HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

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FINAL REPORT

COURSE: HUMAN-COMPUTER INTERACTION (AC4150E)

PROJECT TOPIC: PLANMATE – TIMETABLE PLANNER WEBSITE

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Class: Digital Communications and Multimedia Engineering 01 – K66

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1 PROJECT INTRODUCTION

1.1 Project Name and Value Proposition

1.1.1 Project Name and Slogan

The name "PlanMate" was chosen with care because of what it says about this app. "Plan" is the keyword for a core functionality that this application should possess for students in managing their timetables, while "Mate" brings in connotations of companionship, reliability, and support. This will go a long way in bringing up a friendly, approachable image, and a resonance with college students who are eager for tools that are both useful and easy to use.

The slogan "Your best mate in college" seals this identity of the application as a trusted companion along the student's journey. It is catchy, short, and easily remembered-just what the app is after in making class scheduling easy and stress-free for students. Actually, the slogan positions PlanMate as not just a tool but a trusted friend in support and reliability while one navigates college life.

1.1.2 Project Logo
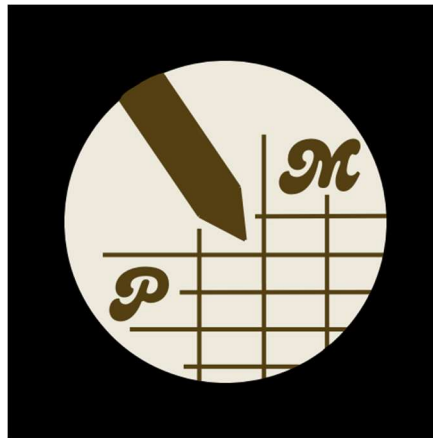
Figure 1: PlanMate Logo

An active pen draws or writes on a timetable. Meanwhile, the initials are inconspicuously integrated with it. This image truly presents the concept of planning and organization. Besides, creative precision is one of those particular features which are held by students. The pen shall symbolize empowerment since it would feel that they have been enabled to take in their hands their time because of the app.

1.1.3 Value Proposition

PlanMate offers an effortless and intuitive timetable planning experience, specifically tailored to meet the unique needs of HUST students. With features like automatic schedule generation, personalized absence preferences, and seamless file imports, PlanMate saves

time and eliminates the stress of course registration. Designed with a student-first approach, it ensures a smooth and efficient way to create, visualize, and manage your weekly timetable, empowering you to focus on your studies and maximize productivity.

1.2 Team Member Names and Roles

Name	Student ID	Role/Work Distribution	Note
Nguyen Gia Bao	20210099	- Interviewer/Observer/Notetaker. - Cameraman. - Evaluator. - Researcher. - Sketcher.	UI Designer
Nguyen Do Hoang Minh	20210591	- Interviewer/Notetaker/Facilitator. - App Name/Slogan Idea. - Actor. - Evaluator. - Researcher. - Sketcher.	Web Developer
Nguyen Huu Phong	20210668	- Interviewer/Observer/Computer. - Report and Slide Preparation. - Logo Designer. - Video Editor. - Evaluator. - Sketcher.	Team Leader

1.3 Problem/Solution Overview

HUST students often struggle with visualizing their timetables before course registration due to the absence of an official tool, leading to confusion and inefficiencies. This challenge makes it difficult to plan schedules effectively and avoid overlaps or missed opportunities. PlanMate addresses this problem by offering a user-friendly app that allows students to quickly customize and visualize their timetables. With features like personalized absence preferences and automatic schedule generation, the app ensures a smoother, more efficient course registration process.

2 NEEDFINDING

2.1 Interviews

Six interviews with candidates from different educational backgrounds were conducted in order to gain deeper insights into the needs and challenges related to timetable planning. The following persons were interviewed: Minh*, Tai, and NMinh from HUST, Rose - currently studying at TMU Canada, Son from HNUE, and Linh* from RMIT.

These participants represented our target groups: current HUST students who are the main users of the tool, and students from other schools or universities, offering a wider

range of perspectives. We classified them into three kinds of users according to their scheduling habits and expertise. Normal Users use basic tools or traditional methods to manage their timetables. Expert Users, with one participant, possess advanced knowledge of course registration systems or technical proficiency in scheduling tools. Extreme Users, also represented by one participant, exhibit unique or innovative scheduling behaviors that differ significantly from typical users.

With HUST students, interviews were conducted offline face-to-face at school, providing a more personal, direct, and in-depth approach to attain insights. Each session took 5-10 minutes, maximum 20 for more details. Online interviews were conducted using platforms like Messenger for participants from other schools and universities who could not meet due to geographical constraints. These sessions followed the same time structure as the offline interviews.

During the interviews, we focused on a few key points that could reveal their pain points and preferences. We talked about the current tools and methods they use for doing timetable planning, their general user experience, and feelings and emotions associated with it. Special attention was given to understanding difficulties they had encountered, solutions they tried, and the level of customizability they wanted from a scheduling tool. Moreover, we have garnered feedback on specific features they find important to include in order to enhance the scheduling process. Here are some examples of the questions that have been used by us to ask:

- *"How do you usually arrange your timetable? (Do you use any tools, like Excel, paper and pen, or websites?)"*
- *"Are there any concerns you have when using these tools?"*
- *"How do you feel when arranging your schedule for a new semester? Do you feel stressed when selecting courses or organizing them?"*
- *"Have you ever needed to share your timetable with friends or professors? If so, do you think sharing your schedule would be a useful feature?"*
- *"What do you think of the interface of the current system? Do you wish it would change in any way?"*

This structured approach lets us capture a holistic view of user needs so that our solution will address common and unique challenges alike.

2.2   Synthesis

2.2.1   Individual

In this section, we synthesized the insights gathered from individual interviews to identify common themes, unique perspectives, and key user needs. By analyzing the

responses of each participant, we aimed to uncover patterns and differences in their experiences with timetable planning. This process provided a deeper understanding of user behaviors, challenges, and expectations, forming the foundation for designing a good solution.
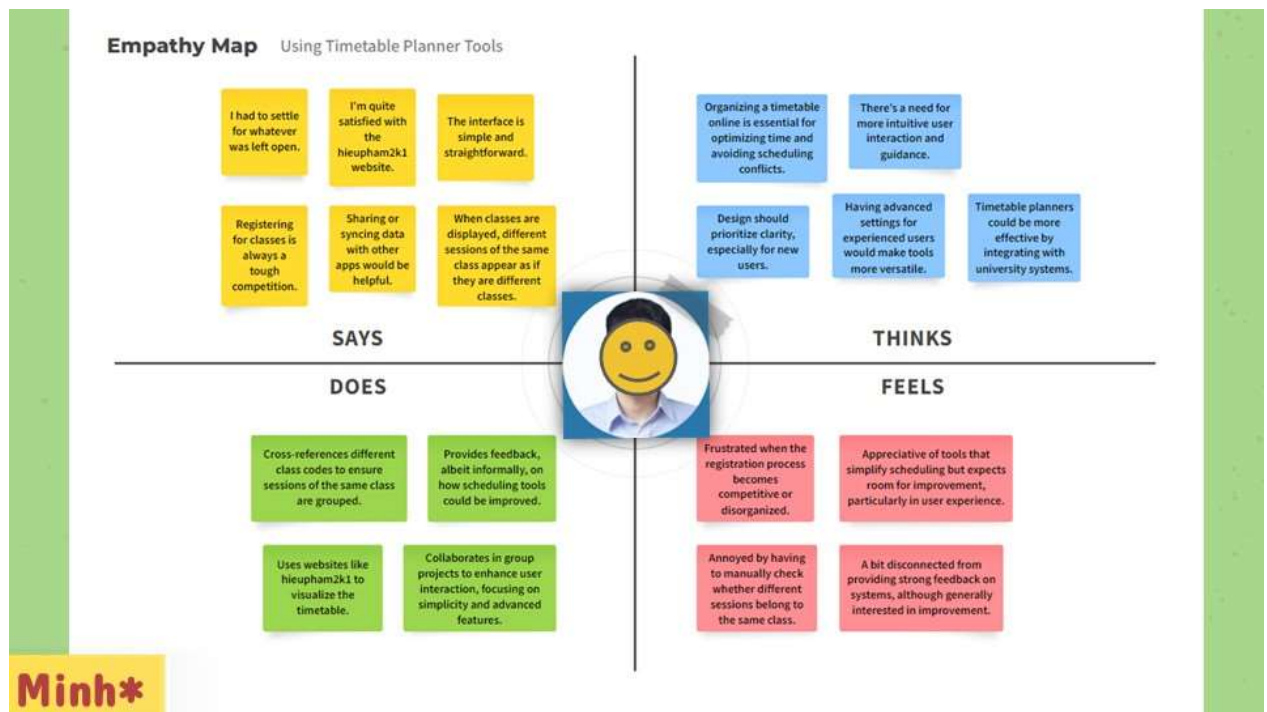

Figure 2: Minh* Empathy Map

"Registering for classes is always a tough competition."

"Organizing a timetable online is really essential because it's more convenient than traditional methods."

"Different sessions of the same class are shown as if they are different classes."

"Both front-end and back-end optimizations are important."

From Minh*, we synthesized key insights regarding efficient scheduling and user preferences. Minh* emphasized the importance of quick and clear course management, highlighting a need for features like data integration to sync with university systems, thereby avoiding scheduling conflicts. He appreciated a simple interface that is easy to navigate but noted the value of advanced options for expert users. Minh* also stressed the significance of customization, such as instructor filters and syncing with external apps, to enhance usability. Overall, Minh*'s feedback underlined that automation is key to saving time and reducing errors, while visual clarity in timetable design helps prevent confusion. He suggested that a balance between simplicity and flexibility would cater to a broader range of user needs.
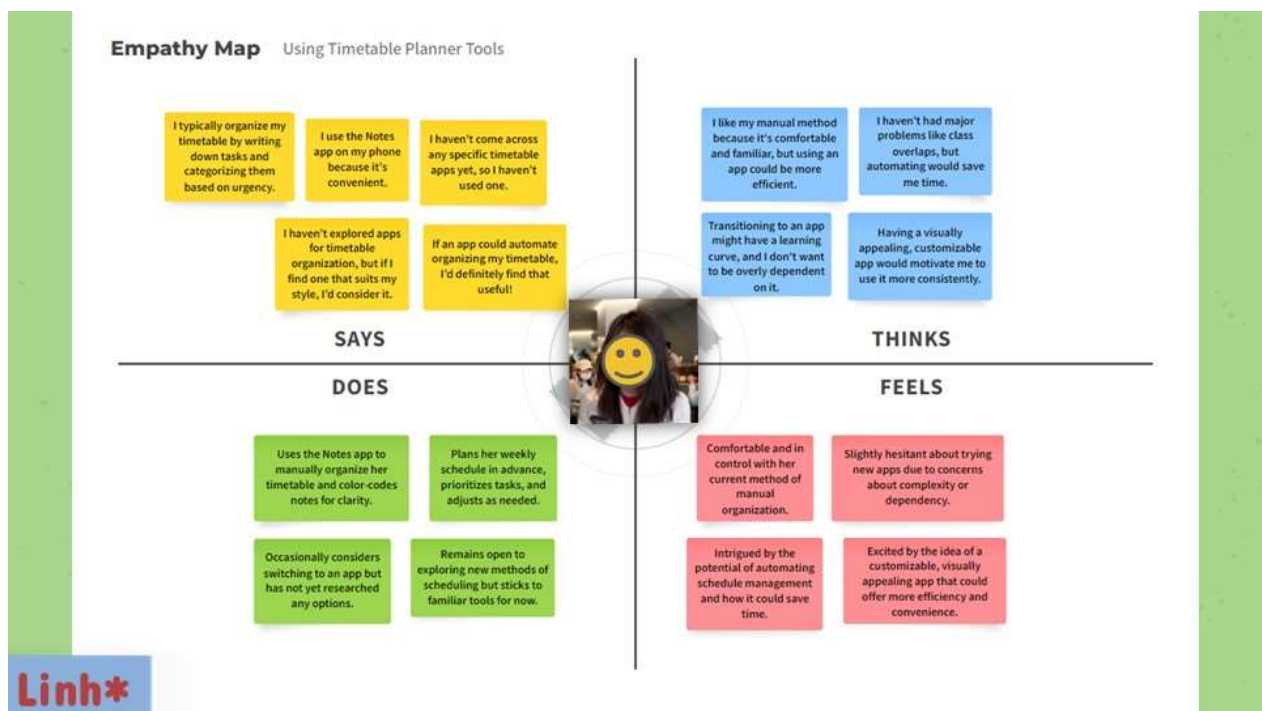
Figure 3: Linh Empathy Map

"I haven't come across any specific applications yet, so I don't have any personal impressions about them."

"The thought of automating that process sounds incredibly appealing."

"I worry that it might be more complicated than I expect and that I might encounter a learning curve."

"I'm drawn to visually appealing designs... a cute and attractive interface would motivate me."

From Linh*, we synthesized insights highlighting the need for familiarity and customization in a scheduling app. Linh* expressed a preference for an intuitive tool that feels familiar, making the transition to a new platform seamless. She values automated efficiency to save time but emphasized the importance of maintaining control over the process. Customizable options are essential to keep her engaged, with a focus on personalization and visual appeal. Linh* demonstrated openness to adopting digital solutions if they align with her habits and offer clear advantages. While she is skeptical about relying too much on technology, she is willing to explore free apps that ensure efficiency while providing sufficient oversight.
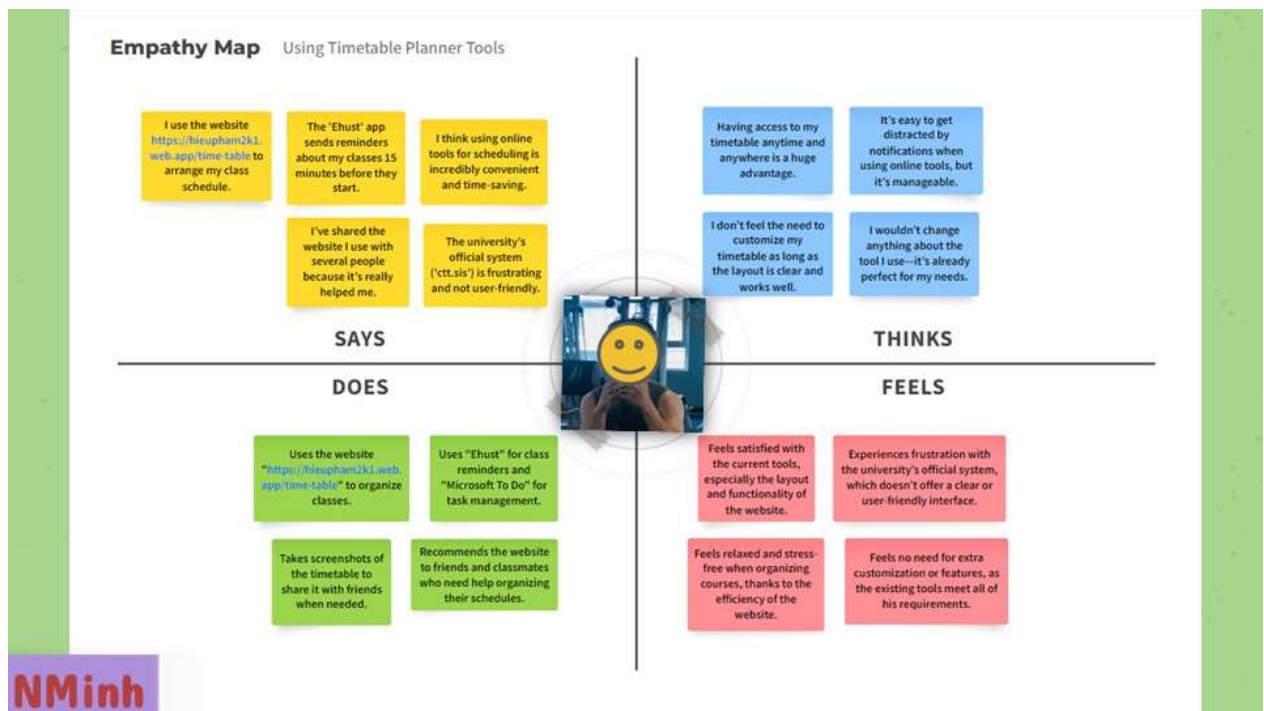
Figure 4: NMinh Empathy Map

"I find it pretty easy... the website has made the process straightforward and quick."

