GENERAL PROJECT: SAHAYAK

A PROJECT REPORT

Submitted by

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CAP5100 - Human Computer Interaction

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Problem/Context

An international student's transition to a new country is arduous, and the problems begin the moment they arrive. Finding accommodation, understanding courses, and communicating with classmates and seniors are among the most difficult difficulties. 63 percent of international students found it difficult to find roommates and residences, according to user data acquired through surveys. Around 80% of students expressed an interest in learning more about the courses available this semester as well as interacting with other students. 83 percent of students had little to no clue where they would continue their studies or what they should do first (University ID, introductory events, student club inaugurals, etc.) As a result, we intend to develop an app that will allow a potential user to To overcome overwhelming challenges and gain a comprehensive experience as an international student, communicate with others, and seek aid on the app. Our app will help students find the greatest fit for their needs by allowing them to search for and submit information about apartments, whether they are looking for a new lease or a sublet. Students can also use the app to acquire reviews and information about lodgings. Aside from that, students may keep a lookout for their peers and learn about course material before selecting one, as well as communicate with others who have completed or are currently enrolled in the course using the app, making the processes less complex and time-consuming. Not only that, also our app keeps its users up to date on current on-campus events, giving international students a place to interact with new people, join new groups, meet new people, and have fun, making their international student experience easier.

User-Centered Design Process

User-Centered Design is an iterative design process where the designers focus on users' needs and then design a system to best fit those needs.

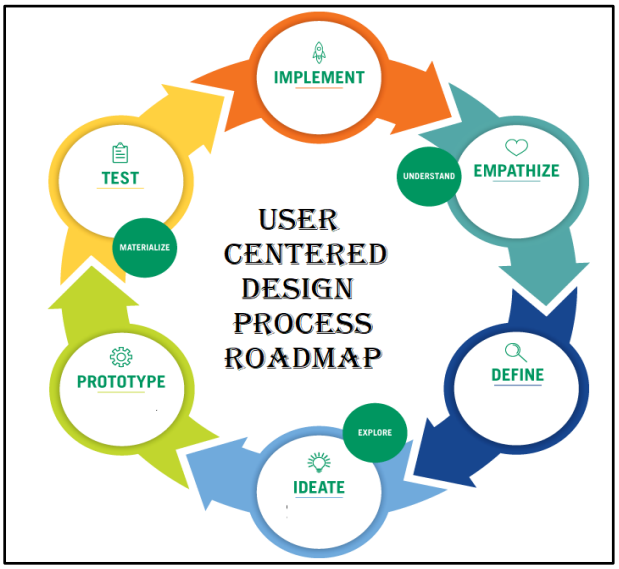


Fig. User-Centered Design Process Roadmap

1. Emphasize

Emphasis is part 1 of the process it refers to identifying user needs through the proper process and user research. In this step, we understand the target audience for whom we are designing by observation and interview. The target group for this project is International students and the main aim is to help those new people moving to an entirely new country find decent accommodation at affordable prices and help them adjust to the new curriculum. We used Google Forms to collect data and identify all the key features the subjects look for while finding accommodation and pin down the problems students face while picking courses.

The survey focused on the following points:

- The country of the test subjects to establish their nationality and identity as International students.
- To identify if the subjects were satisfied with their current living conditions and if not what were the main issues they were facing.
- To identify what were the main factors that influenced their decision to choose a particular accommodation.
- To identify issues faced during course selection and what information could have helped the subjects make an informed decision.
- To identify main features that would allow the students to form groups and networks in order to socialize and communicate effectively.
- To make a checklist of important tasks students must do as a new International students.

The questions were formulated in such a way that allowed us to pick up the key points while valuing the privacy of the test subjects. The test subjects were mainly friends, classmates, and other peers who primarily belonged to the international fraternity to identify their needs and help us build features to cater to those needs.

The results of the survey based on the responses are given below. The text responses were divided into broad categories to establish the importance of individual features.

