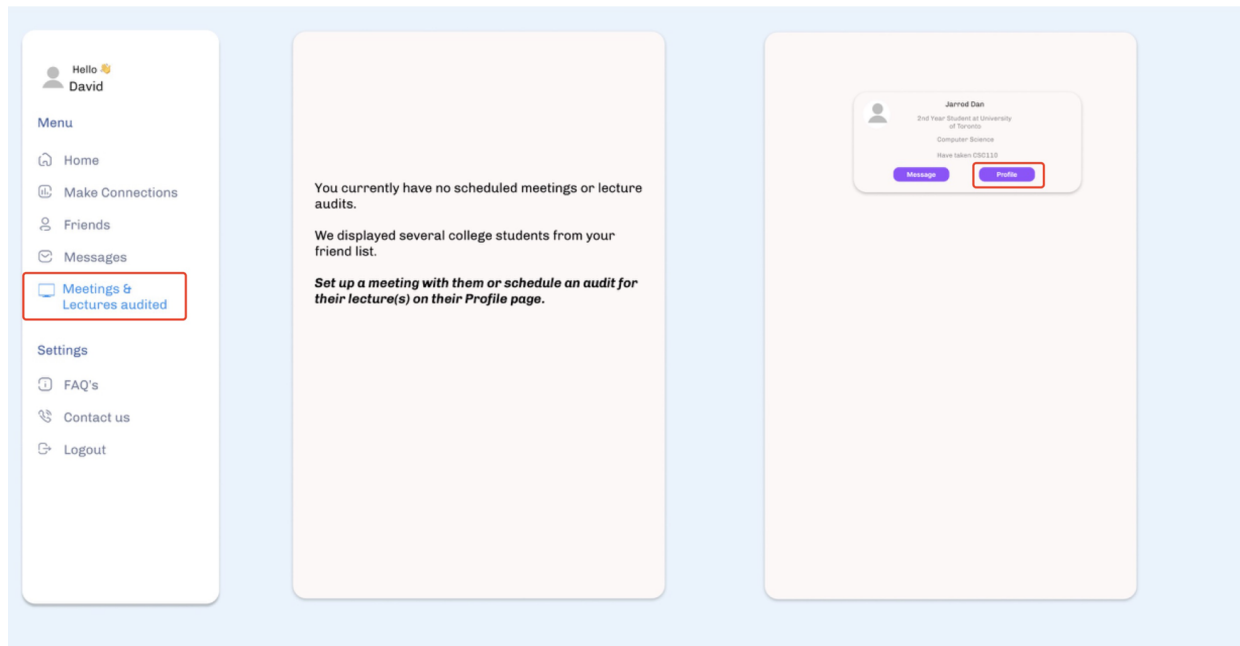


Figure 3.2: Accessing a connection's profile from the Meetings & Lectures audited sidebar

Secondly, during the evaluation process, we ran into issues that could not be resolved unless we took a different method to create our high-fidelity prototype due to limitations in Figma. For example, as seen in [E one.MOV](#), when E came to the Make Connections page and tried to search by the preferences (Figure 3.3), she felt confused and kept clicking on the gray search bar as highlighted by a blue rectangle, thinking that she could type in it as in an input box. In fact, it was only possible to expand the options panel by clicking on the dropdown triangles outlined by the red rectangle. Participants often got stuck here, which impacted the efficiency of their task completion. Moreover, clicking on an area of the page that has not been logically assigned Figma can cause all clickable buttons to be highlighted in blue as shown by Figure 3.4. This feature may have directly revealed the answer to participants when they felt uncertain about what to do next, which potentially affected the validity of the test

results. Hence, it is possible that, without such hints, participants would have been stuck at the task for even longer.