"The university's official system... has quite a few issues with the layout."

"I don't usually have any issues with scheduling, thanks to the website I use."

"I don't feel the need to customize my timetable."

Through the insights gathered, we synthesized key preferences regarding scheduling tools and their use. We found that simplicity and convenience are the top priorities, with users, like NMinh, seeking easy-to-use, mobile-friendly tools. Timely reminders and notifications are crucial for staying on track, and tools that prevent scheduling conflicts and provide a complete view of tasks are highly valued. We also learned that users prefer functionality over customization, with mobile access reducing stress. There is a clear frustration with existing university tools, as third-party apps are often considered more efficient. Additionally, collaboration features like easy sharing are essential for group work, helping users collaborate more effectively.
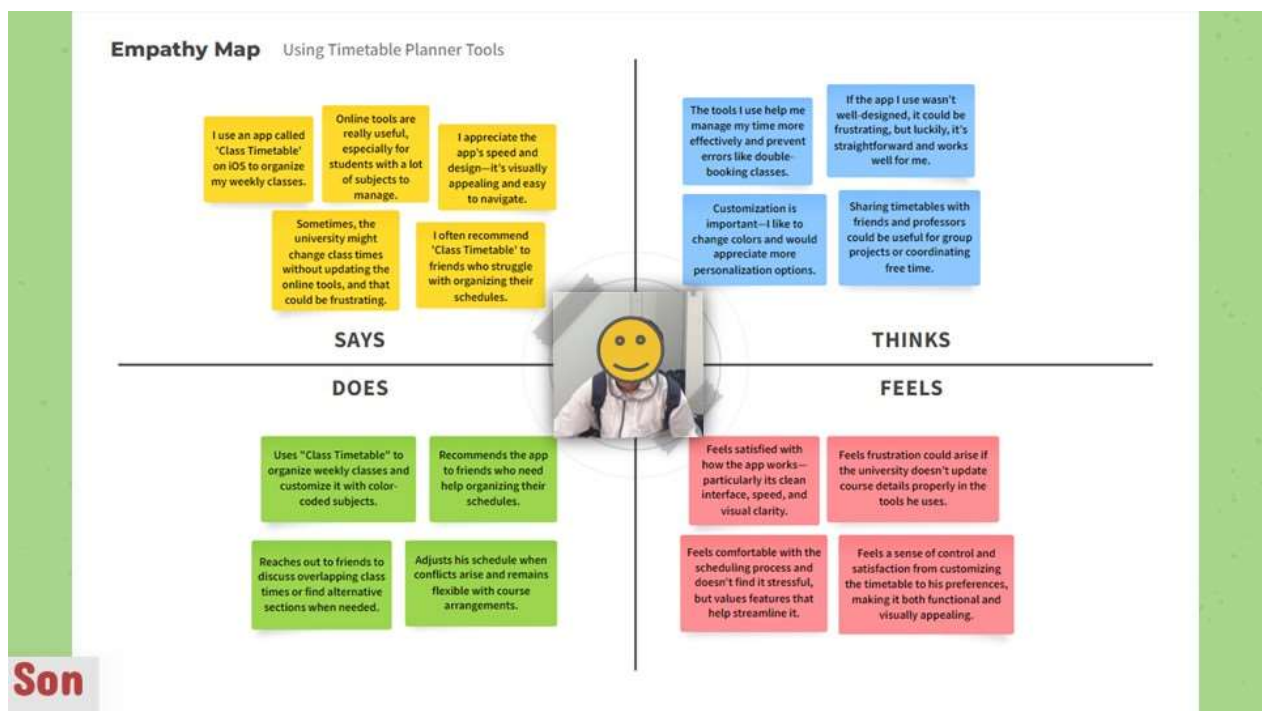
Figure 5: Son Empathy Map

"Online tools are really useful... they simplify the process of organizing everything in one place."

"Organizing my schedule isn't really a stressful process."

"I really appreciate the app's speed and the overall smooth experience."

"I'm satisfied with the current interface... but I'd probably want more customization options."

Through the insights gathered from Son, we synthesized that reliable updates, such as timely information on class changes, are essential for staying on top of schedules. Customization is highly valued, as it allows users to personalize their timetables with colors and layouts to enhance usability. Easy sharing tools are important for coordination with peers and professors, while error prevention features, such as avoiding scheduling conflicts and enabling flexible adjustments, are crucial for a smooth experience. We also learned that user-friendly, simple, and fast tools help with organizing schedules, and color-coding improves usability, with more customization options likely boosting engagement. Consistency in university-provided information is critical, and the need for future sharing features that facilitate group coordination is evident, helping students collaborate more effectively.
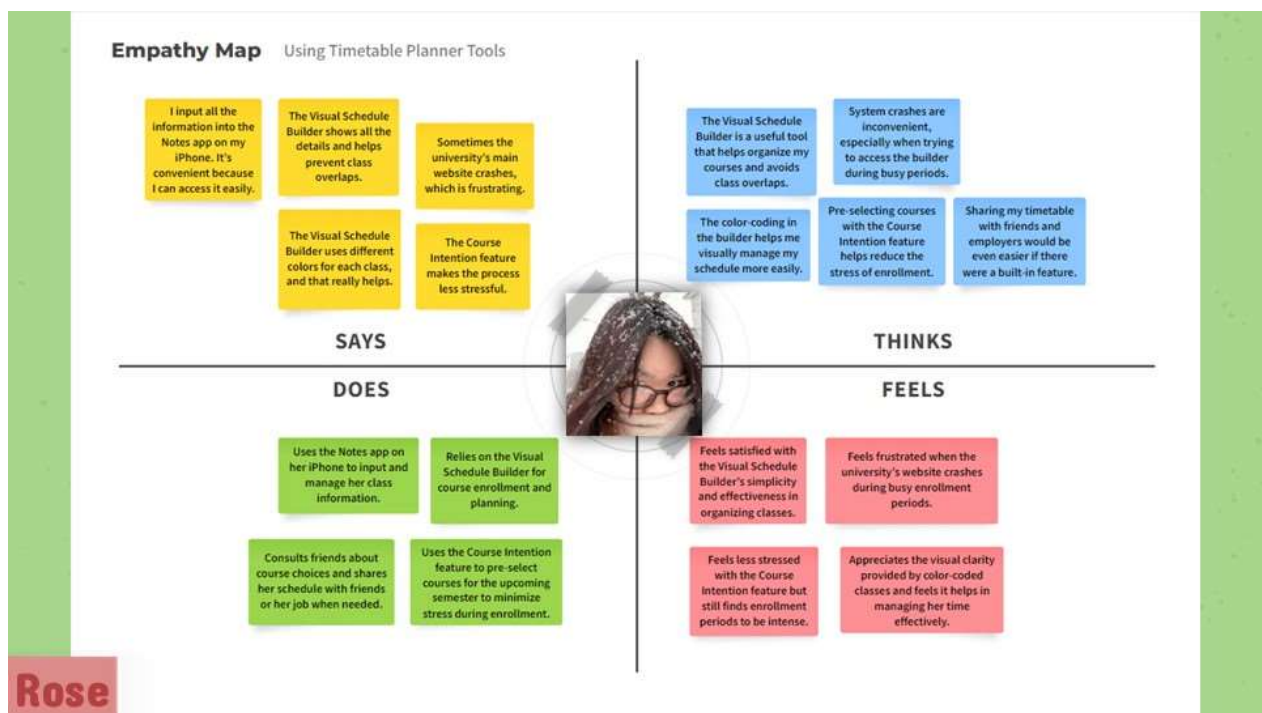
Figure 6: Rose Empathy Map

"I would definitely tell anyone that it's a solid tool if they were to ask."

"Every enrollment period feels like a battle... there's a lot of pressure to make sure you get into the classes you need."

"The scheduling tool automatically prevents you from enrolling in classes that overlap."

"It's useful when I need to send my schedule to my job... having a built-in feature to share would be really helpful."

From Rose's feedback, we synthesized that reliability is crucial, particularly for ensuring a stable site during enrollment periods. Customization is also important, with simple tools that allow color-coding and a clear layout to help users organize their schedules effectively. Pre-selecting courses can help reduce stress and anxiety, while easy sharing options make it easier to plan with others. We also learned that simplicity in tools is essential to prevent conflicts, and efficiency is key, as crashes during peak times lead to frustration. Visual clarity, enhanced by color-coding, improves usability, and customizable sharing options would further help users coordinate their schedules with others.
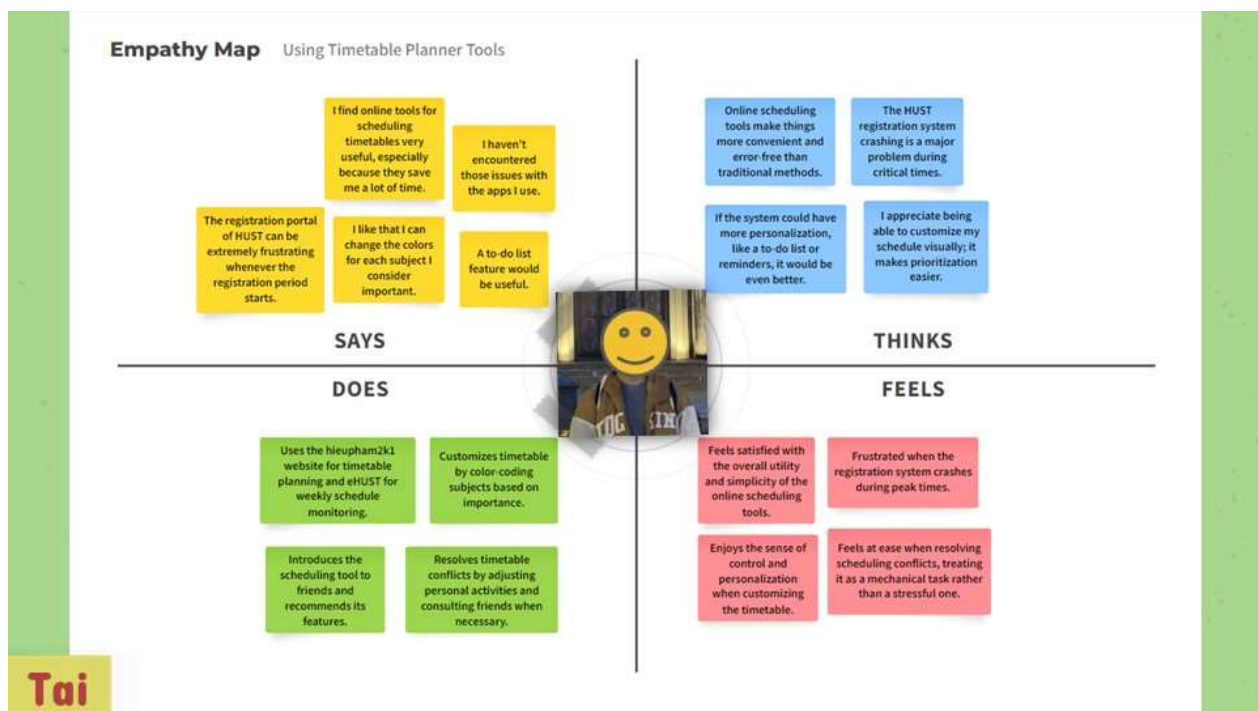
Figure 7: Tai Empathy Map

"I find online tools for scheduling timetables very useful... They save me a lot of time compared to traditional methods."

"I don't usually feel stressed when setting up my timetable for a new semester."

"Yes, I've already introduced the website to some friends for course registration."

"I think everyone's schedule is private and personal."

From Tài's feedback, we synthesized that stability is key, with a reliable, crash-free system being especially important during registration periods. Customization options, such as personalizing with colors and reminders, are highly valued, as they enhance user control and satisfaction. Efficient organization is crucial, with users preferring easy, clear scheduling that avoids overlaps. A simple, intuitive interface with helpful features also contributes to a positive experience. Additionally, online tools are appreciated for saving time and effort, and reliability remains critical during registration. Users also prefer tools that reduce stress, favoring simple and efficient options, with extra features seen as bonuses.

2.2.2 Overall

Across all participants, we observed a clear tension between the need for straightforward tools and the desire for personalization. While normal users prioritize simplicity to avoid being overwhelmed, extreme users often find basic tools too restrictive and seek more customization options. This divergence highlights the challenge of designing tools that balance ease of use with flexibility, catering to a diverse range of user preferences.

A recurring theme was the demand for reliable systems, particularly during peak times like registration periods, versus the need for flexible schedule management. While stable, crash-free platforms are critical to reducing frustration, users also value features that allow them to adjust and reorganize schedules effortlessly. This tension underscores the importance of creating robust systems that can handle high traffic without sacrificing adaptability.

One surprising insight was the strong preference among normal users for third-party tools over official university offerings. This preference highlights significant gaps in current university systems, such as limited functionality, lack of user-friendliness, and insufficient customization options. This unexpected reliance on external solutions reflects users' willingness to explore alternatives when institutional tools fall short.

Another unexpected finding was the outsized role of visual appeal in boosting both usability and engagement. Participants consistently emphasized how features like color-coding and clear layouts enhance their experience, making tools not only more functional but also more enjoyable to use. This highlights an opportunity to prioritize design elements in future tool development.

Finally, attitudes toward technology revealed stark contrasts among user groups. While extreme users expressed skepticism about digital tools, preferring manual or highly customized solutions, normal and expert users were more enthusiastic about leveraging technology. This divergence points to the need for tailored approaches to meet varying levels of technological comfort and expectations.

3 CONCEPT VIDEO

Unlike the conventional design thinking process, where POV statements and HMW questions often guide ideation, our team adopted a slightly different approach. After developing a pre-defined idea for the project, we focused on creating a concept video to validate and communicate the core aspects of our solution. This approach allowed us to gather targeted feedback on specific elements of our concept through interviews and discussions. By presenting a visual and engaging representation of our idea early on, we ensured that it aligned with user needs and expectations. This iterative process enabled us to test assumptions, refine our solution, and incorporate user feedback into the design, ensuring a user-centered approach despite deviating from traditional methodologies.