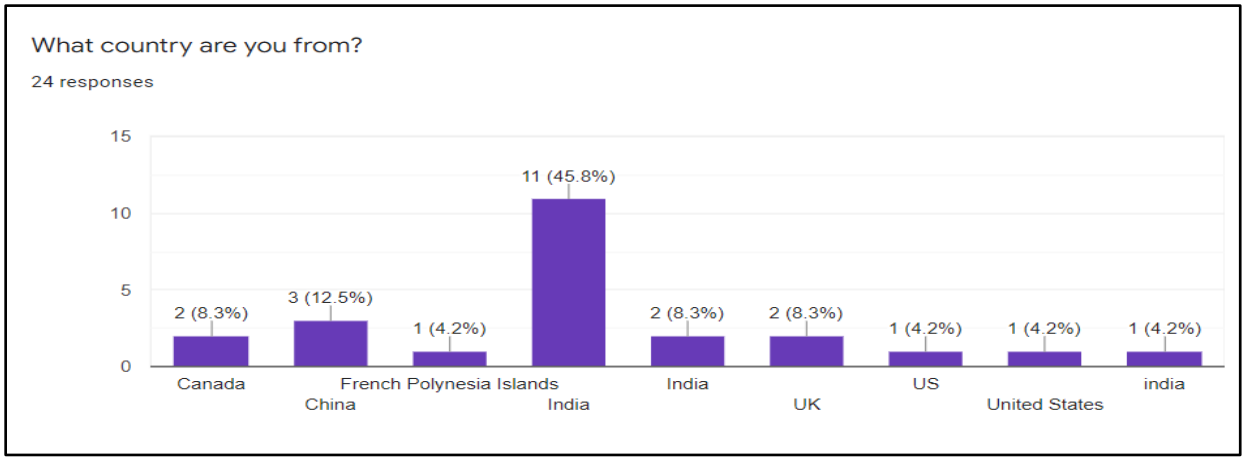


Fig: Nationalities of participants in User Survey

Fig. Results of responses marked by participants in the User Survey

These were results of critical importance as they helped us to order features based on their importance to the users that would distinguish us from the various commercial products already available in the market.

2. Define

The next step of the user-centered design process refers to defining the problems based on the results of the previous phase. In this phase, we as designers create a point of view that is based on user needs and insights and try to address them through our product.

Key inferences are drawn from the user survey:

- Users while finding a new accommodation give the first priority to their budget and many users expressed dissatisfaction due to the recent hike in prices of rental properties.
- Proximity to destinations such as grocery stores, bus stops, etc. was important.
- Students need a platform where they can sublease their apartments or find new roommates at affordable prices.
- New International students want a review of the courses beforehand to clearly mark learning outcomes from those courses.
- Students also expressed a desire to form groups with fellow classmates where they could share lecture notes and discuss doubts.
- Students need a platform informing them of all the important things to do before they start the program.

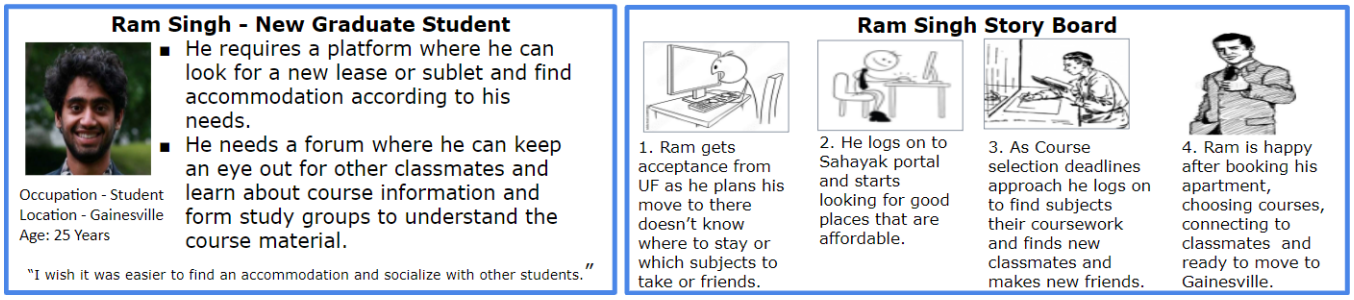


Fig. Persona and Story Board for a potential User of the Sahayak App

3. Ideate

In this step of the user-centered design process, all the group members come together and put together their ideas for a potential solution. This step marks the beginning of the exploration phase of potential solutions which can be developed based on the survey keeping in mind important factors such as time duration and technological limitations.

The members of the group for this phase got together and brainstormed about important features which might be part of a viable solution and then voted for them based on their desire keeping in mind the user needs based on the survey.

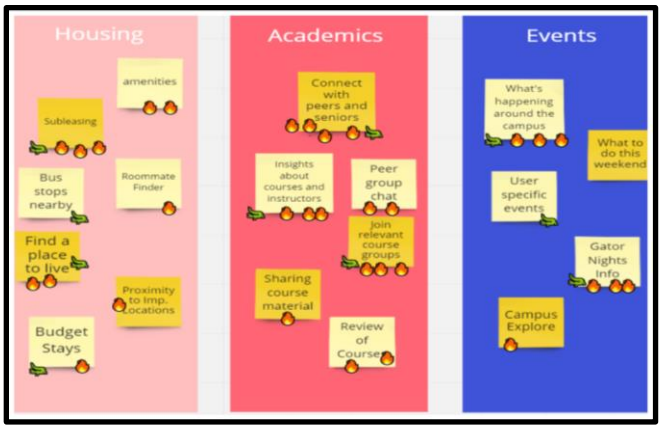


Fig. Ideation process of User-Centered Design

4. Prototype

Prototyping refers to building a representation of one or more ideas and then gaining user feedback to improve the design and build a user-friendly solution. The wireframes that were designed and tested have been shown diagrammatically in the subsequent sections and explained in detail. The prototyping phase took place during the MidPoint project presentation where we field-tested our product where the potential users critiqued our solution and gave feedback. Based on the user feedback we improved our design and refurbished certain features in order to improve on our original design.

5. Testing

The testing phase of the user-centered design process focuses on materializing the project idea where the prototype idea is shared with the original user for feedback. During this phase of the cycle, we conducted interviews with anonymous international students and received their feedback for the Sahayak App which was then deployed as a mobile app with the aim to identify potential flaws in the application and noting of time duration for performing various tasks on our application. After using the application the participants were asked to fill out an evaluation form that evaluated the responses on a 7-point Likert scale. A Likert scale is commonly used to measure attitudes, knowledge, perceptions, values, and behavioral changes. The feedback was also received from our instructor about the design of our app and changes were incorporated into the application accordingly.