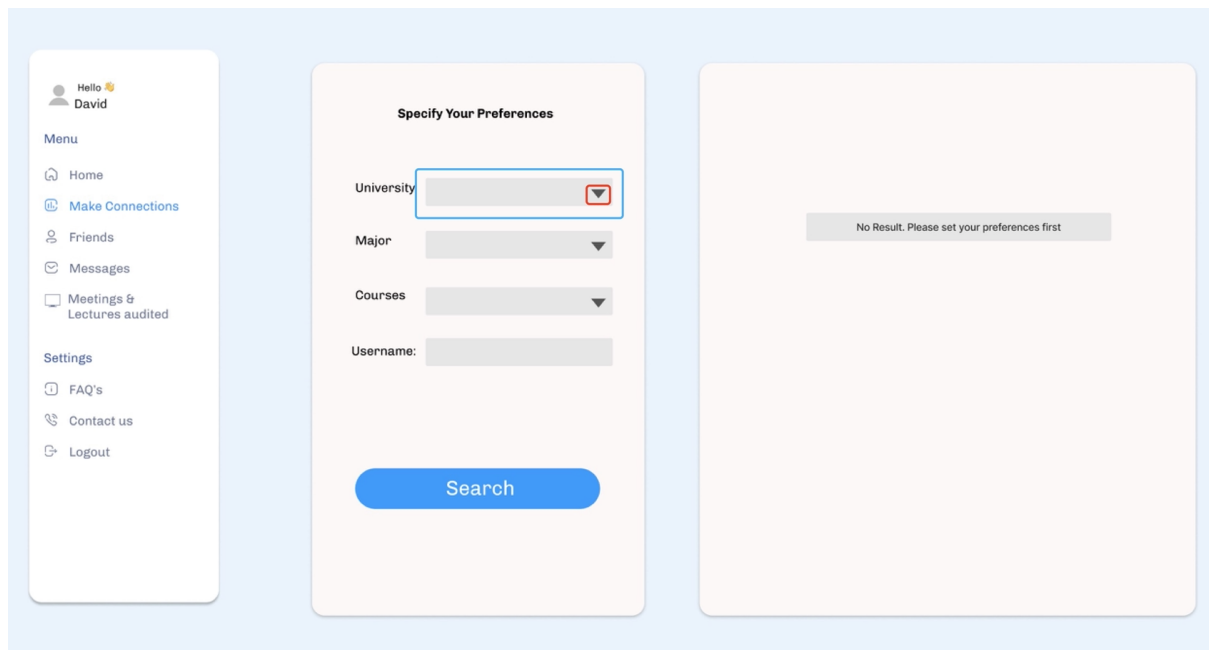


Figure 3.3: Search connections by personal preferences

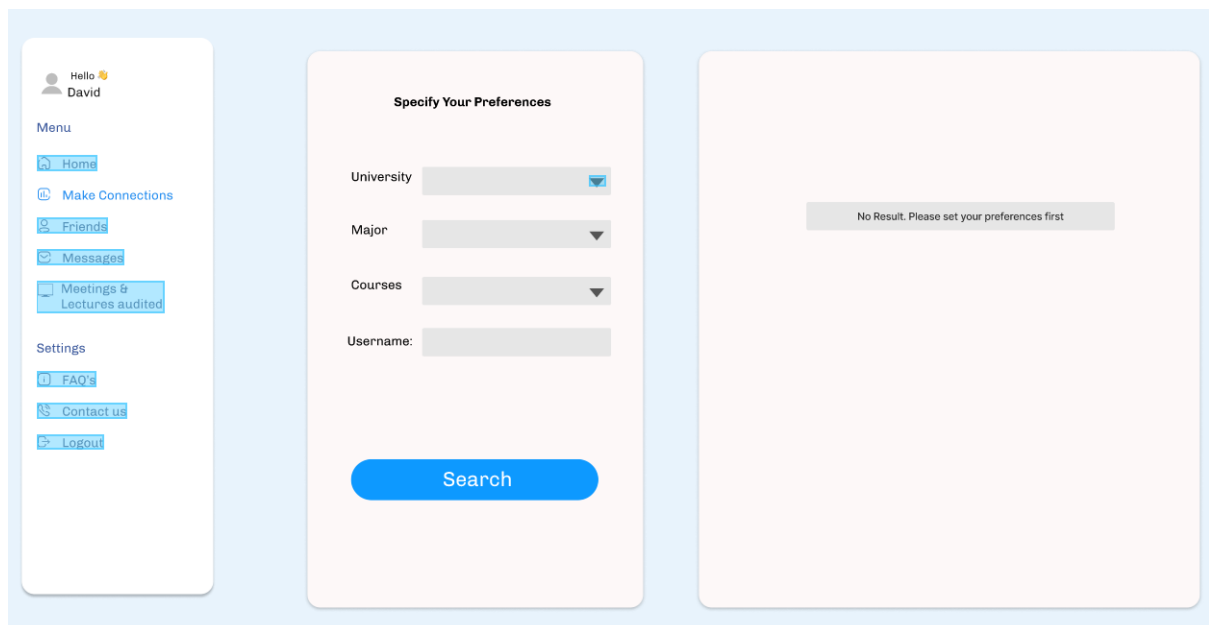


Figure 3.4: Unassigned logic as a limitation in Figma

Thirdly, as mentioned by the first point, we have enabled the feature to allow access to a student's profile from the Meetings & Lectures audited page (refer to Figure 3.1). As seen in [E two.MOV](#), for task 3 ("schedule a meeting with the college student you just

connected with”), E went to this page and successfully navigated to Jarrod’s profile. Nonetheless, when it came to task 4 (“set up a lecture audit with this student”), she went back to this page again, as she probably tried to navigate to Jarrod’s profile page in the same