The following figures are the storyboard for our video:

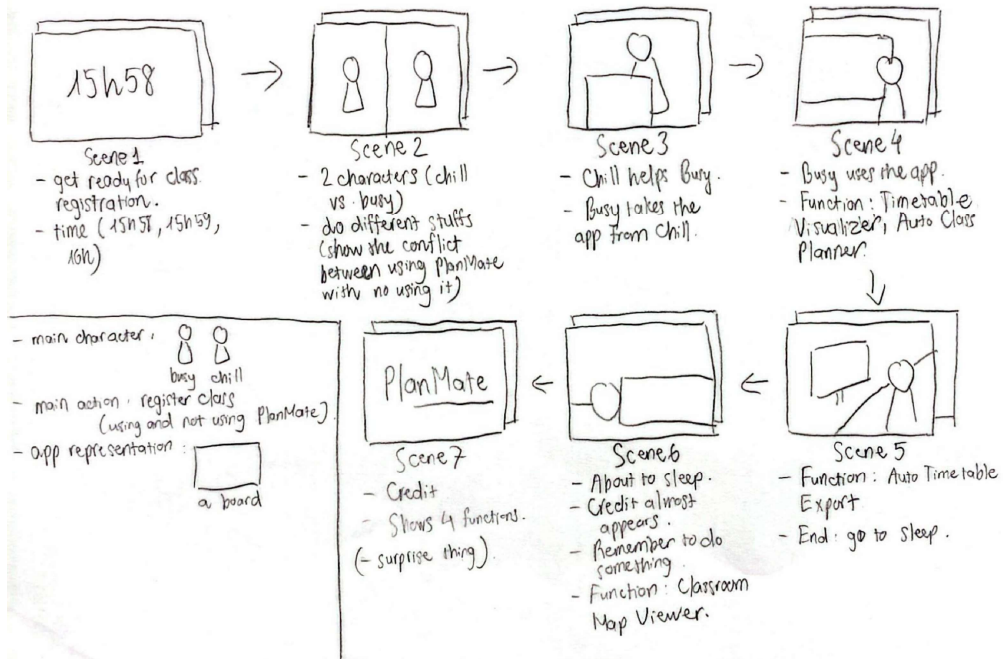*Figure 8: PlanMate Concept Video Storyboard (1)*
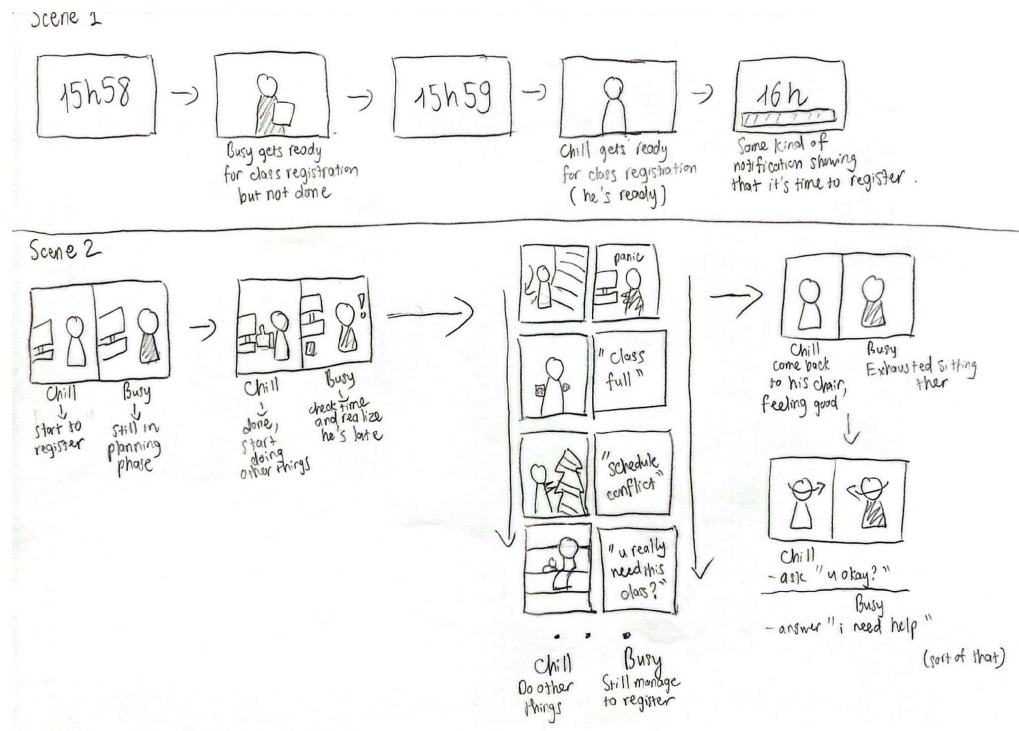

Figure 9: PlanMate Concept Video Storyboard (2)

Scene 3

Chill "I know something that can help you"

Chill gives directly to the camera

Busy takes from the camera and have a look

Scene 4

Busy use the app (board) and hit "Auto"

the board appears the schedule automatically (using stop motion technique)

Busy happy

Scene 5

Busy press "Print"

The printer print the time table out

Busy use the planner to register quickly

Busy happy

Busy go to sleep

Figure 10: PlanMate Concept Video Storyboard (3)

Scene 6

Busy close eyes

credit almost appear but then disappear

Busy open eyes and thought "wait but where are the classes?"

Busy press the "Location" button

map appear

Busy happy

Scene 7

Scene black out and 4 function appear

name and slogan (with voiceover)

surprise thing (with voice over)
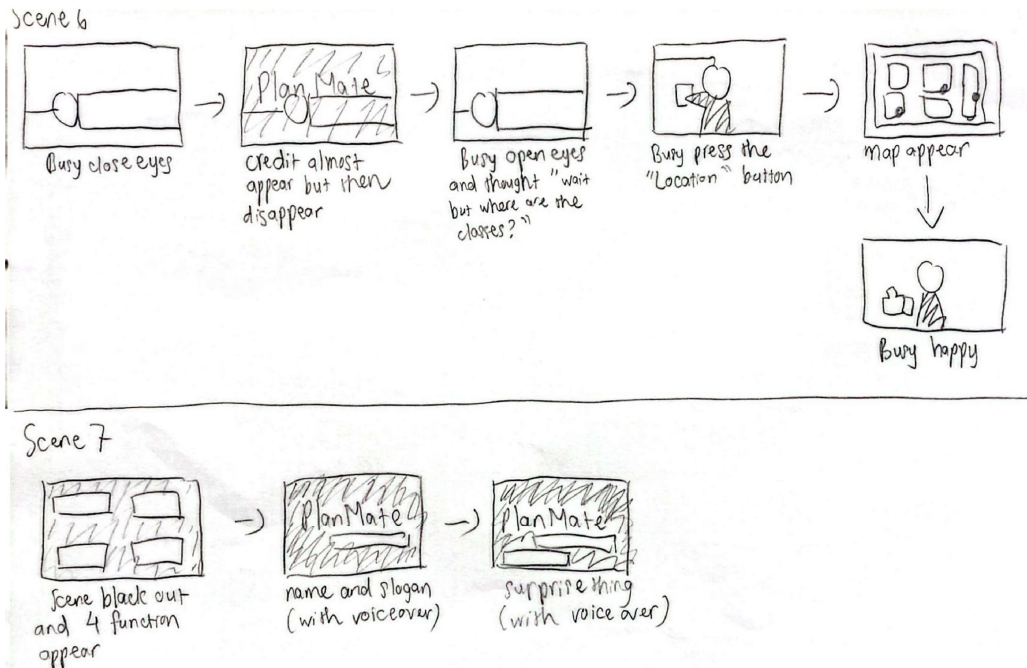
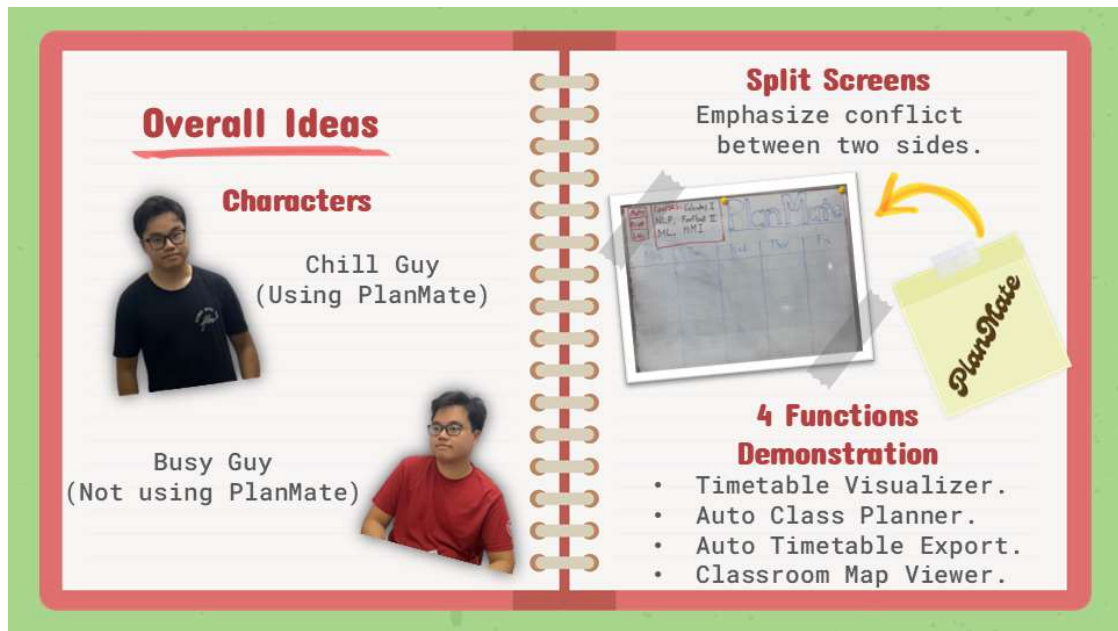*Figure 11: PlanMate Concept Video Storyboard (4)*

Figure 12: Concept Video Overall Ideas

We created a concept video under two minutes to showcase the core ideas of PlanMate. The video begins with a scene highlighting the stress of class registration season, introducing two characters: Chill Guy (using PlanMate, dressed in black) and Busy Guy (not using PlanMate, wearing a red HUST uniform). The screen is split to emphasize the contrast between the two. Chill Guy, benefiting from PlanMate, quickly registers for classes and has free time for other activities, while Busy Guy struggles with arranging his timetable as planned. A brief dialogue follows, where Chill Guy offers PlanMate (represented as a whiteboard) to Busy Guy. After using PlanMate, Busy Guy quickly resolves his issues. The video also highlights key tasks and functions of the website, such as auto-scheduling timetables and printing. Just when it seems the video is ending, Busy Guy decides to use the final feature: displaying a map of class locations. The video concludes at this moment.

4 DESIGN EVOLUTION

4.1 Solution

4.1.1 Description

PlanMate is a comprehensive timetable planning application designed primarily for HUST students to simplify and optimize course registration and schedule management. With its user-friendly interface, the app enables students to create, customize, and visualize their timetables effortlessly, catering to both basic and advanced scheduling needs. The system developers are key stakeholders, ensuring the app's smooth operation and feature updates. Schools and universities, including HUST, benefit indirectly as PlanMate helps students manage their academic commitments effectively, contributing to a better

educational experience. Indirect stakeholders also include parents, who gain peace of mind from their children's improved organization. Competitors, such as other scheduling apps, influence the app's design to ensure it remains innovative and relevant. Additionally, student clubs and communities can utilize PlanMate for organizing and promoting extracurricular activities, further enhancing its value within the academic ecosystem.

The rationale for selecting PlanMate as the solution is grounded in evidence gathered from user interviews and needfinding processes. HUST students reported significant challenges in visualizing their timetables and managing schedules effectively due to the absence of an official tool. This gap highlighted the need for an intuitive, centralized platform tailored specifically to their requirements.

Interviews revealed a strong demand for customizable scheduling features, integration with university systems, and options for visual clarity and automation—insights that directly shaped PlanMate's core functionalities. Evidence from competitor analysis also emphasized the importance of simplicity and advanced options to balance the needs of both regular and expert users. By addressing these pain points with features like auto-scheduling, personalized timetable generation, and integration with academic resources, PlanMate stands out as a practical and user-centered solution. The inclusion of broader stakeholders, such as parents, schools, and student communities, ensures its relevance and long-term sustainability within the educational ecosystem.

4.1.2 Ethical Implications

To address the ethical implications of PlanMate, we referred to a page containing guiding questions. We found this resource very structured, with questions such as *"If two friends use your product, how could it enhance or detract from their relationship?"* and *"What could cause people to lose trust in your product?"* We chose these questions as the basis for our exploration before drafting detailed responses.

With PlanMate, a lot of potential can be developed in relationships because schedule sharing can be allowed to your trusted people, making it more easy to organize study sessions or social activities. Besides, the app automates the alignment of timetables, hence minimizing manual discussion and interactions among friends may be smoother. However, there are some risks involved that may counteract those benefits. The privacy problems or misuse of the schedule-sharing feature may hurt friendships.

Other critical issues might relate to trust. Examples are data breaches, unauthorized access to schedules, and the accidental sharing of sensitive information. Users may feel unsafe if an app is not transparent in the way it handles data. With a view to reducing these risks, mechanisms for feedback collection through in-app surveys and support channels are

integrated into PlanMate. This feedback is then analyzed for trends to prioritize updates to ensure user trust in using the application.

4.2 Tasks

Although PlanMate supports a variety of tasks to enhance scheduling and timetable management, we decided to focus on three key tasks for evaluation: **Exporting the personalized timetable to a PDF** (simple), **Viewing the campus map with class locations** (moderate), and **Automatically generating and viewing a personalized timetable** (complex). These tasks were selected based on their relevance and importance to our primary user base, HUST students, as well as their alignment with PlanMate's core objectives.

- Exporting the personalized timetable to a PDF (simple task)

This task is crucial for students who prefer offline access to their timetables or need a shareable format for coordination with peers, instructors, or family. By simplifying this action, PlanMate ensures convenience and accessibility, even in scenarios where internet access may be limited.

- Viewing the campus map with class locations (moderate task)

Navigating the campus efficiently is a common challenge for students, especially when managing back-to-back classes in different locations. This feature helps users visualize their class locations and plan their day effectively, reducing stress and improving punctuality.

- Automatically generating and viewing a personalized timetable (complex task)

Timetable customization is one of the most sought-after features for students during course registration. Automating this process saves significant time and effort while accommodating users' preferences, such as preferred class timings or breaks. This task reflects the app's promise of balancing efficiency with flexibility.

By addressing these tasks, PlanMate meets critical needs of its target audience, showcasing its usability and value in facilitating a seamless scheduling experience.