6. Implementation

The implementation is the final phase of the User-Centered Design process in this phase we finally deploy our solution based on the user feedback. The detailed layout of the User-Centered Design Process for our project is listed below. The sequence follows the deployment from our initial prototype to the final product through different stages and how different features were improved or added based on user feedback and survey.

Our Solution

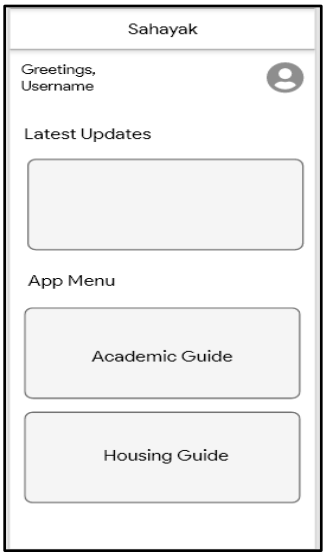
Our solution is a cross-platform mobile app created using the Flutter framework and the Dart programming language. Academics and Accommodation are the two key modules in our application along with our home screen. The former includes a catalog of classes as well as chat rooms where students may discuss the course, teacher, and academic issues. We also offer a general conversation thread where students may talk about anything. We also include professor ratings collected from "RateMyPofessor.com" in the academics area, where students may view professor ratings and reviews and make decisions based on them. The idea is that students pick their courses based on their interests, but carefully and after thorough research, all from one location. Following that, in the accommodation module, we have a variety of rental listings based on the user's location and preferences. By clicking on the cards, the user may discover various details about the postings. Currently, we are using an open API to get property details on our front end that shows data in real-time.

We created two prototypes and the finished product. The first prototype is a wireframe of the UI that is interactive but not entirely functional and was created in AdobeXD; the second prototype is a functional prototype that was created in Flutter and offers a rough concept of the look and feel of our application, which was improved following user input on prototype 1. Finally, we have the completed product, which is completely functioning and has been enhanced based on comments from prototype 2.

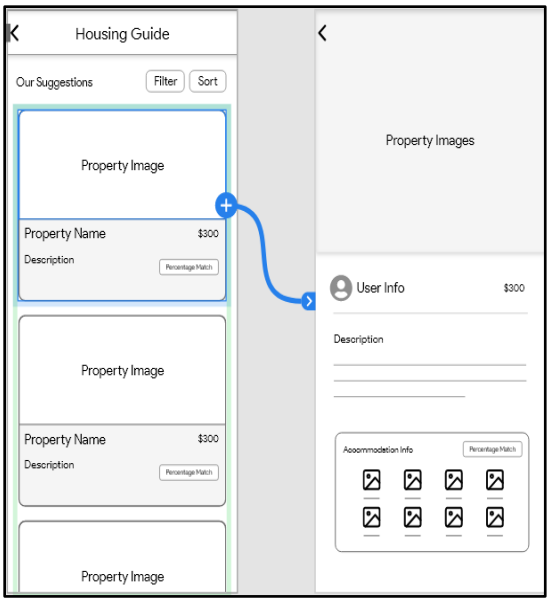
Prototype 1 (The wireframe)

We did a google form survey based on the inputs received before beginning to design the real mobile application. We created the application wireframes in Adobe XD (software used to design Mockups and Designs) after understanding the user needs and what we planned on the miro board. During the first brainstorming session, we attempted to incorporate as many features as possible while keeping the survey findings in mind.

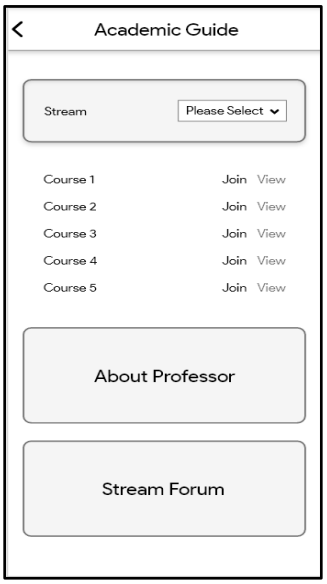
- **Home screen:** The home screen serves as the application's focal point. We included an event update card here that shows the events going on in/around campus as most people miss out on event information, therefore we came up with the idea of making event information broadcasting more streamlined. Along with this, we added two cards, one for the housing guide and the other for the academic guide. We attempted to make the design as simple as possible so that it is less obtrusive and more user-friendly.



- **Housing Module:** Currently, there are two pages in the housing module: one that lists all of the properties that would help with the process of finding a place to stay, and another that lists all of the properties that would help with the process of finding a place to stay. The second page provides more particular information about the chosen property, such as the number of rooms, bathrooms, and a description of the property's location.