way that she had for task 3. However, due to the existing scheduled meeting after task 3, the interface had become as what Figure 3.5 shows. This meant that she could not get into the profile page from this state onwards. Even though users can navigate to other pages, like Friends, and then access their friends’ profiles, this issue causes some inconsistencies and confusions.

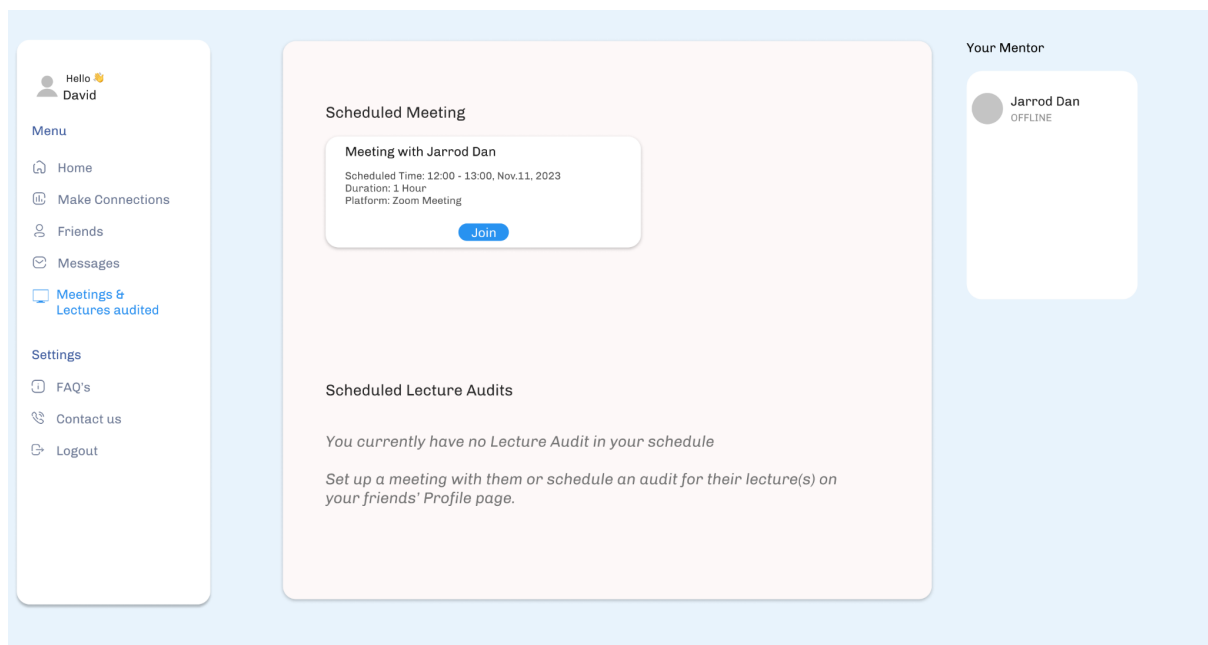


Figure 3.5: Scheduled meeting panel

The usability study results data are organized and stored in a Google Sheet (see [Appendix](#)), and contains four spreadsheets. These spreadsheets respectively record task time and error rate for high school and college participants, SUS responses, and participants’ comments.