4.3 Design Evolution Visualizations and Rationale

4.3.1 Sketching Explorations

After finalizing the core ideas for Planmate, we embarked on an extensive sketching exploration to envision how the app could be implemented across various interaction modalities. We tested numerous storyboards, each representing distinct approaches, including a web/PC application for conventional use, voice interaction for hands-free control, gesture-based interaction combined with projection mapping for an innovative

touchless experience, AR and VR walkthroughs to immerse users in their schedules, and even hologram displays with gamification elements to make scheduling interactive and engaging. These explorations allowed us to evaluate the potential of different interfaces in addressing user needs while pushing the boundaries of usability and creativity.
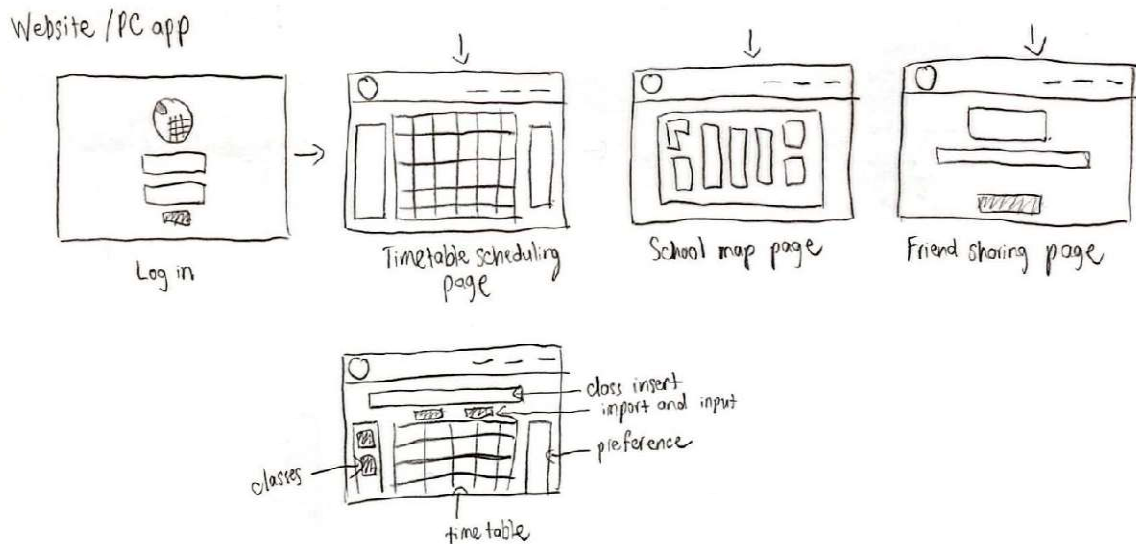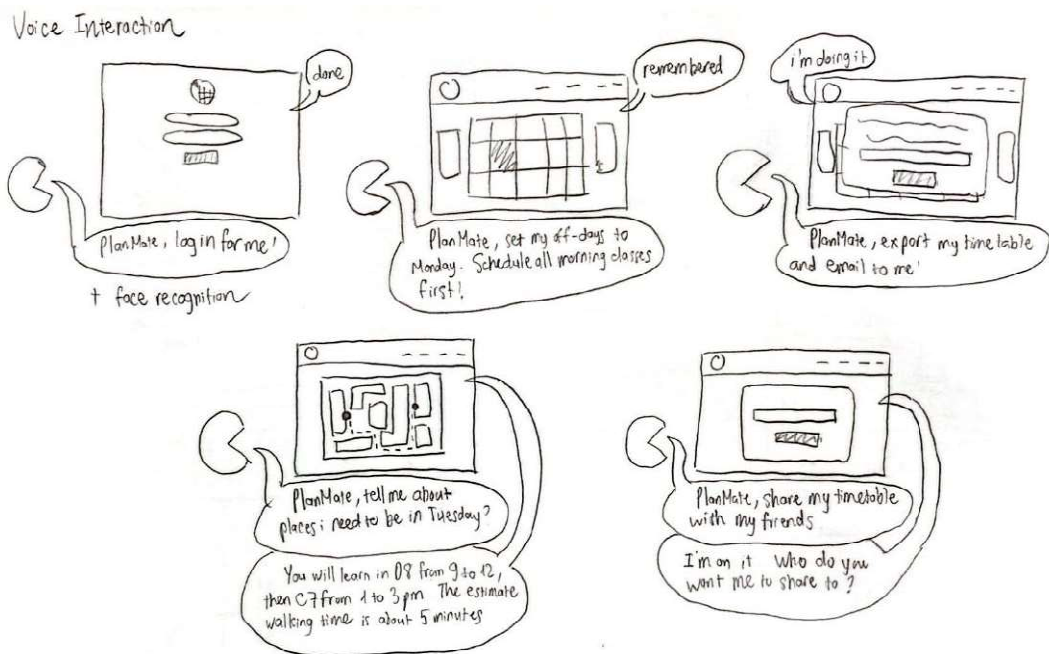

Figure 13: Website/PC App Idea

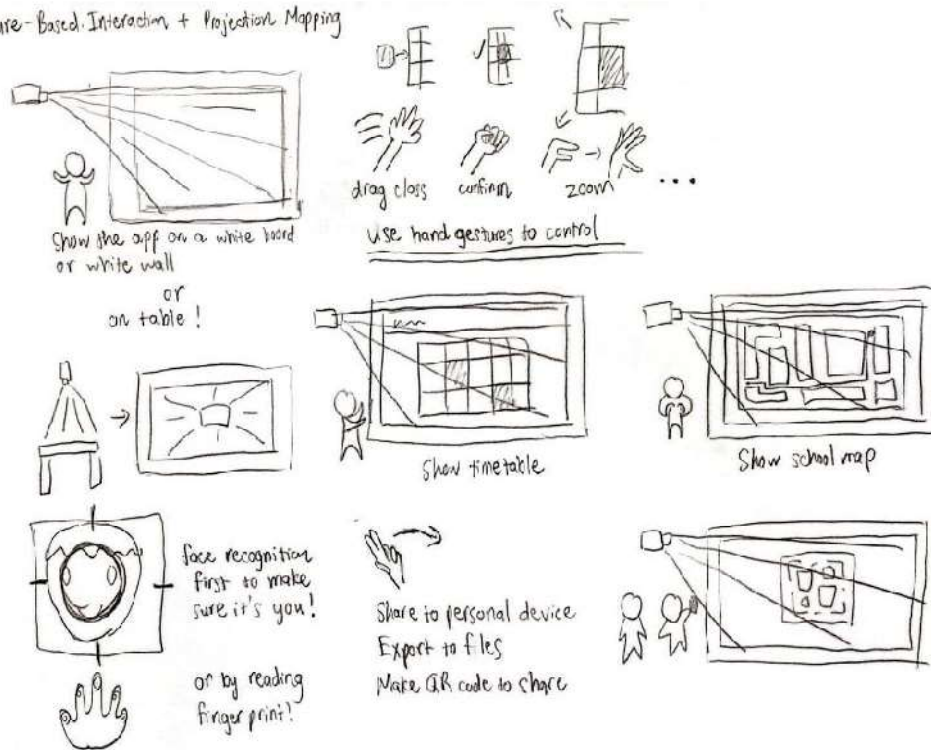*Figure 14: Voice Interaction Idea*

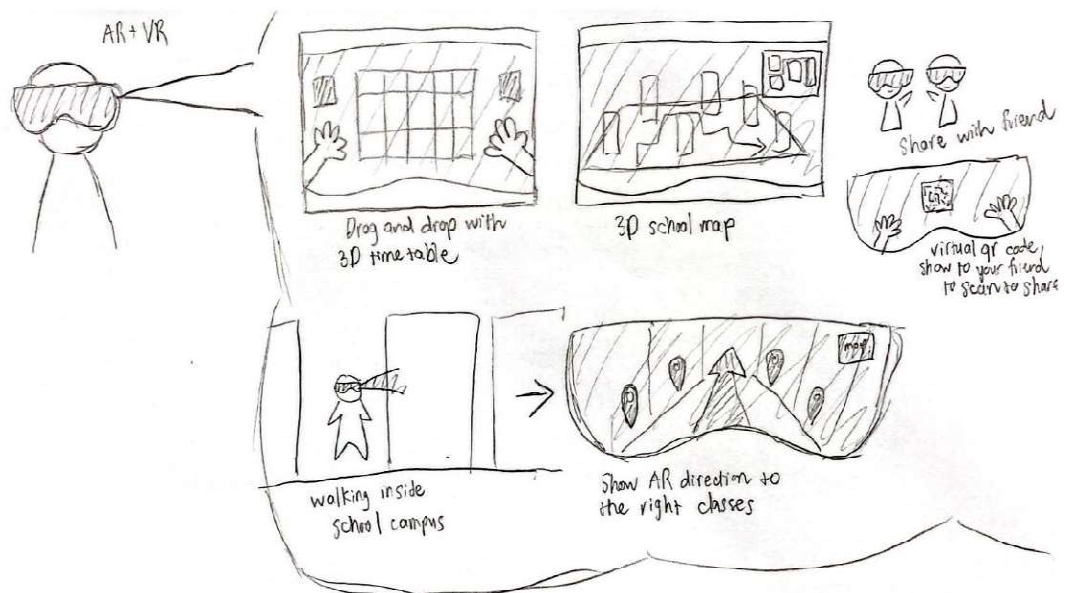*Figure 15: Gesture-Based Interaction + Projection Mapping Idea*
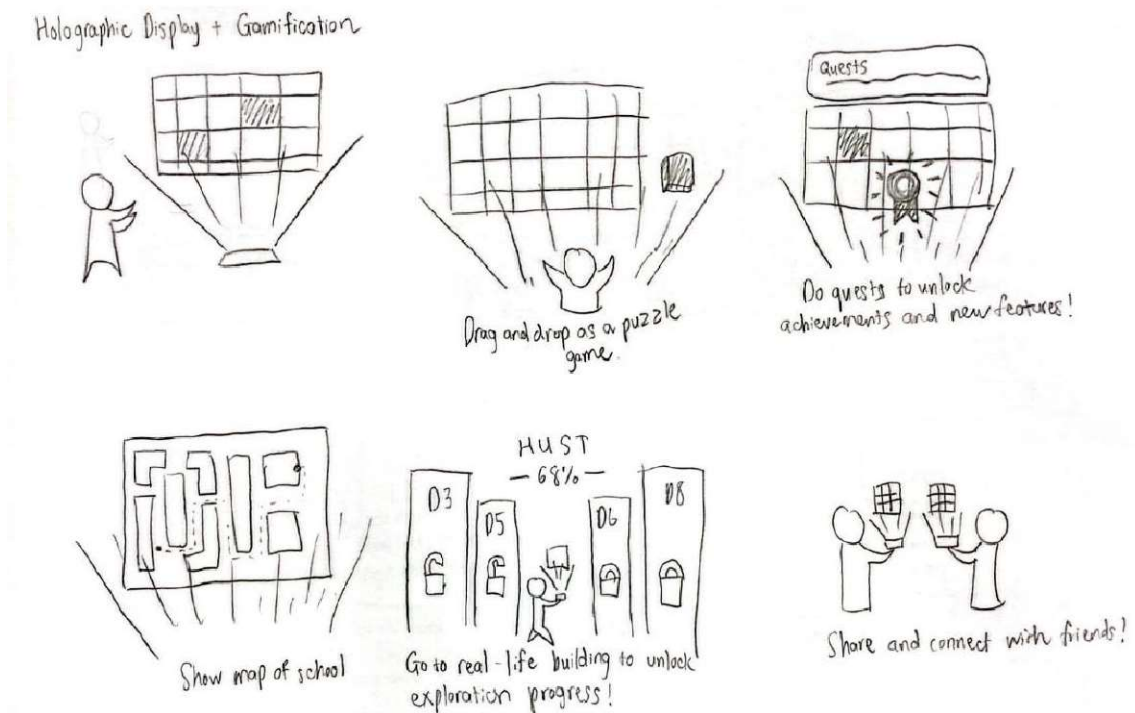

Figure 16: AR+VR Walkthrough Idea

Figure 17: Hologram Display + Gamification Idea

After the exploration was done, we filtered down to two diverse realizations: AR/VR walk-through or Web/PC application, each with different advantages and challenges.
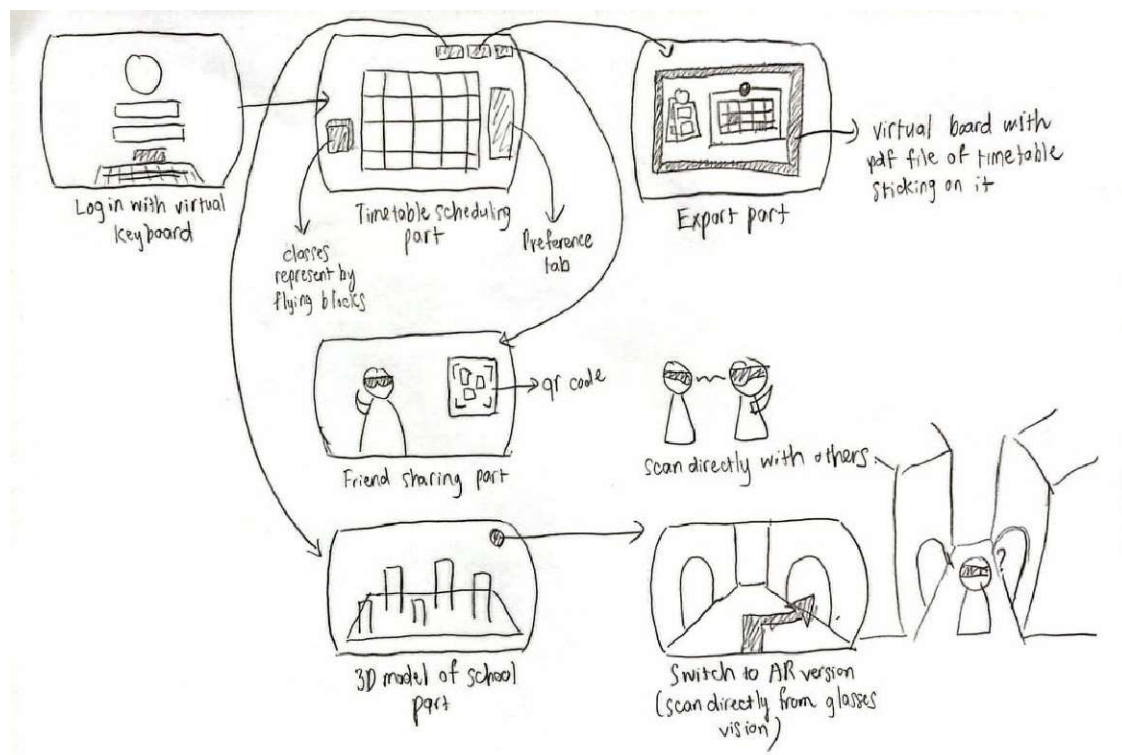

Figure 18: AR+VR Walkthrough Sketch

AR/VR Walkthrough: Most immersive experience, wherein active 3D visuals increase user engagement. Navigation is instinctive, letting students explore, plan using spatial interactions. Its appeal to tech-savvy users is definitely there due to bleeding-edge features. However, high barriers exist in access: AR/VR-capable devices are required, limiting adoption. Costly development in both hardware and 3D design made it resource-heavy, while its complexity seems challenging for non-tech-savvy students.
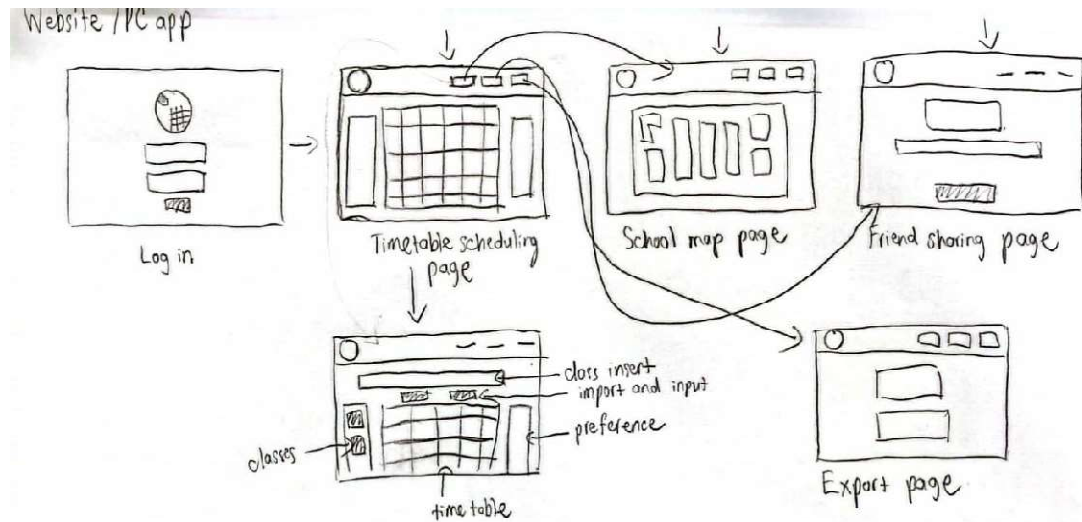

Figure 19: Website/PC App Sketch

On the other hand, the web/PC app excelled in wide accessibility, working seamlessly on any browser or device without additional hardware. Its user-friendly design ensured ease of use for all students, and it was cost-effective, with lower development and maintenance expenses. Nevertheless, it lacked immersion, providing a functional but less engaging experience. There was also over crowding of screens, confusing to some users, and offering fewer innovative features as compared to AR/VR.