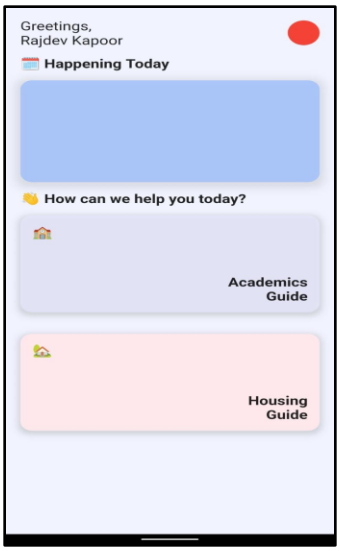
- **Academic Module:** Currently, the academic module's page shows all of the course groups that a student can join so that he/she can learn more about the courses. This would simplify the process of learning about the subject because information about the subject would be at one's fingertips.



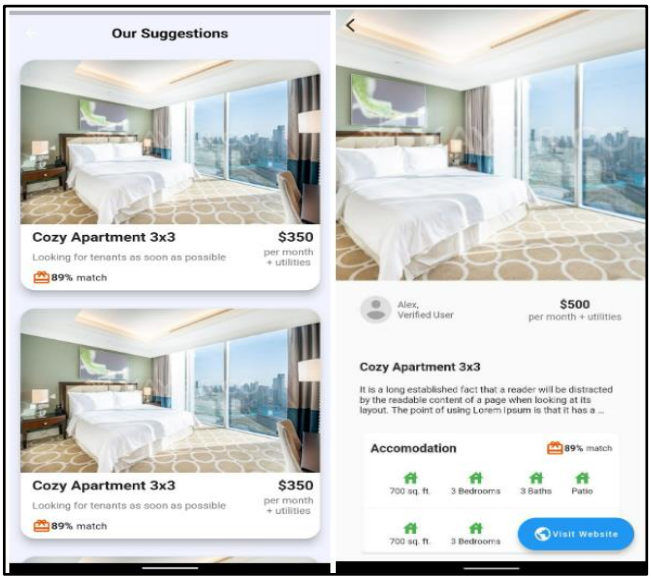
Prototype 2 (Mid-term demonstration)

Based on the input from our initial prototype, we built a second prototype in Flutter and linked the Accommodation module's backend. We tried with a few different color schemes before settling on a blue tone as the main theme for our app since it provides the whole experience a soothing sense. One of the most common suggestions we got was to integrate user login, especially through Google since it would be more simple for both users and developers during the implementation of the authorization.

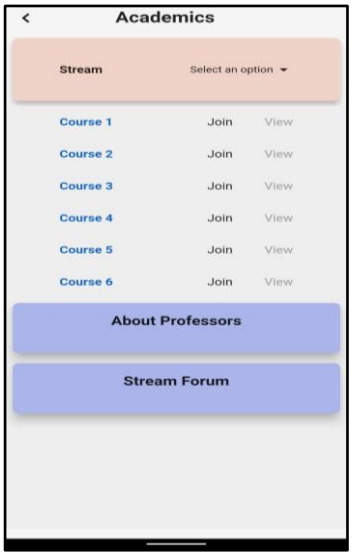
- **Home screen:** From the wireframe, there were mostly user interface-based changes for this screen. We eliminated the app bar with the application's name from the top of the page since it was unnecessary, and added color elements and indication messages. After authorization, the user's name and display image would appear at the very top. "Happening Today" will show the user what's going on around campus today, "Academics Guide" will take them to the academics module, and "Housing Guide" will take them to the housing module.



- **Housing Module:** Based on the wireframe, we created a user interface for listing cards on the two screens. The user gets shown the top 10 results for homes based on their preferences, as well as basic information such as the property's name, monthly rent, and a brief description when the screen is first opened. When you click the card, you'll get further information such as the number of beds, bathrooms, and the location, as well as a link to the website.



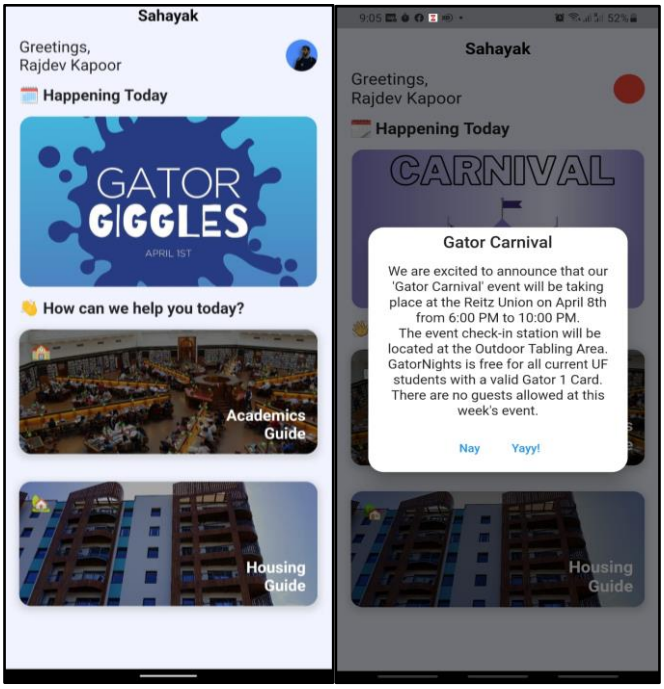
- **Academic Module:** In this prototype, we did not change much of the user interface from the wireframe Similar to Wireframe we have incorporated 3 Sections. The first section displays the Course Wise groups, the second section holds information about professors, and the last section “Stream Forum” is a general chat place.