## High School Participant Results

### Task 1: Create an Account

We can observe that it was overall completed very successfully, likely due to its straightforward and fairly simple nature. The average completion time was 28.2 seconds, and the average error rate was low, 1.54%.

### Task 2: Connect With a College Student

The average completion time and error rate were dramatically affected by an extreme data point (participant D, 1 minute and 58 seconds, with a 60% error rate; later on she told us that she did not fully understand the instructions, but she did not ask for help). However, if we consider only the other data, most people were able to complete it in a shorter amount of time, and the error rate fell within a normal and acceptable range (44.5 seconds with an error rate of 18.45%, on average, for the other 4 participants). Furthermore, when combined with the qualitative data, no one mentioned any aspects of task 2 that were confusing or problematic for them. Thus, overall, it was also completed satisfactorily.

### Tasks 3 & 4: Schedule a Meeting and a Lecture Audit

The procedures of completing these two tasks are very similar, and they yielded the most qualitative responses. Even though the overall data looks decent (task 3: average completion time is 40.6s, and average error rate is 19.16%; task 4: average completion time is 46.2s, and average error rate is 34.2%), we can observe a pattern: either participants quickly navigated to the Profile page (for example, task 3 was completed by A and E in just 4 or 5 steps with an error rate of 0%), or they might have taken lots of extra steps, similar to task 4 (A and B finished in 7 or 8 steps with an error rate of 0%, but many unneeded steps).

E, D, C and B all provided valuable critiques for the question, “During your use of the system, were there any moments where you felt stuck or confused?” Both B and C mentioned that they were unsure about where to go for tasks 3 and 4, and D said that she was not able to

find anything related to meetings after she navigated to the Meetings & Lecture audited page (refer to Figure 3.2) without realizing she needs to get into the Profile page. E brought up the fact that after you scheduled a meeting, you are no longer able to schedule meetings from the Meetings & Lecture audited page, which confused her (refer to Figure 3.5).

In general, both quantitative and qualitative data indicate that tasks 1 & 2 were completed well. The main problems were found in tasks 3 & 4: although the data appears fine, how quickly participants could complete the task and the number of errors they made largely depend on their ability to realize the need to find and access the Profile page, which seemed to rely more on chance than on a clear design on our part.

### **College Participant Results**

Both college participants completed all tasks very quickly (typically in around 10 seconds) and in very few steps. The only instance of confusion occurred with College participant 1, for task 3 (“set up your meeting availability”). The participant tried to click on various parts of the screen, such as the whitespace around the table, for a few seconds, before asking the evaluator where to click, as can be seen in this video: [College Student 1 Error](#).

Hence, although the majority of the evaluations went very smoothly with the college participants, a design issue to keep in mind is that it might not be clear that the user needs to click on the blank table to set up their meeting availability. There is text at the top of the meeting availability screen instructing them to click and drag on the table, but it is grey and possibly difficult to see.

However, a highlighted bright spot is that, after setting up his meeting availability, College participant 1 was able to set up his lectures for audit as quickly as College participant 2; this means that our design, in this case, is consistent.

It is important to underline that, as our project is more focused on high school student users, we only evaluated 2 college student participants. This means that our results may not



encompass the experience that an average college student would have with our website (see more at [Reflection](#)).

## SUS Responses

Odd questions: ideal answers = 5

Even questions: ideal answers = 1

Figure 3.6 is the exact screenshot of SUS spreadsheet, where the two lines highlighted in yellow are the responses for college students.