We finally went for the web/PC application as our main realization. Thus, it would be more available for our target audience, simple in use, and quite reasonable in price, taking care of the wider expansion and adoption among diverse categories of users.

4.3.2 Low-fi Prototype

After finalizing our concept, we transitioned to creating a low-fidelity prototype. We began by sketching the individual pages on A5 paper, capturing the core elements of the interface. These sketches were then photographed and scanned before being uploaded to Figma and PowerPoint, where we designed user flows and linked the pages together.
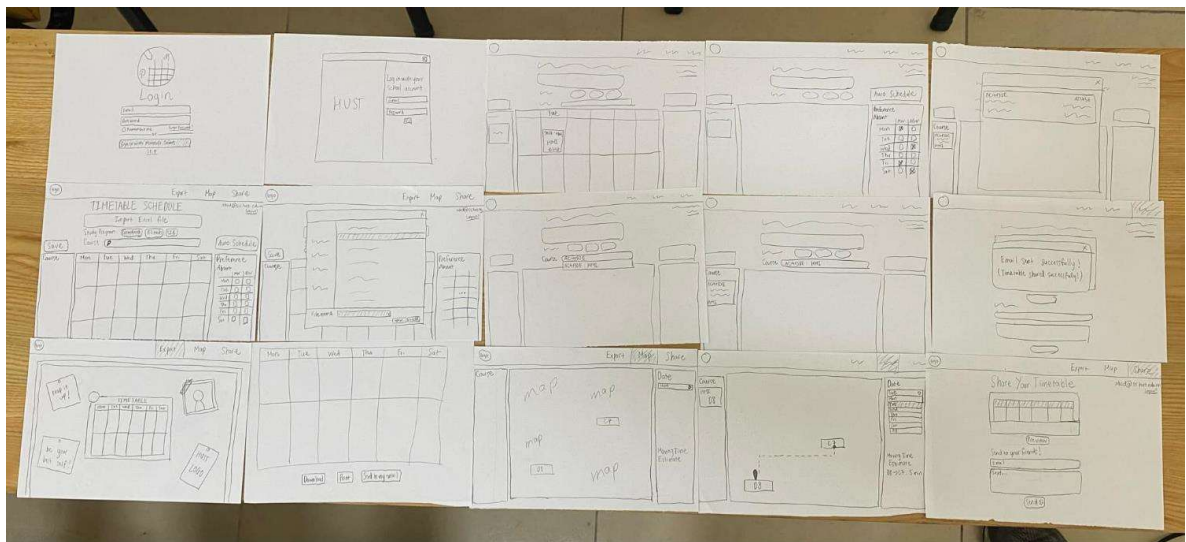
Figure 20: Paper Low-fi Prototype

Using paper sketches provided several advantages. It allowed us to iterate quickly, make immediate adjustments, and streamline the prototyping process. Additionally, the tangible nature of the sketches made them particularly useful during user interviews. Participants could interact with the designs more directly, offering feedback in real time, which helped us refine our ideas effectively.
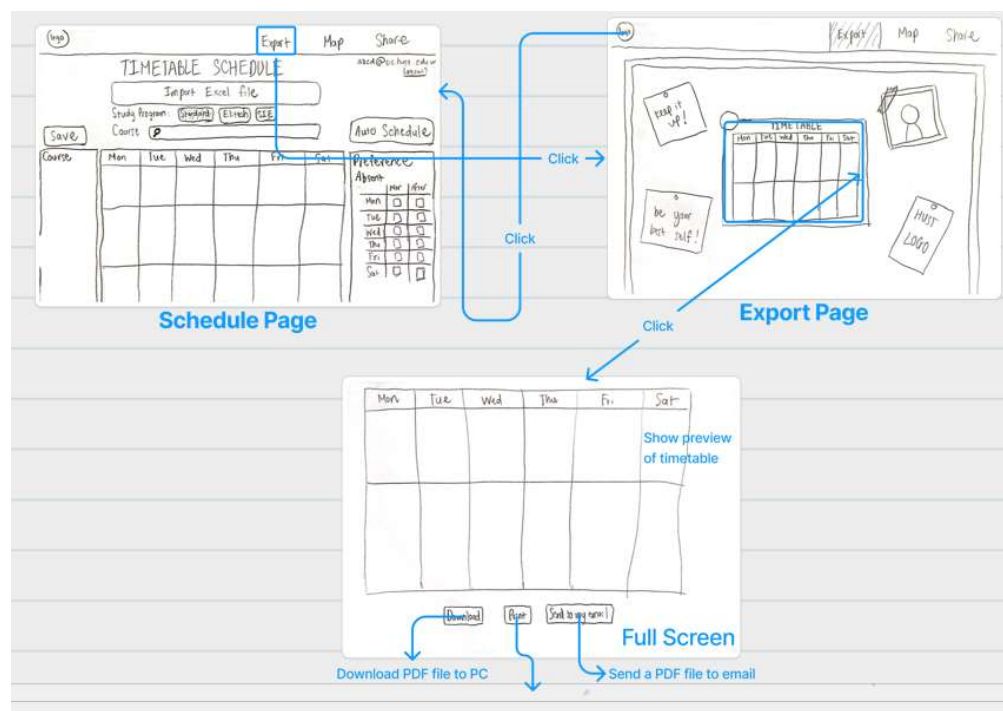
Figure 21: Low-fi Flow of Simple Task
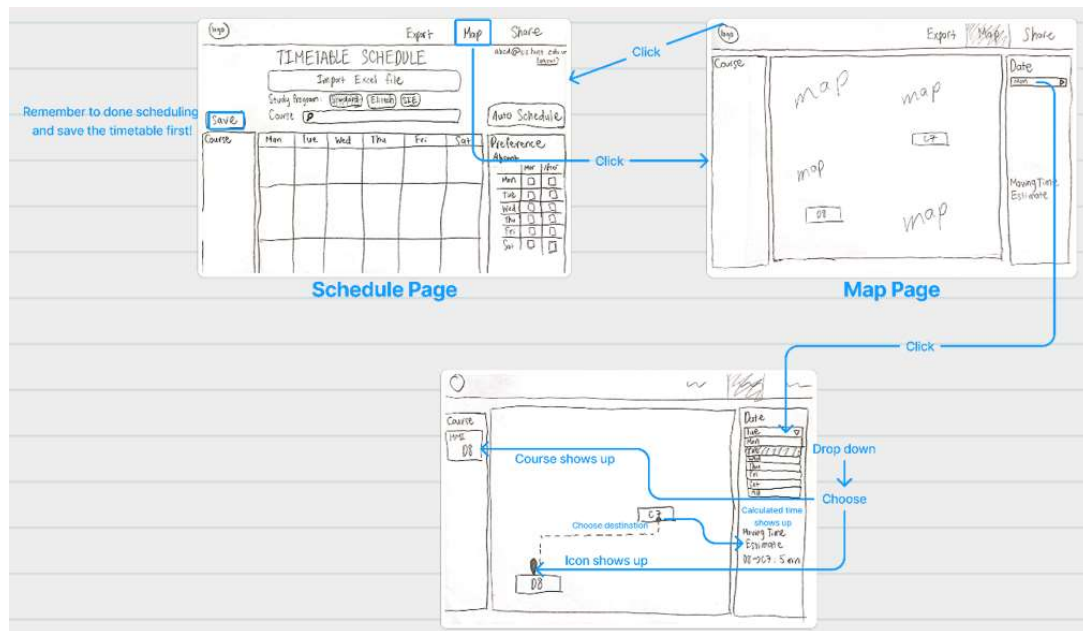
Figure 22: Low-fi Flow of Moderate Task
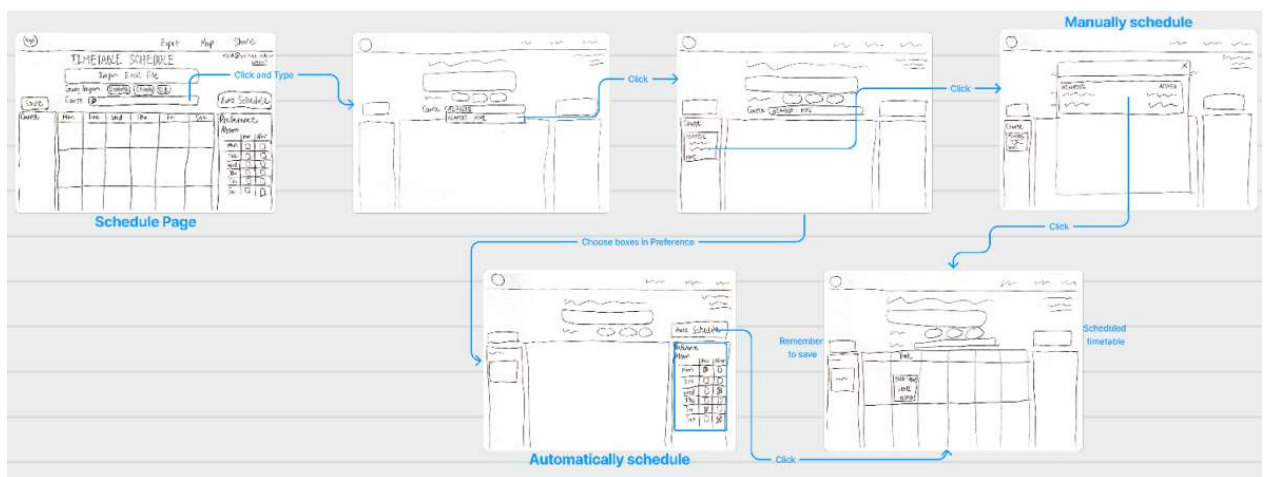
Figure 23: Low-fi Flow of Complex Task

For a better version of all low-fi flows, please have a look at the Appendix.

4.3.3 Low-fi Prototype: Usability Testing

4.3.3.1 Methodology

For the low-fidelity prototype usability testing, we did it offline, face-to-face, with three participants: Duy from HUST; My from the Banking Academy Hanoi; and Nhi, currently at the University of Exeter, England, who came back to Vietnam for a visit. We used a previously prepared paper prototype to manually act out three test flows: export a timetable to a PDF, see the campus map with the class locations, and get a personalized timetable. The sessions were organized in a non-formal environment, such as cafes, living space, or even during dinner at a restaurant-the best option where participants wouldn't feel at unease.

Figure 24: Low-fi Prototype Usability Testing Setup

The prototypes were set up on a table in a logical manner, and the participant was guided through the tasks according to a script. To start testing effectively, we introduced the session by welcoming participants and explaining the purpose: to test the prototype of PlanMate, emphasizing that the focus was on the prototype and not on testing their skills. At thi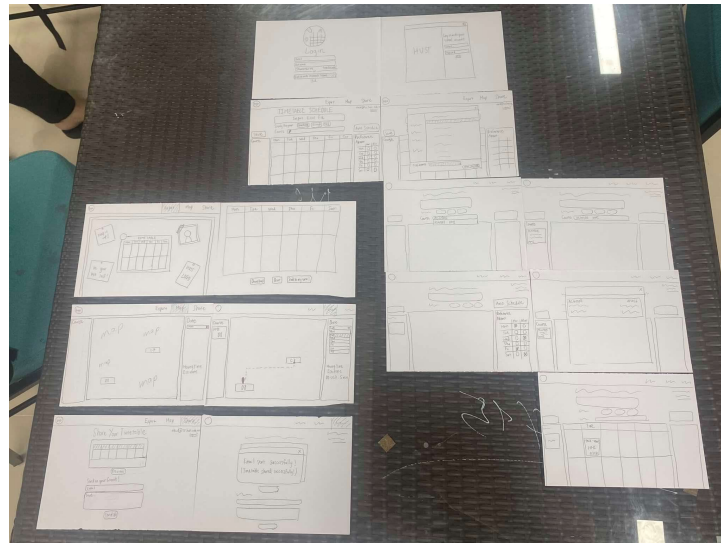s stage, consent for participation and note-taking was also sought. We set up the sequence of prototype elements clearly and explained the roles within the testing process: the facilitator guides the participant, the computer simulates interactions, and the observer notes user behaviors and challenges. We briefly overviewed the three tasks that are to be performed. In the task execution phase, participants executed the three tasks while we observed and noted any difficulties or confusions. After the completion of the tasks, we collected feedback on what they liked, disliked, and where confusions arose, and any suggestions for improvement. The session ended with an explanation of how their feedback would contribute to refining PlanMate.

For quantitative results, we evaluated usability goals and metrics:

- Efficiency: For the tasks given, the participants were to carry them out as quickly as possible with no unnecessary steps. Key measures included time taken for each task in minutes and seconds.
- Ease of Use and Intuitiveness: The design of the prototype had to be easy and intuitive to use. Key measures included errors-for example, choosing the wrong feature or being unsure-and participant feedback on clarity, measured by rating intuitiveness on a 1-5 scale.

These usability testing sessions provided valuable insights into how the PlanMate prototype performed against the identified goals and metrics.

4.3.3.2 Result and Insight

Based on the usability testing of our low-fidelity prototype, a number of key observations were identified for each of the three main tasks.

In Task 1: Export Timetable to PDF, test participants generally found the export function easy once they found the correct button. With the feature, there were usability issues because two participants mistakenly clicked 'Share' instead of 'Export'. They said further that the 'Export' button is not catchy, hence partial confusion sets in with it. It worked well but the visibility and labeling of this feature needs to be improved.

For Task 2: View Campus Map with Class Locations, testers liked the potential of this feature to estimate times of travel between classes. The idea was good, but it was not very usable; for example, it was hard to navigate around the tabs, and the process of estimating travel time was not very clear. Testers felt they did not know where to start or how to select endpoints; better guidance was needed.

This became even more desirable in Task 3: Create and View Personalized Timetable, because the participants, here too, showed quite some appetite to deal with their personally generated timetables themselves, this allegedly preventing headache when courses become difficult to register.

Contrasting to attractiveness, preference setting proved very confusing: it has led to one participant assuming he is supposed to handcraft some automated process, and then this happened only during minor repositions of 'Save'. This is a call for clearer design and more intuitive functionality in this feature. Efficiency and clarity metrics highlighted further areas for improvement. For Efficiency, tasks were completed, but not without challenges. Misclicks and navigation difficulties slowed participants down, and several required backtracking to complete tasks. For Clarity and Intuitiveness, the interface showed potential but often demanded trial-and-error approaches from users. Errors like unclear button placement and task confusion were common, indicating the need for step-by-step guidance and improved interface design. From this set of insights, several design implications emerged: first, button placement and labeling should be improved to reduce errors by providing a better visual hierarchy and clearer labels; second, navigation might be improved by instituting a 'Home' tab or breadcrumb trails to improve user flow; finally, guidance for more complex aspects-tooltips or short instructions for the set-up of preferences and travel time estimation-would support first-time users.