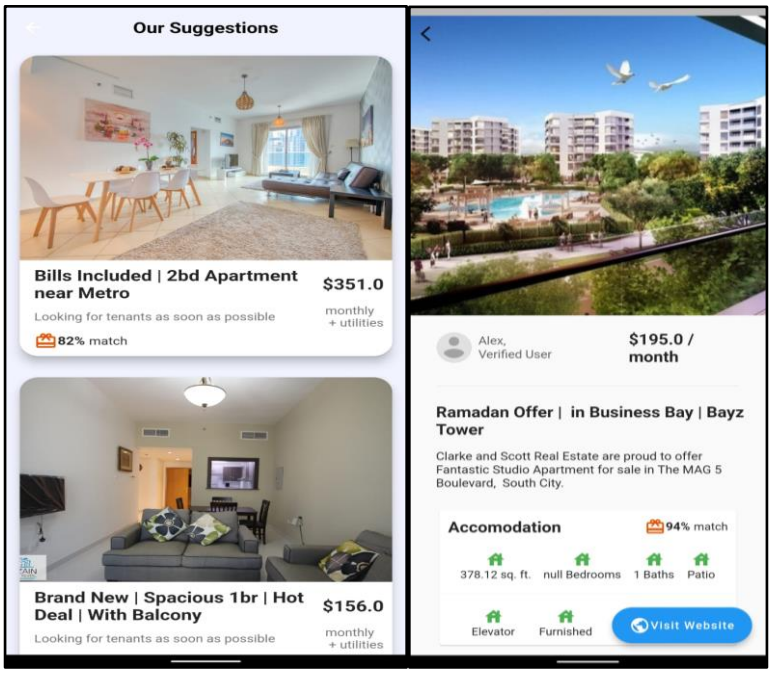
Final Product

We had a lot of proposals after the second prototype, but we opted to go with these three. To begin, now there is a single "Join" button that allows you to join and watch the group chat for a certain course. The second was to link the Instagram page for events displayed on the home screen, and the third was to add a signifier for the course term for easier understanding. We didn't adopt a couple of suggestions because of the potential impact and the time it would take to execute them. "Add a bottom navigation bar for fluid navigation," for example. We didn't find this to be very beneficial because it wasn't practical to add the navigation bar to only two modules, which would lengthen the development time.

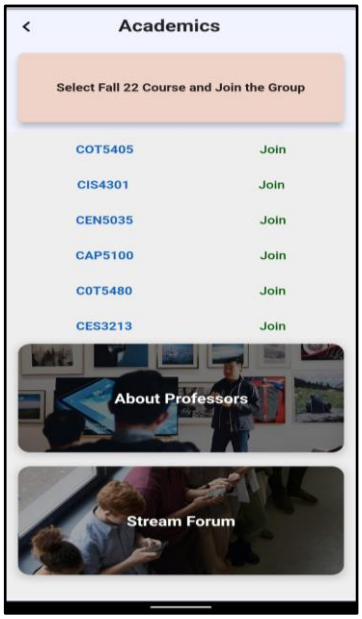
- **Home screen:** After prototype 2, we added placeholder pictures for the three cards on the homepage to improve the look and feel and to quickly communicate the cards' function to the user. The most significant update we made was that users may now click on any of the events that are automatically scrolling (using a carousel) to see details and connect to the Instagram page for more information in the "Happening Today" card.

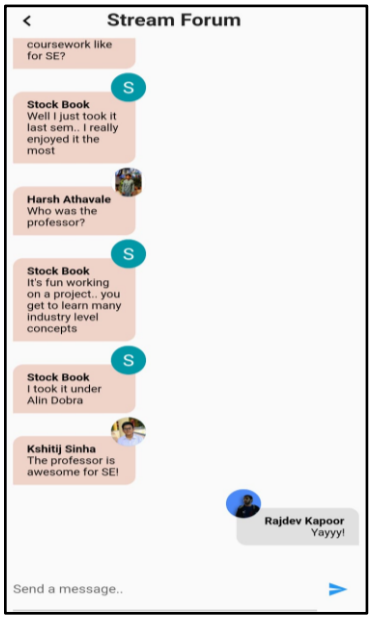


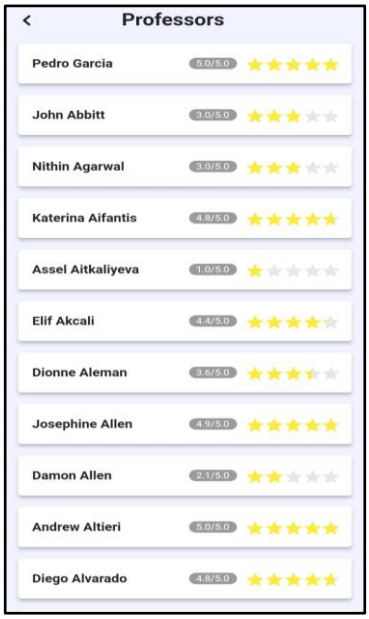
- **Housing Module:** The backend API was finally integrated, and real-time data is now presented in the module. All of the data is now dynamic on both screens, and users may go to the property website for further information about renting. There were no substantial UI modifications or recommendations from prototype 2.