A	B	C	D	E	F	G	H	I	J	K
Participants' name	I think that I would like to use this system frequently.	I found the system unnecessarily complex	I thought the system was easy to use	I think I would need the support of a technical person to be able to use this system	I found the various functions in this system were well integrated	I thought there was too much inconsistency in this system	I would imagine that most people would learn to use this system very quickly	I found the system very cumbersome to use	I felt very confident using the system	I needed to learn a lot of things before I could get going with this system
Julia	4	2	4	2	4	3	5	2	4	2
College robot 2	2	1	1	1	4	1	1	3	5	1
College robot 1	2	2	4	2	3	3	4	2	3	2
Emily	4	1	5	1	4	2	5	2	5	2
Gao	4	4	3	4	5	3	5	3	2	3
Hanzi Li	4	2	3	1	5	2	5	2	4	2
Calvin Chen	4	1	5	2	5	3	5	2	5	1

Figure 3.6: SUS Spreadsheet snapshot

## High School Responses

Overall, the responses from participants were quite close to the ideal answer, typically differing by only 1-2 values. Responses to several questions indicated that the majority of people felt quite good about the corresponding aspect, specifically with questions B, C, E, F, H, I, J, and K.

For question D, participants B and C both gave 3 out of 5, probably because they were a bit stuck while doing tasks 3 and 4. Based on the responses to “Participants’ facial expressions and body language”, B frowned a bit in task 3, probably feeling weird about where to schedule a meeting; In task 4, C tried to browse through every possible page to look for the correct button, which obviously indicated she was confused.

For question G, participants E, C, and A answered 3 out of 5. For participant E, based on her response to the feedback form, she would definitely feel that the system is inconsistent

because for task 4, when she tried to go back to the Meetings & Lecture audited page, she could no longer access the Profile page (Figure 3.5) while she could do that in task 3. In terms of C, she generally rated a bit far away from the ideal answers compared to other participants, and if we take a look at her completion time for each task, she took the longest time among all participants (task 3: 1:08s; task 4: 2:13s). Also, she mentioned that “some of the buttons are confusing based on the instructions” in the feedback form. Hence, we could consider, in the future, changing the button text to be more clear and specific.

## Lessons Learned and Implications for Design

In reflection, we came to the realization that most of the participants had overlooked the specific instructions we used to guide them through the process in our evaluations. We suspect that this was due to the large amount of text on these pages, which led users to feel overwhelmed and encouraged them to either skim over these pages or ignore them altogether. An example of where this instance occurred was the empty Friends page (Figure 4.1):