We now go ahead and suggest the following to address these issues: Button redesign: Critical buttons should be more salient. Adopt consistent design patterns for completion of an action and send confirmation messages to the user. Improved navigation: Features like

a 'Home' tab and breadcrumbs will allow for easy task switching. Guiding the user through features: Tutorials or better annotations will make complex features more accessible.

Despite the progress, there are limits to testing. The aesthetic appeal was not judged because the prototype lacked color and finalized design elements. Long-term usability and performance under load also were not tested since testing focused on first-time usage with a static prototype. In addition, edge cases like conflicting preferences or partial timetable files were not tested either. All these aspects need further exploration in subsequent iterations if the design and functionality of PlanMate are to be fully refined.

4.3.4   Med-fi Prototype

4.3.4.1 Design Changes From Low-fi Prototype

Building on the insights gained from the low-fidelity prototype testing, the transition to a med-fi prototype aimed to address the usability issues identified while enhancing the overall user experience. Several key changes and refinements were implemented during this phase:
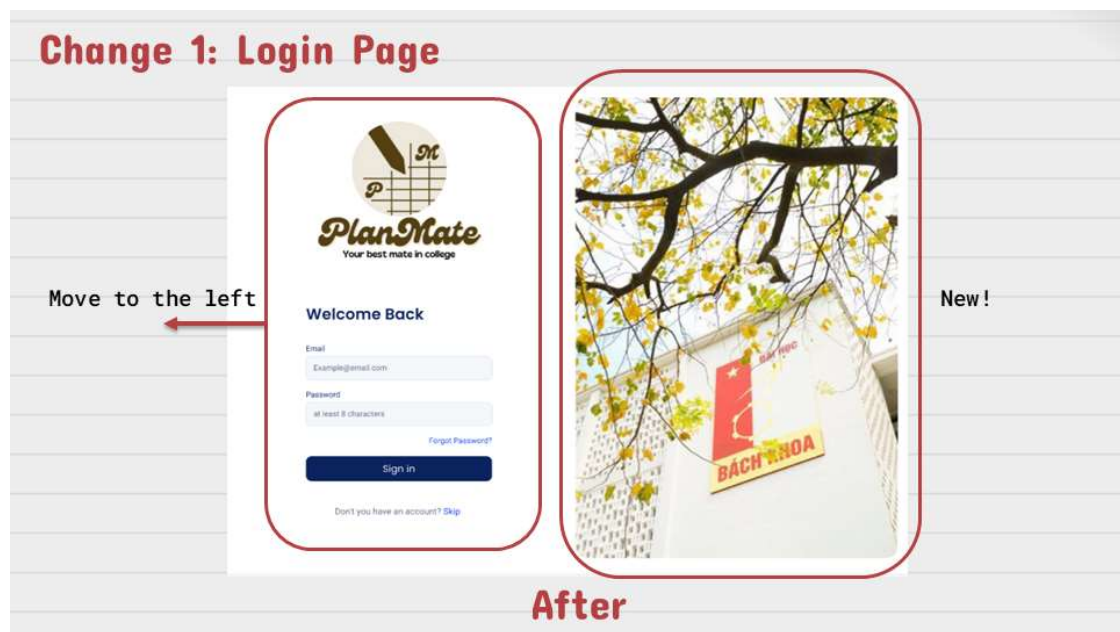
Figure 25: Login Page Changes

One of the most notable changes during the transition from low-fi to med-fi prototype was the redesign of the login page, despite it not being part of the main task flow. Based on user feedback, the login box was relocated to the left side of the screen to create a more balanced layout. This adjustment improved visual flow and ensured that users could interact with the login elements more intuitively. Additionally, an image of the HUST campus was added to the right side of the screen. This change enhanced brand recognition and provided a familiar, engaging environment for users. Together, these updates significantly refined the

login page, making it more user-friendly and visually appealing, while fostering a stronger connection with the target audience.

Figure 26: Schedule Page Changes

The recent changes to the "Schedule" page were designed to enhance user experience and improve navigation. By adding a dedicated "Schedule" bu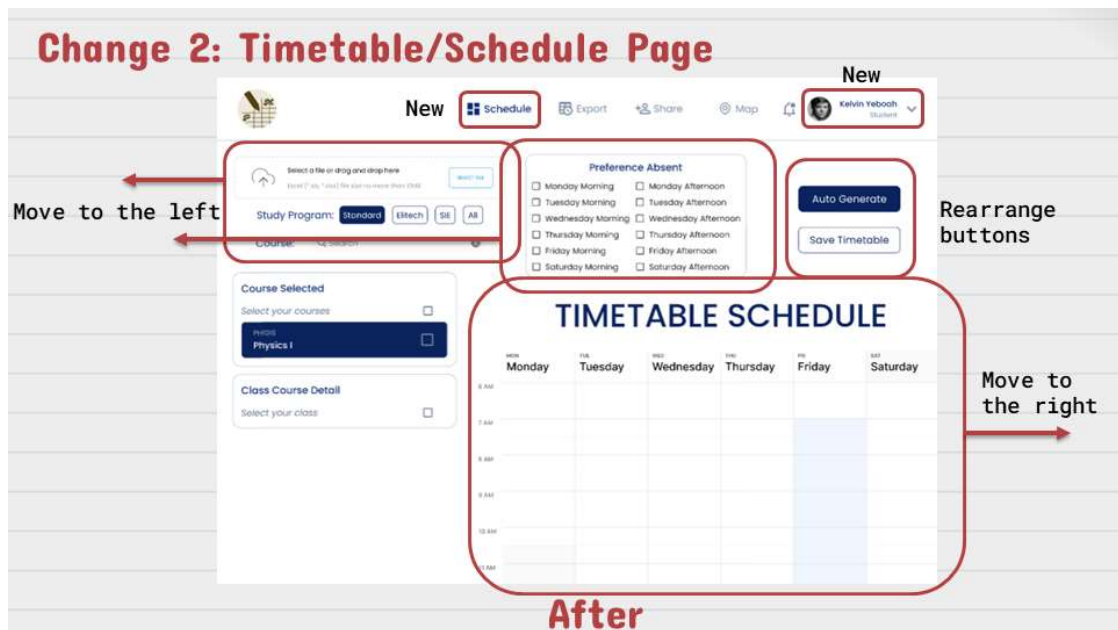tton in place of the logo, we make it easier for users to quickly access and return to their schedule. The repositioning of the "Upload File" and "Search Course" sections to the left creates a more organized and accessible layout, making these important functions more intuitive to use. Moving the "Preferences" section to the left and adjusting the checkbox options improves readability by better separating them, leading to a more user-friendly interface. The "Auto Generate" and "Save" buttons have been grouped together for greater efficiency, allowing users to complete key actions more quickly. Shifting the timetable slightly to the right creates a balanced visual flow, ensuring the layout feels natural and cohesive. Additionally, by adding a button or tab for the profile, instead of the email/logout options in the corner, we enhance accessibility and streamline navigation, making it easier for users to manage their account settings. These adjustments collectively aim to provide a more seamless and intuitive experience for users interacting with the schedule page.

Figure 27: Map Page Changes

The updates made to the "Map" page aim to improve organization, clarity, and overall user experience. By moving the "Day Check" to the left and replacing the dropdown with checkboxes, the interface becomes more intuitive and consistent with the course schedule selection, allowing users to easily match their chosen courses with available times. Separating the "Moving Time Estimate" from the "Day Check" and positioning it at the bottom enhances clarity by isolating time estimates from other options, while also providing additional details that help users plan their schedule more effectively. Shifting the map to the right helps create a more balanced layout, ensuring that the elements on the page are visually cohesive and easier to navigate. These adjustments streamline the user interface, making the map page more user-friendly and efficient for scheduling purposes.

4.3.4.2 Operating Instructions

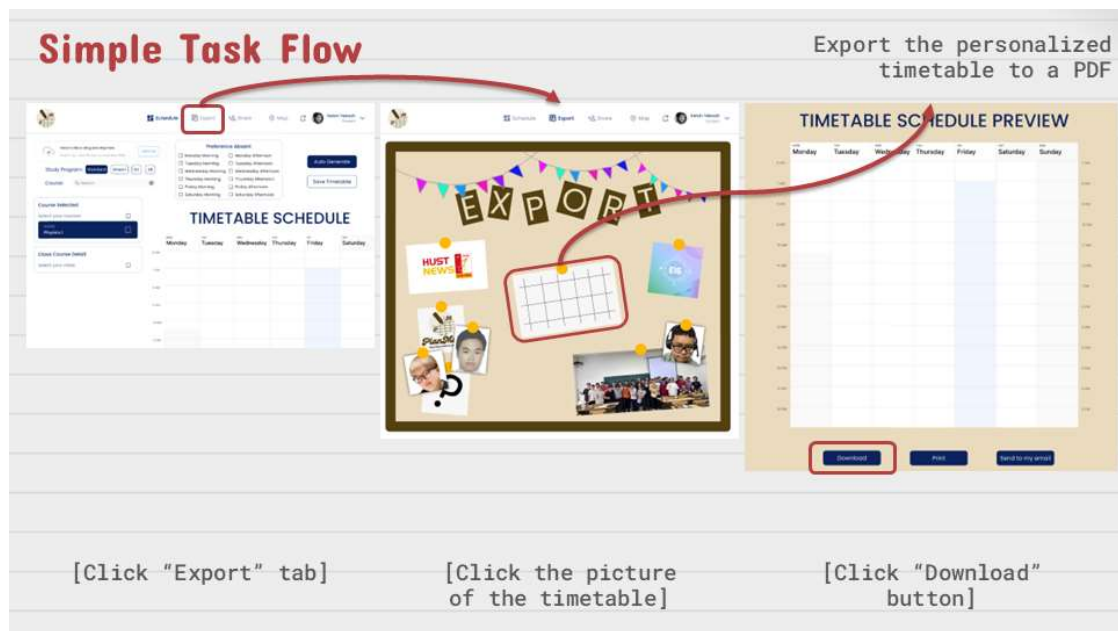- **Task 1: Export the personalized timetable to a PDF**

Figure 28: Simple Med-fi Task Flow

Go to the Dashboard: On the main page (also referred to as the schedule page), click on the "Export" tab to be redirected to the export page.

Export Page Design: The export page is designed to resemble a corkboard, with various images that act as buttons. These images may contain easter eggs (currently just an idea, not yet implemented in the prototype):

- o Clicking on HUST News will take you to the official HUST news page.
- o Clicking on the ETE16 avatar will redirect you to the Facebook page of the department.
- o Clicking on the group member faces will open their personal Facebook profiles.
- o And more to come!

Timetable Preview: Click on the image of the timetable in the center of the page to proceed. This will open a full-screen preview of your timetable.

Available Options: Below the timetable preview, three options are available:

- o Download: Saves the timetable as a PDF file on your device.
- o Print: Connects to a printer and allows you to print the timetable directly.
- o Send to My Email: Sends the PDF version of the timetable to your email.

Exit Preview: To exit the preview, click anywhere on the background of the screen.

- **Task 2: View the campus map with class locations**
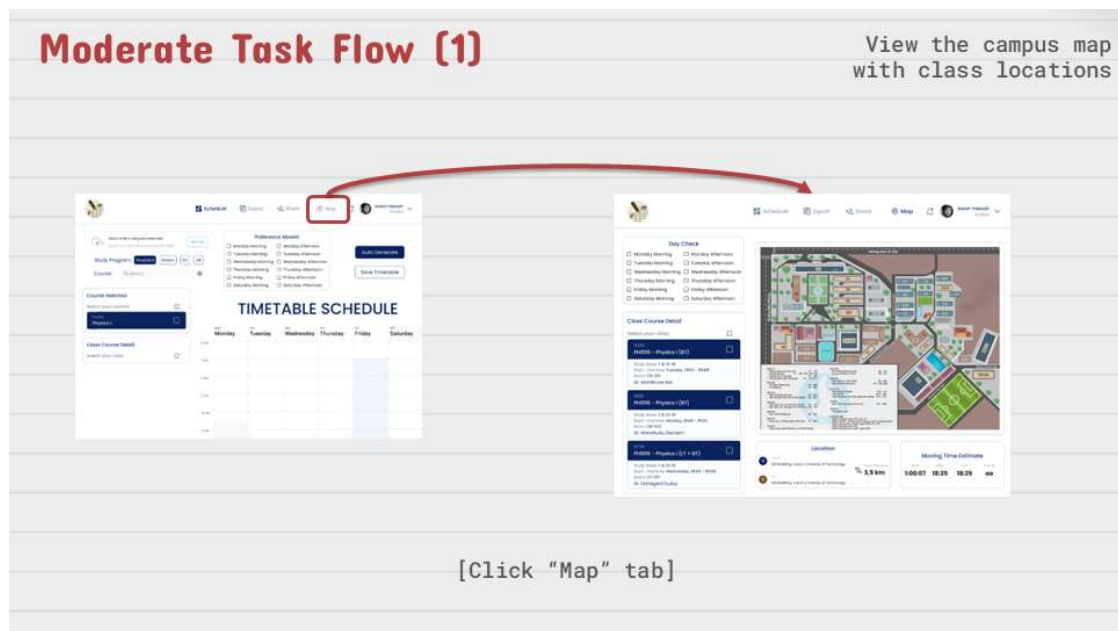
Figure 29: Moderate Med-fi Task Flow (1)
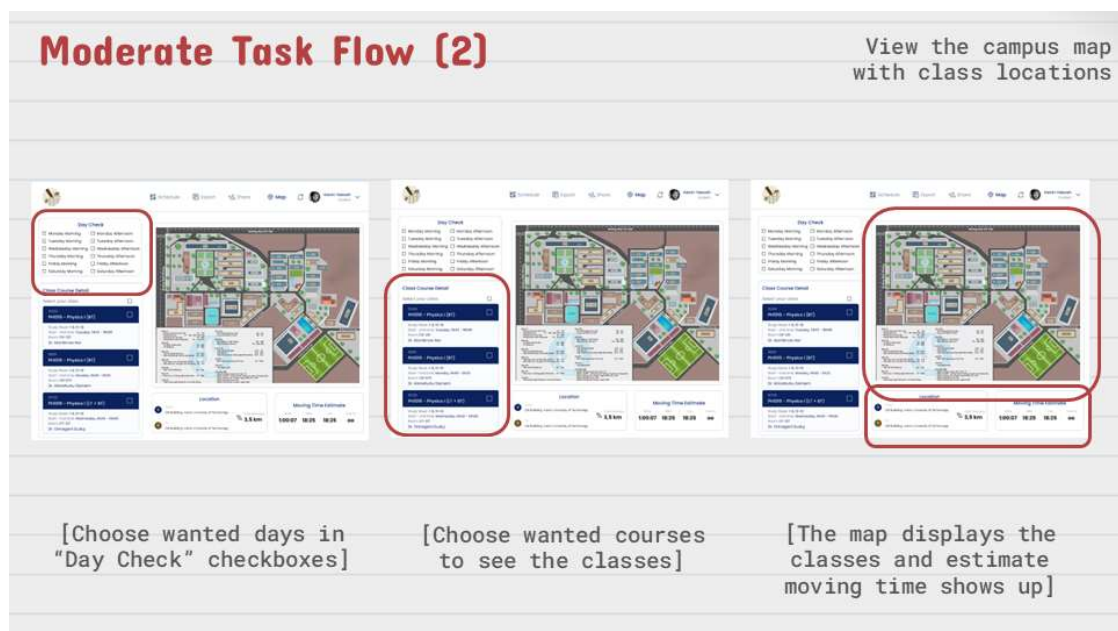
Figure 30: Moderate Med-fi Task Flow (2)

Go to the Dashboard: On the main page (schedule page), click on the "Map" tab to be redirected to the campus map page.