- **Academic Module:** From the second prototype, we received the most ideas for this module. First, as previously mentioned, an indicator text for a term of courses was added; second, the "Join/View" text was changed to a button because users' first instinct was to click on the course code rather than "Join," and finally, placeholder images for "About Professors," which displays professor ratings, and "Stream Forum," which is a general chat forum, were added. The group chat function in this module is a key change, allowing authenticated users to join a course group and discuss their issues.







Project Development: Midpoint to Final Product

From the midpoint presentation onwards, we started building the final product. We started converting the different screens and views of our prototype into a fully functional coded app.
The code for the app was written in dart and for the backend and database, we used firebase which uses NoSQL for storing data.

We first started with coding the main module of the app which contains different cards for events, academics, and accommodation with the event's card containing a carousel iterating through different events on campus. On clicking each event, the information regarding the event appeared in the form of a floating modal. Inspired by the user test feedback we changed this functionality to redirect the user to the Instagram page of the event.

Next, the accommodations module was coded and the layout and style of the cards on the page were decided through research of current sites and apps like Zillow and Airbnb. As the API for fetching results of different houses in Gainesville was not available, we used a dummy API to show the different properties. Every listing on the page was connected to its own separate details page which shows the number of rooms and bathrooms and other information.

The Academics module was built with the functionality to join chats of different subjects and ask and answer questions in real-time. For this functionality we needed our app to store and remember users. So as precursor steps to developing the chat functionality we implemented the signup and sign-in through google and the users were stored, through firebase, in the database.
After this, a unique chat functionality was developed for each subject with an option for chatting to the people of a specific major like (Computer Science or Mechanical Engineering, etc.). Inspired by the user feedback we replaced the two buttons for join and view with a single join button and added a label to show which semester the courses belong to.

Functionality to view the ratings of the professors was also added. To implement this, an API from rate my professors were integrated, and the name of the professor and their ratings were displayed.

The search bar in the professor rating module could not be implemented as the API fetched a list of around 5000 professors and selective filtering was observed to be not working and the screen went into an infinite loading when triggering a search, so this functionality was dropped from this version.

Final Project Evaluation Plan

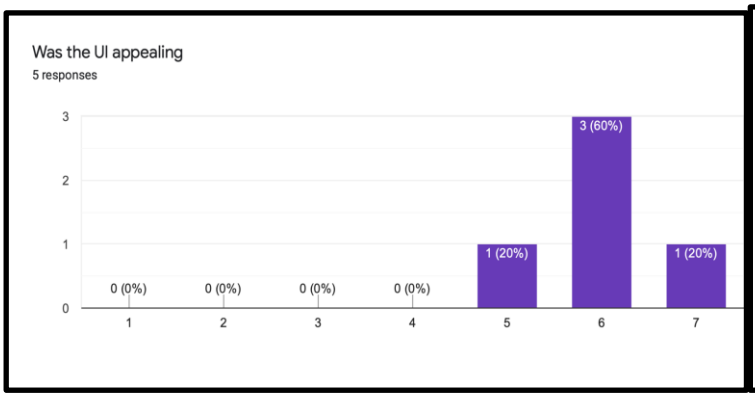
Based on our mid-point evaluation plan, we followed the decided steps and executed them successfully. The main aim behind the plan was to deliver the best product which provides an easy-to-use interface and also to make sure that all the necessary features are added and provided to the users in the most convenient way. So to evaluate our product, we did the following user study:

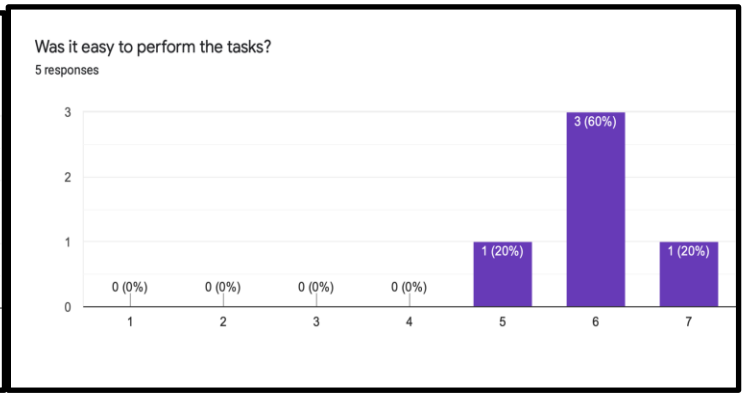
We gathered a group of our peers and asked each of them to perform some tasks in the application. We even noted the time each of them took to execute these tasks.

The tasks were as follows:

1. See details of a particular event.
2. Join an academic course group and try the live chat feature.
3. Go to the ‘about professors’ screen from the academic section and view the ratings of a particular professor.
4. Navigate to the housing guide and lookout for a specific listing and its necessary details from the details page.