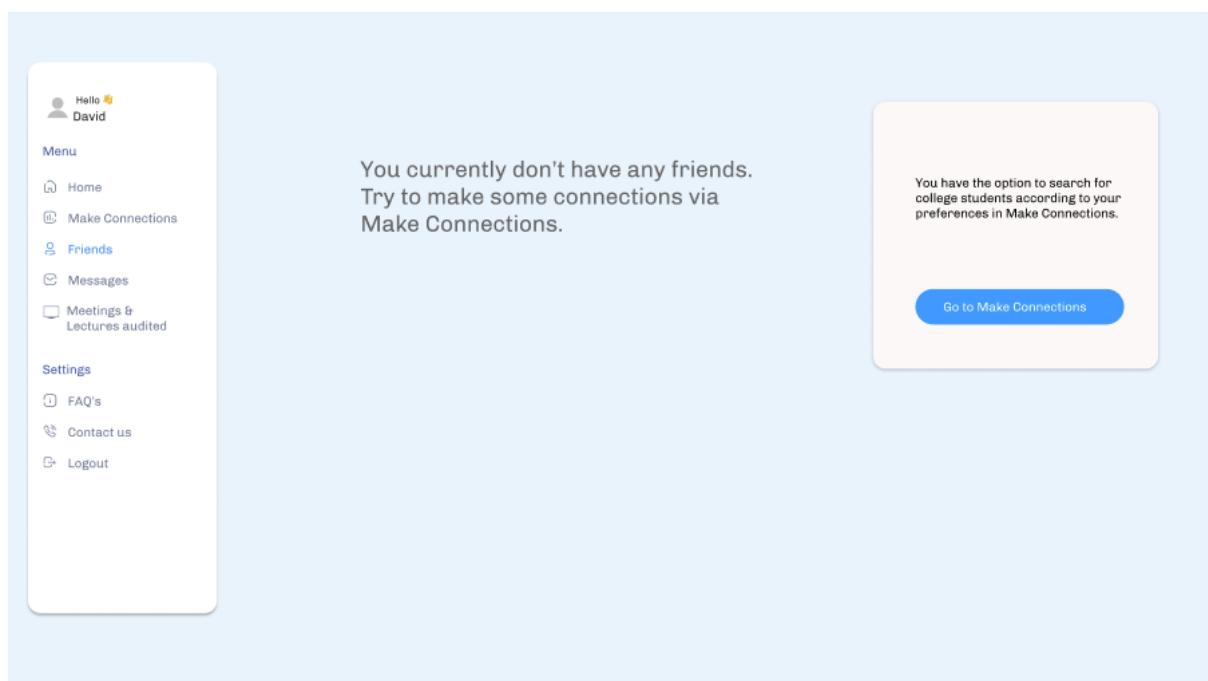


Figure 4.1: Friends page appearing to be empty looking

In another instance, it was done poorly on the empty Meetings & Lectures audited page (Figure 4.2), which participants visited far more frequently.



Figure 4.2: Meetings & Lectures audited page also appearing to be empty

Here, as we learned from the usability tests, the guidance (outlined in red) on this page was entirely ignored (see [Negative Results](#), paragraph 2, about participants B, C and D). Hence, a change that we would make is a reduction in the volume of text on these pages, and then impose a larger font size to improve clarity, as in Figure 4.1. In essence, the lesson we learned from this issue was that providing helpful hints is an assumption we make the the user; hints, documentation, and guidance must be designed in a way to ensure users will actually interact with them. Thus, we present a summary of potential changes below.

### Summary of Potential Changes

Problem	Potential solution	Justification or reason for the change
A lot of blank space in the UI.	Add more elements to the UI in order to make it both more aesthetically pleasing and also take advantage of the space by providing more functionality.	The excess space is both a waste and makes the UI look dull and boring. (referring to the feedback from the professor and the TA)

Color scheme is inconsistent in some pages, especially the purple buttons for profile pages.	Use the same color on all navigation buttons (e.g. meetings, lectures), and another color (preferably blue-ish) on buttons related to interactions between users (e.g. send friend request, view profile).	Choosing a color scheme properly can make the UI more attractive and less confusing. (referring to the feedback from the professor and the TA)
Inconsistent font size/ button size hierarchy.	Maintain a consistent standard for font size/button size based on the functionalities.	Inconsistency could be confusing and visually unpleasant for users. (referring to the feedback from the professor and the TA)
It is not intuitive that meetings and audits functionalities are under users' profiles.	Make a pop-up quick tutorial when users view any page for the first time.	A pop-up tutorial would solve the problem (referring to <a href="#">Negative Results</a> ), and wouldn't be intrusive as it would only show up once for the first time users.
Friends management system (unfriend / report / rating) hasn't been implemented	Implement friends management system, including unfriend, rating and reporting functionalities.	More user control and flexibility, and covering more edge cases (referring to unimplemented functionalities from A2 suggestions)
No discussion board or forum for users to talk together.	Add a discussion board so that users can make posts and reply to everyone.	To bring convenience and improve interaction quality between users. (referring to unimplemented functionalities from A2 suggestions)
There is no function to see profiles that the user has navigated before (e.g. view history)	Add a function to enable users to see their own view histories	Some users might want to view certain profiles but they couldn't remember the details(e.g. names, fields).(referring to unimplemented functionalities from A2 suggestions)
When viewing a profile, the user could not tell if the person is already a friend	Add an indication to notify users if the profile being viewed belongs to a friend	Provide more information to make sure the quality of interaction.(referring to unimplemented