Select the Day: In the "Day Check" section, select the date for which you want to view the class locations.

Select the Class: In the "Class Course Detail" section, choose the class you want to display on the map.

View Class Locations: Once a class is selected, its location will be marked and displayed on the map.

Estimate Moving Time: If there are classes scheduled on the same day, the "Moving Time Estimate" section will show the estimated time to move between classes. Alternatively, users may select two locations to estimate the moving time (this feature is currently not implemented but may be included in future updates).

- **Task 3: Automatically generate and view a personalized timetable**

Figure 31: Complex Med-fi Task Flow (1)

Figure 32: Complex Med-fi Task Flow (2)

Figure 33: Complex Med-fi Task Flow (3)

Login to the Website: Upon accessing the website, you'll be directed to the simple login page, where you'll connect using your school email (this is the planned feature).

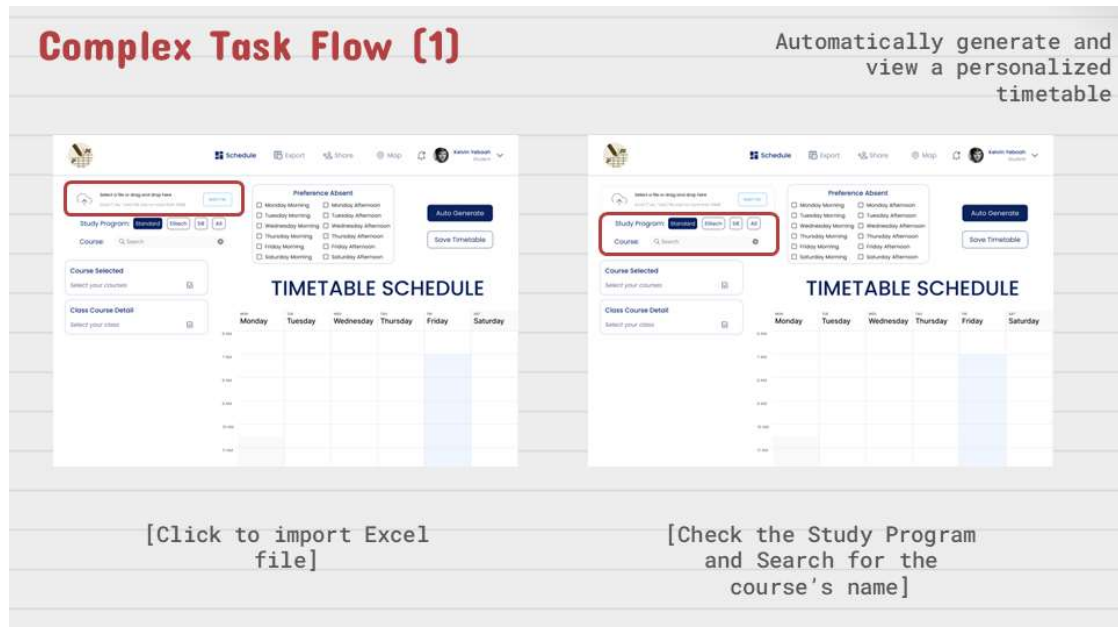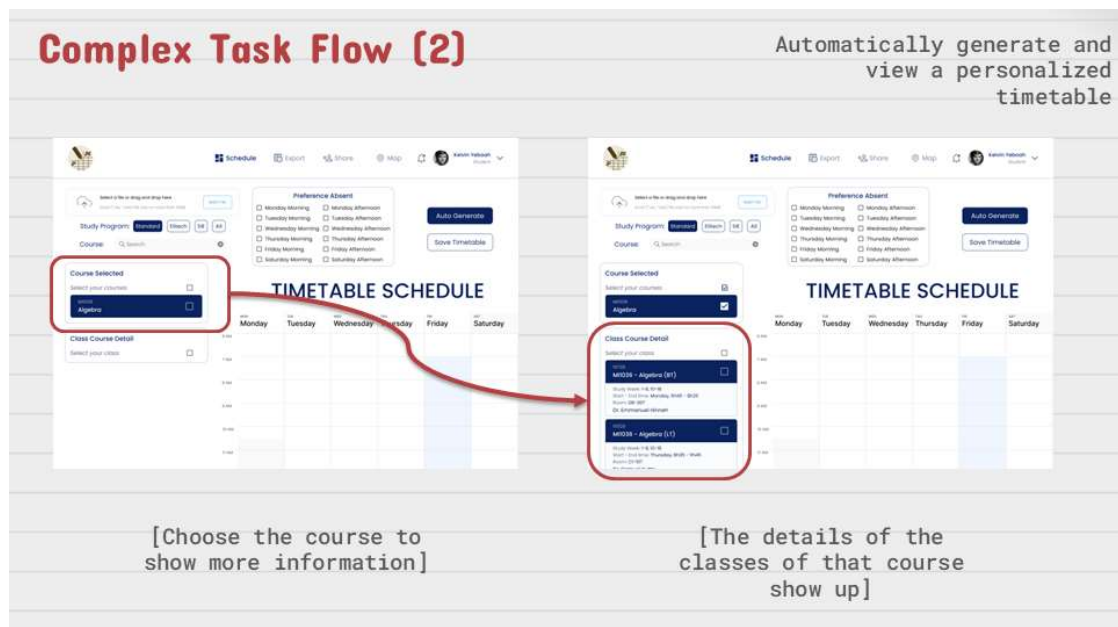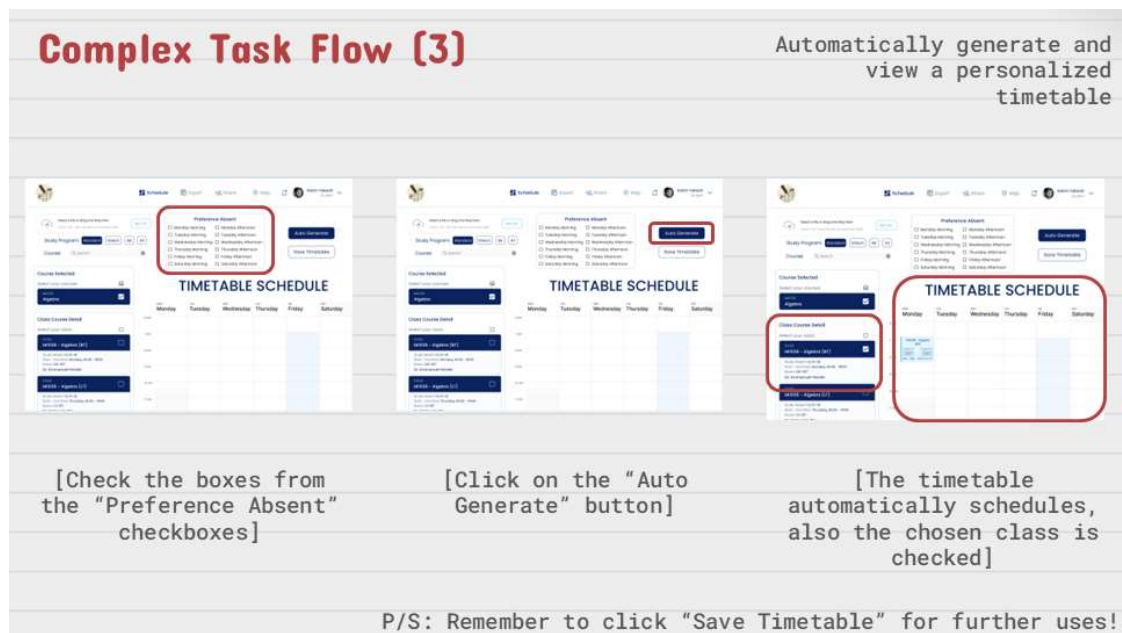Dashboard (Main Page): Once logged in, you'll land on the Dashboard (main page), also known as the Schedule Page. This is where most of your work will take place. At the top of the page, you'll see the header with the logo and tabs such as "Schedule" (links to the main page), "Export" (links to the page to export the timetable), "Map" (links to the campus map), and "Share" (links to the page for sharing the timetable with friends).

Upload Timetable: On the left side under the logo, you'll see a button and an empty space to click on and upload the school's timetable as an Excel file to start working. Below that, you can select the study program (e.g., Standard, Elitech, SIE, or All). Further down, there's a search bar to search for courses by name or course code.

Select Courses: After performing a successful search, the relevant courses will appear in the "Course Selected" column on the left side of the screen. Click on any course to see detailed information about its classes in the "Class Course Detail" column right below it. You can tick the classes you want, and they will be immediately displayed on the timetable. This is the manual timetable creation process.

Save Your Timetable: Once you have selected your classes, you can save the timetable by clicking the "Save" button at the top right of the timetable. After saving, your timetable will be stored in an album of timetables that you can access by clicking on your profile picture/name at the top right corner of the screen. (This Album feature is still in development and is an idea in progress.)

Auto-Generate Timetable: If you prefer not to manually arrange the classes, you can select courses from the Course Selected column. Then, choose the days you prefer to be absent by ticking the relevant boxes in the "Preference Absent" section, which is located in the middle of the screen, under the page tabs. This section includes checkboxes for each day (e.g., Monday AM, Monday PM, etc.). Once you've selected the days you want to be absent, click the "Auto Generate" button, located just above the "Save Timetable" button, to automatically generate your timetable.

Save the Generated Timetable: After reviewing your auto-generated timetable, make sure to save it by clicking the "Save" button when you're satisfied with the results.

4.3.5 Med-fi Prototype: Heuristic Evaluation

To evaluate our medium-fidelity prototype thoroughly, we decided to take on the role of users ourselves, assessing the design from a consumer's perspective. We applied Nielsen's 10 heuristics for usability evaluation, rating each identified issue on a severity scale from 1 to 4, with 4 representing the most severe impact. This self-assessment revealed a total of 29 usability issues, including 12 categorized as severity 3 and one as severity 4. Below, we delve deeper into the most critical of these issues.

Note: All the solutions below are merely ideas on how to address the issues and have not been implemented as actual fixes. This is because upgrading from the med-fi to hi-fi prototype is beyond the scope of our course, which only requires an interactive med-fi file in Figma. Therefore, please read this section with an open mind and a cheerful spirit!

- **H5 Error Prevention / Severity: 3**

Task: Export & Auto-Generate Timetable

Description: There is no warning or confirmation before users perform critical actions, such as exporting or auto-generating the timetable.

Rationale: Lack of warnings may cause users to accidentally execute unintended actions, leading to confusion or loss of data.

Fix: Add confirmation dialogs before exporting or auto-generating the timetable.

- **H9 Error Recovery / Severity: 3**

Task: Export Errors

Description: If an error occurs during the export process (e.g., missing data, unsupported file type), there is no clear notification or recovery option.

Rationale: Users might not understand why the export failed or how to fix it.

Fix: Display error messages with specific instructions to resolve issues.

- **H3 User Control & Freedom / Severity: 3**

Task: Timetable Preview

Description: When viewing the timetable preview, users don't know how to exit the preview mode (they must click on empty space outside the screen).

Rationale: Lack of clear exit buttons can confuse users unfamiliar with the interaction.

Fix: Add a visible "Close" button or a clearly labeled "Back" button within the preview window.

- **H5 Error Prevention / Severity: 3**

Task: Validate Before Exporting Timetables

Description: There is no validation or guidance when users try to export a timetable without selecting any courses.

Rationale: Users might be confused when an empty timetable is exported, wasting time.

Fix: Add a warning prompt if no courses are selected before exporting.

- **H6 Recognition Rather than Recall / Severity: 3**

Task: Map Locations

Description: Locations on the map are not clearly labeled (e.g., some codes like D9-201 are hard to interpret).

Rationale: Users must memorize or figure out codes themselves, making the task time-consuming and confusing.

Fix: Add annotations or detailed information when users click on specific locations on the map.

- **H6 Recognition Rather than Recall / Severity: 3**

Task: Map Search Functionality

Description: The campus map lacks a search function to quickly find specific buildings or classrooms.

Rationale: Users must manually look for locations, which can be time-consuming.

Fix: Add a search bar that highlights locations on the map when queried.

- **H6 Recognition Rather Than Recall / Severity: 3**

Task: Display Visual Routes on Map

Description: Moving time estimates are displayed as numbers without showing a visual route.

Rationale: Users must recall map locations and estimate their path, reducing usability.

Fix: Display a highlighted route on the map for better understanding.

- **H3 User Control & Freedom / Severity: 3**

Task: Undo Timetable Generation

Description: There is no option to undo or revert after automatically generating a timetable.

Rationale: Users cannot edit or return to the previous state if the generated timetable is incorrect.

Fix: Add an "Undo" button or allow users to edit the timetable after generation.

- **H1 Visibility of System Status / Severity: 3**

Task: Provide Feedback for Actions

Description: There is no visible feedback when users select a course or generate a timetable.

Rationale: Users need confirmation or progress indicators to know their actions are being processed.

Fix: Add a loading spinner or confirmation message for feedback.

- **H1 Visibility of System Status / Severity: 3**

Task: File Upload Errors/Feedback

Description: If a file upload fails due to format or size, the user only sees a generic error message (or none at all, as previously mentioned), but even when implemented, no link or instructions to a help section are provided.

Rationale: Users might not know how to correct the issue if they do not understand the error message.

Fix: Provide a link or embedded instructions in the error message. For example, "File upload failed. Please ensure it's an Excel file under 10MB. [View Supported Formats]."

- **H2 Match Between System & the Real World / Severity: 3**

Task: Absent Preferences in Timetable Generation

Description: The interface does not explain how absent preferences (e.g., Monday Morning) affect timetable generation.

Rationale: Users may not understand how the system prioritizes their preferences.

Fix: Add an explanation (e.g., "Selecting preferences ensures no classes are scheduled during these times").

- **H5 Error Prevention / Severity: 3**

Task: Conflict Detection During Class Selection

Description: When selecting multiple classes that overlap, there is no immediate warning or prevention mechanism before the timetable is generated. Users only realize conflicts after the timetable appears incorrect.

Rationale: Users can inadvertently create conflicting schedules, leading to frustration and rework.

Fix: Implement a real-time conflict detection system that alerts users when they select overlapping classes, allowing them to address conflicts before generating the final timetable.

- **H9 Recognize, Diagnose, & Recover from Errors / Severity: 4**

Task: Improve Error Messages for Invalid Selections

Description: If a user selects an invalid or unavailable course, no clear error message or guidance is provided.

Rationale: Lack of feedback leaves users uncertain about what went wrong.

Fix: Provide detailed error messages with specific instructions for resolution.

The fact that we encountered 13 issues with severity levels of 3 and 4, distributed across multiple heuristics, highlights significant areas for improvement in our prototype. Specifically:

- H1: Visibility of System Status (2 issues) suggests that users may not always receive timely feedback about the system's current state, potentially causing confusion and reducing confidence in interactions.

- H2: Match Between System and the Real World (1 issue) indicates that certain design elements may not align well with users' expectations or real-world conventions, which can make the system feel less intuitive.

- H3: User Control and Freedom (2 issues) reveals a lack of flexibility for users to undo or escape from unintended actions, which can lead to frustration and errors.

- H5: Error Prevention (3 issues) emphasizes that some design elements fail to anticipate and prevent user mistakes, making the system more error-prone than it should be.

- H6: Recognition Rather than Recall (3 issues) highlights the cognitive load placed on users by requiring them to remember information rather than offering clear, visible options.

- H9: Recognize, Diagnose, and Recover from Errors (2 issues) suggests that the system lacks sufficient support for users to identify, understand, and resolve errors effectively.