After each user performed the above-mentioned tasks, we asked them to fill out a survey based on these tasks and our application. We took the responses via a **likert-scale (0 - 7)** and some single option responses. Below are the questions asked in the survey along with the responses we got:





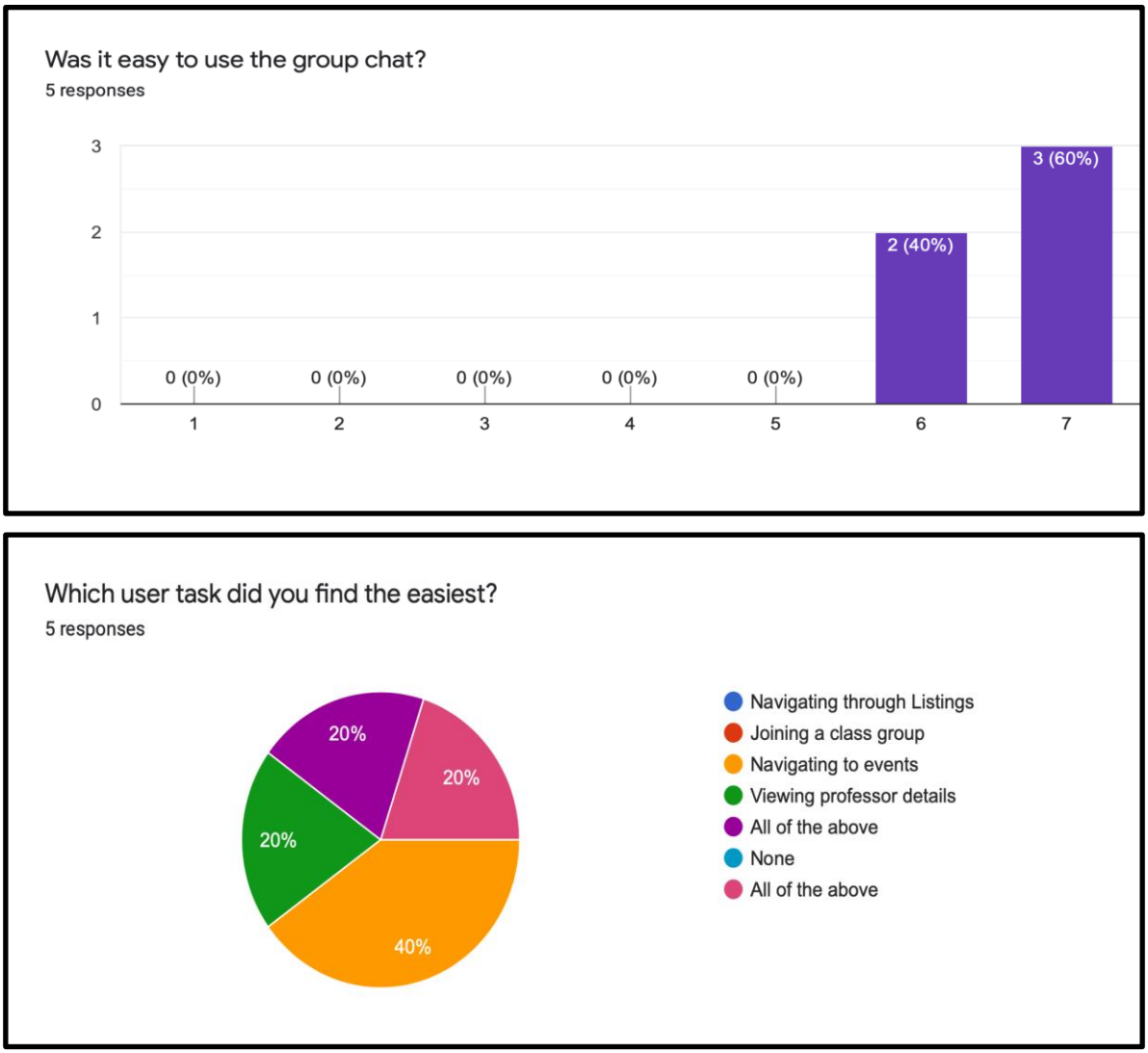
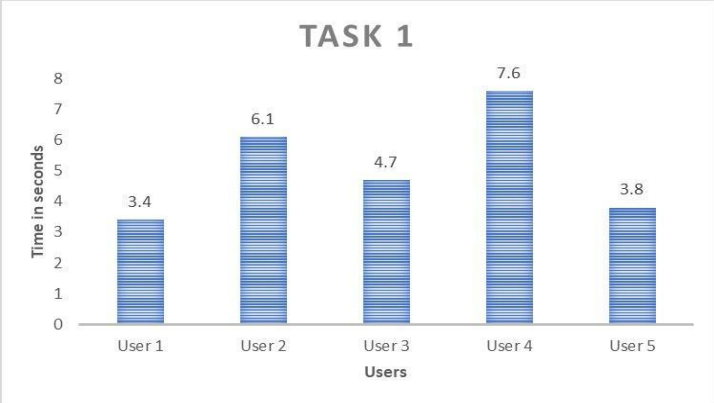
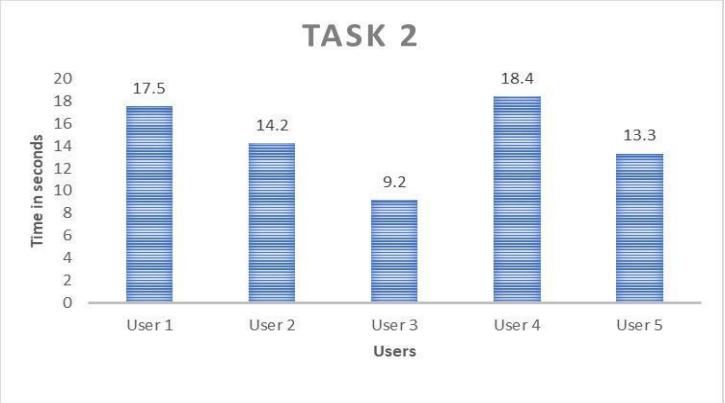


Fig. Results for feedback form after using Sahayak App.