		functionalities from A2 suggestions)
It is not very obvious that there are many core functions that need to be accessed within the profile page of college students	Perhaps we can use a more prominent color to highlight the profile button to attract attention, or we could force new high school users to visit the Profile button after they make their first connection, serving as a tutorial for beginners	Many people might assume that the Profile page is only for viewing basic information about college students, and hence ignore it. If they want to schedule meetings or audit lectures, this misunderstanding could result in many extra steps.
If a student has scheduled a meeting, he/she is not be able to access the Profile page again through Meetings & Lectures audited page (refer to Figure 3.2, 3.5)	Always have the Profile button displayed for connected college students.	If students are accustomed to accessing college students' Profile pages through Meetings & Lectures audited page, this problem could lead to unnecessary extra steps, as they would have to navigate to other pages to find the Profile button.
Students are not able to cancel / reschedule a meeting or a lecture	In the Meetings & Lectures audited page (refer to Figure 3.5), all information regarding meetings and lectures is displayed. In addition to the join button, we can add two more buttons: 'cancel' and 'reschedule'.	If a student suddenly becomes unavailable for a scheduled meeting or lecture due to unforeseen circumstances and is unable to cancel or reschedule, it could lead to college students waiting in vain.
For college students users, cannot import their own calendars	Add a function to import calendar when creating sessions	The interaction would be way faster if users can import their own calendars.(referring to unimplemented functionalities from A2 suggestions)

## Reflection


### Reflection on Usability Testing

Upon reviewing our usability study, it became apparent that, although we garnered valuable feedback, some unanticipated aspects surfaced, notably participants' rationales for overlooking the provided hints, as observed during the study. For subsequent usability studies, if viable, we intend to deliberately emphasize the collection of feedback regarding participants' reasons for skipping hints. This strategic approach will enable us to refine the design in future iterations based on insights gathered, ensuring the hints become more effective and user-friendly.

Additionally, we recognize the importance of expanding our participant pool to achieve a larger and more diverse sample, in order to provide a more comprehensive understanding of user interactions and experiences. This would contribute to enhancing the reliability and generalizability of our findings, which allows for a more robust evaluation of our prototype. This is especially the case with our evaluation of our system from the perspective of our secondary stakeholders, college students. We only evaluated two college student participants, meaning that, while the results compiled from these evaluations provided some insights on minor design flaws, they are by no means exhaustive or representative of all of the issues in the system. Hence, if we had more time and resources, we would have evaluated more participants; specifically, in lecture (see [Appendix](#)), we discussed that an average of 97% of the problems discovered by 60 participants would be discovered if 12 participants are evaluated. Because we have thus far evaluated high school and college users separately, we would ideally have been able to evaluate 12 high school students and 12 college students to maximize the chances that we have found most of the major design flaws in our system.

## Appendices

### A1 Job Stories

 A1 Formative Studies Report

### A1 Design Requirements

 A1 Formative Studies Report

### A1 Questionnaire Data

[A1 Questionnaire Data](#)

### A1 General Problem

 A1 Formative Studies Report

### A2 Key Insights from Heuristic and Think-Aloud Evaluations

 A2 Design Concepts and Prototypes

 A2 Design Concepts and Prototypes

### Gr8 Usability Study Form

<https://forms.office.com/r/q3tg7NS9du>


### System Usability Scale Form

<https://37dm0dzbbcq.typeform.com/to/tHA2zkyu>

### Participants's Feedback Response Form

<https://37dm0dzbbcq.typeform.com/to/dMtrT6LZ>

### Usability Study Data

 Gr8 usability study




## **Lecture Reference**

This refers to CSC318F 2023 lecture 9.2 on User Testing, slide 7, by Professor Fanny Chevalier.

## **Consent Forms**

 Consent forms.docx

## **Usability Study Protocol**

 Usability study protocol.docx

## **Group Meeting Notes**

 Notice

(Note: most of the time we held Zoom meetings and simultaneously worked on the Figma prototype or other products, so we did not make many notes)