These findings underline critical gaps in usability that could hinder the overall user experience. Addressing these issues is essential to ensure the system is intuitive, reliable, and user-friendly.

4.4   Values in Design

Design is never a neutral process; it reflects and incorporates the values of its creators and the contexts in which it is developed. For PlanMate, we recognized the importance of embedding values that resonate with our target users—university students—while ensuring inclusivity, efficiency, and user empowerment. By intentionally aligning the design with these values, we aim to create a product that not only addresses practical needs but also fosters a sense of trust, accessibility, and ease. This section explores how we identified and integrated key values into our design choices, ensuring they remain central to the user experience.

4.4.1   Identified Values

4.4.1.1   Intuitiveness

With very limited time, if at all, and a rather impatient audience-the students-easy usage was a major aspect that had to be guaranteed. Our focus on intuitiveness is reflected in features such as the drag-and-drop Excel upload function, which allows users to input data quickly and receive immediate confirmation. This design choice eliminates unnecessary complexity and ensures users can interact with the platform with ease. We believe that by reducing the cognitive load and giving feedback on every step, students will feel confident to go through the platform without any instructions or prior experience.

4.4.1.2   Personalization

University life is highly individualized; each student has different needs and preferences. That's why we embedded personalization as a core value in our design. Features like customizable preferences empower users to define specific off-days, preferred

study hours, or other criteria that matter to them. This flexibility ensures that PlanMate can adapt to diverse scheduling needs, making it more inclusive and user-focused. Personalization also fosters a sense of ownership, as students can create timetables that truly reflect their lifestyles and academic goals.

4.4.1.3 Efficiency

Time is of the essence, especially during the high-pressure course registration period. Our commitment to efficiency is reflected in the auto-generate timetable feature, which streamlines the process by instantly organizing classes based on user preferences. By automating this traditionally tedious task, we free students from the stress of manual planning and allow them to focus on other priorities. This means that users can obtain a schedule with much lesser use of effort and this does save a lot of their time, reducing errors within the schedule as well.

4.4.1.4 Spatial Awareness

Whenever any student has to take a number of classes at different locations around the campus, knowing the location is fairly helpful. We then built into PlanMate a highly detailed campus map marked well with the locations of the classes. This will definitely enhance the students' ability to estimate travel time and organize their days effectively. By incorporating spatial awareness into the platform, we are not only helping the students plan their schedules better but also supporting them to navigate their campus environments more easily and confidently.

4.4.2 Conflicting Values

4.4.2.1 Simplicity vs. Customization

One of the most significant value tensions we encountered was between simplicity and customization. As a design team, we aimed to create an interface that was clean and easy to navigate for users of all levels. This meant minimizing complexity in the layout and interactions—features like checkboxes instead of dropdown menus and the use of clear, intuitive navigation buttons. While this approach helped simplify the user experience for those who needed quick access to their schedules, we also recognized that some users wanted more customization options. These users felt limited by the default settings and wished for more flexibility in how they could tailor the system to their unique needs, such as adjusting colors, layouts, or other finer details of their schedules. Balancing these two values was tricky. While simplicity aimed to prevent overwhelm and streamline the experience, customization sought to allow users to have more control over their interactions. We had to strike a delicate balance, offering enough customization for those

who needed it while ensuring that the overall design did not become cluttered or overwhelming for more casual users.

4.4.2.2 Efficiency vs. Comprehensiveness

Other very important tensions in values were between efficiency and comprehensiveness. In designing the website, one of the major objectives was to introduce efficiency by creating a system that allowed users to complete tasks quickly and with fewer efforts. We repositioned elements like "Upload File" and "Search Course" into more reachable locations in order to reduce the time spent by users in searching for certain actions. This would allow users to get through tasks, such as uploading documents or searching for courses, without diversion. In trying to make the system efficient, we faced the challenge of possibly sacrificing comprehensiveness in our desire to do so. For some users, this meant that the simplified layout and the reduction of on-screen elements made it more difficult to find the level of detail needed to make more informed decisions-especially when planning more complex schedules or dealing with multiple courses. This set up a tension between keeping the interface lean and not overwhelming the user, while still making the comprehensiveness of features-things like detailed course descriptions or advanced scheduling options-accessible to users who needed it. In doing this, we had to find a way to simplify the user experience without losing the depth of functionality required for more advanced users.

4.4.2.3 Clarity vs. Visual Balance

A third tension that we created was between clarity and visual balance. In an effort to make the interface much clearer, we decided to separate certain elements such as the "Moving Time Estimate" from the "Day Check" section. This decision was made to make the time estimates stand out, allowing users to receive clearer, more easily digestible information. While this change managed to bring a little more clarity into this by logically setting out the page, it also caused aesthetic imbalance. This separation fragmented the layout, and a few users said that this took away from the natural flow of the page. Along with refining our designs to be more legible, we also tried to make sure our designs had a good balance and element alignment so that all items were placed in an unobtrusive and clear manner. However, when adjusting the "Moving Time Estimate" and relocating the map to the right side of the page, we saw how some elements felt slightly off-kilter. For instance, the map felt a bit disconnected from the rest of the content, which in turn made this element less striking visually for users to engage in rapidly. It would take another round of iteration to keep the balance between clarity and a good flow of vision. This design definitely had to be not only easily readable but also visually harmonic, with everything fitting and blending well together.

4.4.2.4 Streamlined Design vs. User Needs for Detail

A final tension was between a streamlined design and users' need for detailed information. We wanted to simplify the interface and reduce clutter so that a design would allow users to focus on key tasks they needed to do. However, in streamlining the design, some users felt we had removed or hidden too much information. These users needed to access more detailed course descriptions, to customize their timetable options, or to be able to see more information about scheduling on one screen. Although this simplified layout made navigation quicker, it was not always what the users needed when they needed to get a more complex overview of their schedule, such as planning a heavy course load or coordinating with others. That underscored the tension between needing to design for novices who wanted speed and a simple experience and for advanced users who wanted more granular information as part of their choices. We arrived at giving priority to an interface through which some key information was front end-visible but provided the ability of drill-downs if necessary in a streamlined, not-to-lose key feature form.

5   FINAL PROTOTYPE IMPLEMENTATION

5.1   Tools Used

Figma was the main design tool employed in the creation of this prototype for Med-Fi. Figma is a powerful, online tool that allows team members to collaborate in real-time in bringing ideas to life through shared feedback and quick revisions. Its interactive features allow us to create clickable prototypes that simulate how users would interact with the application, providing valuable insights into the user flow and overall experience. It is also super friendly for end-users, allowing even those with non-advanced design skills to make functional prototypes and designs. Also, being a cloud tool, Figma can be accessed from any location, meaning that team members working remotely will be able to work together, keeping alignment across different locations.

However, Figma does have some drawbacks. While great for interactive prototyping, it cannot fully simulate complex user flows or more advanced features, such as dynamic data updates or backend interactions. In other words, some of the more advanced behaviors of an app cannot be fully replicated in Figma. Also, performance can be an issue when dealing with large, complex files; the app may slow down, especially with high-fidelity prototypes. Lastly, Figma prototypes are not fully realistic because they do not really simulate the complete experience of using a live app-mostly system behavior, data integration, and live interactions.

5.2 Wizard of Oz Techniques

In our Med-Fi prototype, we've used the Wizard of Oz technique to mock up some features that we haven't yet completed. The Course Search feature is hand-simulated. In fact, the search feature isn't implemented at all, but we pretend it is when the users submit a query and make it look like a real working search. Timetable Generation: We arrange courses manually in order to simulate the auto-generation of timetables, although the auto-generation timetable algorithm has not been implemented yet. Map Functionality: Although the map is incomplete, we simulate the location-based action—like showing the location of classrooms—manually by selecting from the predefined points on the map. Lastly, the Save/Load Timetable feature is also simulated manually. Users trying to save or load their timetables—it gets emulated without actual backend storage, simulating the feature for the user, although it is not fully implemented.

5.3 Hard-Coded Techniques

There are also some hard-coded items in the Med-Fi prototype to represent functionality that can't dynamically be adjusted, such as the Predefined Timetable Layout. This is not dynamic either; it contains pre-fixed courses and structure of schedule. Users have the functionality to only see the time table; however, nothing can be dynamic or adjustable on the schedule. Similarly, with the Fixed Course List, there might be a hardcoded list of courses where dynamic updates or tailored choices do not exist, implying the course list offered is irrelevant to the user. In this view, Static Preferences may even have days and time selection of the course hardcoded onto the interface; that is, a selection of day and times will be really very restricted and does not offer any user choice in their dynamical setting. Lastly, Map Display most likely displays static locations, such as buildings on campus, but doesn't change dynamically based on user input or the courses chosen.

5.4 Limitations

Though the Med-Fi prototype is designed to be highly interactive and user-friendly, it has a few limitations. To begin with, there are no specific user profiles: this prototype does not contain personalized user data or profiles; hence, it cannot fully offer a tailor-made experience based on the preferences or behaviors of each user. Besides, the prototype has incomplete button implementation. Some of the buttons are still not fully functional, which limits the interactions users can engage in while testing and exploring. Another limitation is related to the search and import features. The search and import course functions are not fully developed, so users cannot search for or import courses into their timetable, which reduces the functionality of the app at this stage. Further, the map functionality is incomplete. Currently, the map does not display all locations or relevant features, so users cannot explore the campus in its entirety or view all locations related to their timetable.

Finally, the current prototype has limited testing scenarios; it does not simulate all real-world interactions or complex user flows, which means that certain behaviors cannot be tested in-depth, and only basic flows can be explored.

6 REFLECTION & NEXT STEPS

6.1 Key Learning

6.1.1 About the Design Process

This quarter has indeed been a period of transformation in learning, particularly on the design thinking process. We did know the principles of design thinking from prior reading. However, it wasn't until trying to actually use these techniques that we appreciated the critical role of every one of those steps: empathy, define, ideate, prototype, and test, in ensuring a product solves user needs. One of the most critical things we learned was to empathize with users by interviewing them and gathering feedback from real-world users. It was through these interactions that we uncovered the problems students face in managing their schedules and gave a foundation for the project. Iterative feedback led us to refine our ideas, then develop a user-centered solution.

6.1.2 About the Studio Theme

Working in the scheduling website project also gave us a fuller understanding of the role and importance of user experience, UX design in a very practical way. The heart of this project was to build an interface that is both functional and easy to navigate for students who often suffer under time and mental pressures as they organize their academic commitments. In this process, we learned the importance of not just making a useful tool but one which emotional resonance would enable users to make their experiences easier and less stressful. Certainly, students needed a site that would reduce the anxiety over scheduling - not add to it. Designing the website with efficiency and ease of use in mind let us realize that small changes in layout, wording, or functionality can significantly improve how users perceive and interact with a product.

6.1.3 About the Project

On a personal level, this project taught us how to balance creativity with practicality. While we had ideas for innovative features, we constantly had to remind ourselves that the main goal was serving the needs of the users, making their lives easier. It is an iterative process, from sketching to prototyping, that taught us the openness of feedback and adjustments. In some of the beginnings of certain design ideas, everything looked so promising, but later on, after testing, it didn't work as expected. The process has taught us the flexibility required when conducting a project, how sometimes the project needs to be changed from the initial plan. More than anything, we have learned to value team work-

when other people with diverse skill and perspectives work together to provide us with a final product, one that was functional, as well as effective in solving the real problems faced by the students.

6.2 Future Work

Looking ahead, there are a few key areas that we would like to explore further, given more time and resources. The first of these would be to deploy the project as a fully functioning web app or mobile application. While at this moment the prototype already exists, we tried to bring it into a real application in order to check its feasibility in real usage and have students test and inform us of their insights. Our dream is that one day this application could be integrated into the university's systems, whereby it can automatically pull out course data, timetable info, and maybe even integrate personal calendars. This would create a better experience by offering a seamless integration between academic scheduling and personal planning.

We would further develop the personalization features, giving students the ability to personalize the layout, colors, and reminders to suit their individual preferences. Inclusion of other advanced options like priority-based task management or study time suggestions would make this app even more useful for a student in balancing academic and personal life. Notifications can also be extended to reminders about deadlines, upcoming exams, or even study group meetings, further helping the student to stay ahead in their schedule.

Other future work could involve deploying a more robust backend system that would handle large volumes of data, hence scalability, as increasingly more and more students use it. Integrating such features as real-time updates of course availability or automatic shifting of schedules when there is a conflict would go a long way in enhancing its utility.

In the end, we really hope this can be one tool that will really help HUST students in the future. For this reason, we design this app to make students not feel pressured when performing scheduling and time management, since it allows them to make more intuitive planning, raising their productivity level and giving them more well-being. By understanding specific challenges students face in managing their time in academics, we feel the potential of our project to benefit the students of HUST.

6.3 Acknowledgements

We would want to thank everyone who has contributed to this project. First and foremost, thanks to the participants of our user interviews: their insights and feedback have been of huge importance when improving the design of the website, and we are very grateful for taking the time to share with us your experiences.

We would also like to acknowledge the support of our teachers, Assoc. Prof. Dr. Tran Thi Thanh Hai & Dr. Nguyen Viet Tung, for their invaluable guidance and constructive feedback. Their expertise in both design and user experience played a significant role in helping us navigate through challenges and refine our approach. Without their support, this project would not have reached its current stage.

Lastly, I would like to thank all of you guys for following us along the journey. It's fun knowing you guys read all the way down here.

Please be invited also to make use of the Appendix at the end of this report to find more detailed information about our design iterations, user interview transcripts, and development process.

TABLE OF FIGURES

APPENDIX

Needfinding Interview Script: [Link](#).

Concept Video: [Link](#).

Low-fi Prototype Full Version: [Link](#).

Low-fi Prototype Usability Testing Script: [Link](#).

Med-fi Prototype: [Link](#).

10 Nielsen's Rules for Heuristics Evaluation:

1. **Visibility of System Status**: The system should always keep users informed about what is going on through appropriate feedback within a reasonable time. Users should know the current status of their actions, like when a page is loading or if a form has been successfully submitted.

2. **Match Between System and the Real World**: The system should speak the users' language, using words, phrases, and concepts familiar to them, rather than system-oriented terms. Information should be presented in a natural and logical order.

3. **User Control and Freedom**: Users should have the ability to undo or redo actions. This helps users feel in control of their interactions and reduces anxiety if they make mistakes.

4. **Consistency and Standards**: The system should follow platform conventions and design standards. Consistency in design elements, terminology, and navigation across pages ensures users can predict the behavior of the interface.

5. **Error Prevention**: The system should prevent errors from occurring in the first place by guiding users through tasks and providing confirmation messages for critical actions (e.g., deleting data or submitting forms).

6. **Recognition Rather Than Recall**: Minimize the user's memory load by making objects, actions, and options visible. Users should not have to remember information from one part of the system to another; instead, options should be easily accessible.

7. **Flexibility and Efficiency of Use**: The system should cater to both novice and experienced users by offering shortcuts for experienced users while ensuring that novice users can still navigate easily without confusion.

8. **Aesthetic and Minimalist Design**: Interfaces should avoid unnecessary information and design elements. Every additional item on the screen should serve a clear purpose, reducing clutter and focusing on the most important content.

9. **Help Users Recognize, Diagnose, and Recover from Errors**: Error messages should be clear and helpful, offering solutions and guidance on how to resolve the problem. The language should be simple, and the tone should be friendly and constructive.

10. **Help and Documentation**: While the system should be intuitive enough to use without documentation, providing easy-to-find, concise help documentation or support options for users who need assistance is important.