To improve the easiness to use and know which functions are being harder to operate, we even noted the time taken by users to perform the tasks and got the following results:





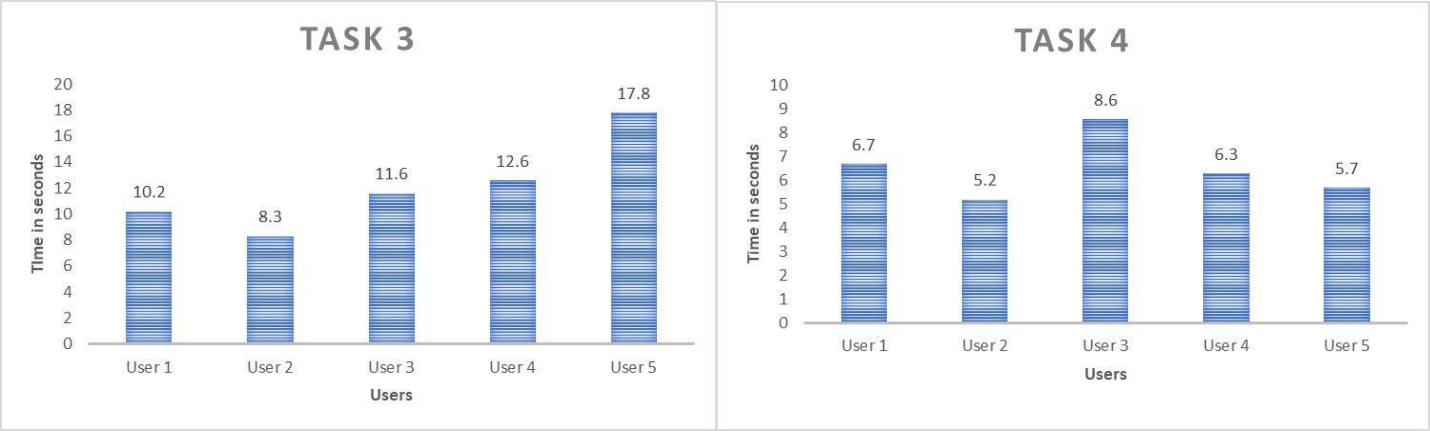


Fig. User time for completing various tasks on Sahayak App.

We also asked the users if there is anything in this application that needs to be updated and got the following responses:

If you could change anything in this application, what would it be.

5 responses

In academics section "join " and "view " buttons are a little confusing. Instead you can implement only one button to join the course chat.
A Nav bar at the bottom could be a nice option to navigate for other features.

The events functionality is nice but it can go directly to the instagram page or a website as those contain info about the current and also the upcoming events

The courses listed are a bit arbitrary. If you can add what the courses signify, that would be great like which semester do the courses belong

include a search functionality in professors list to make it intuitive.

I dont think any addition is necessary

After performing the user study, we found that the designs of a few screens could be improved and we worked upon that. We basically made the following changes:

1. Only one button to join the course chat.
2. A better and more appealing UI of the course listings.
3. Professor listing was made easy to understand by displaying ratings in the form of star marks instead of numeric.

Though we tried to deliver the best user-centric product, due to limited time and knowledge, there are certain features we plan on working on in the future (in case we move towards deploying the application):

1. Allow students to post for sub-leasing: We were halfway through this functionality but couldn't make it deliverable due to limited time.
2. Customized Icons: We couldn't achieve this because of a lack of knowledge in graphic designing and its tools therefore we used in-built icons provided by the flutter framework.
3. Multiple sign-in methods: We implemented the Google Sign-in method for now but we plan on providing multiple options such as phone authentication, email login, and login via UF e-learning credentials.

ACKNOWLEDGEMENTS

We would like to express our deepest gratitude to our Alma Mater University of Florida and our instructor Mr. Pedro Guillermo Feijóo-García for his valuable guidance, consistent encouragement, personal caring, timely help, and for providing us with an excellent atmosphere for this project. We would also like to specially mention our teaching assistant Ms. Sarah A. Brown who in spite of her busy schedule extended cheerful and cordial support to us for completing this project.

CONCLUSION

The project was a great learning opportunity for us and helped us gain an in-depth knowledge of various concepts of Human-Computer Interaction and gain first-hand experience of the User-Centered Design process. The development of the final product following various steps of user-centered design from conducting user surveys to testing our solution and finalizing our solution helped us develop the spirit of teamwork and enhance our understanding of programming languages and various frameworks which would be critical for us in a professional working environment. A complete overview of our project and the user-centered design can also be viewed at https://sites.google.com/view/sahaayak/ .