



PLANMATE
LOW-FI PROTOTYPE
SKETCHING REPORT

AC4150E – HUST – 2024.1

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1 INTRODUCTION

1.1 Value Proposition

PlanMate offers HUST students an effortless way to plan their timetables, helping them visualize their course schedules before registration. The app provides a user-friendly platform where students can easily customize and preview their timetables, ensuring a smoother registration experience and reducing the stress of scheduling conflicts.

1.2 Problem And Solution Overview

HUST students struggle to visualize their timetables before course registration, as there is currently no official tool for this purpose. This leads to confusion, potential scheduling conflicts, and delays in making informed decisions during the registration process.

PlanMate addresses this issue by providing a streamlined, easy-to-use app that allows students to quickly create and visualize their personalized timetables. With features like automatic timetable generation, class location mapping, and preferences customization, PlanMate ensures that students can make well-informed choices before registration, reducing frustration and enhancing the overall experience.

2 SKETCHES

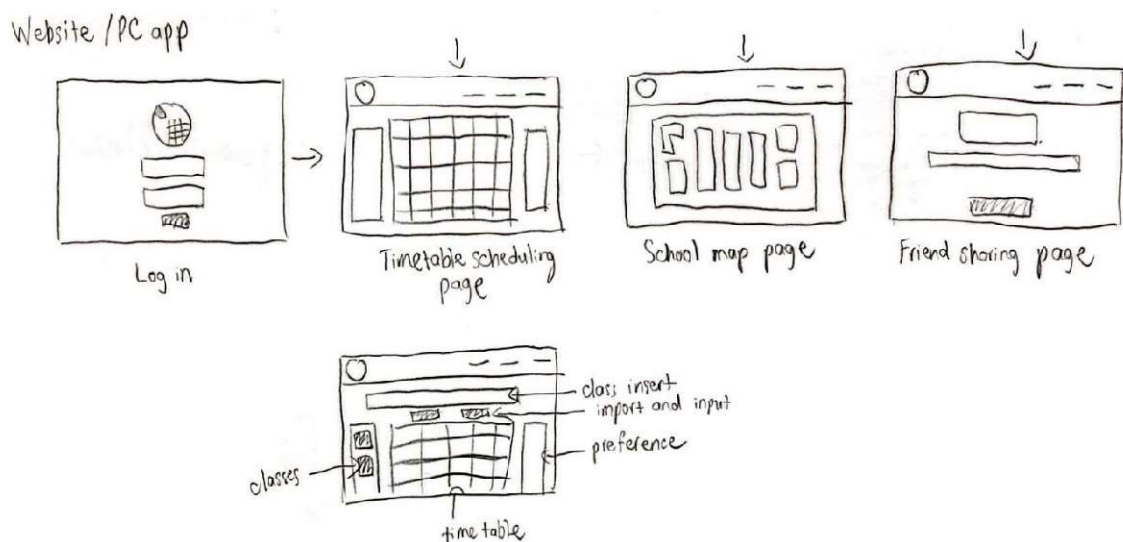


Figure 1: Website/PC App with main pages

Voice Interaction

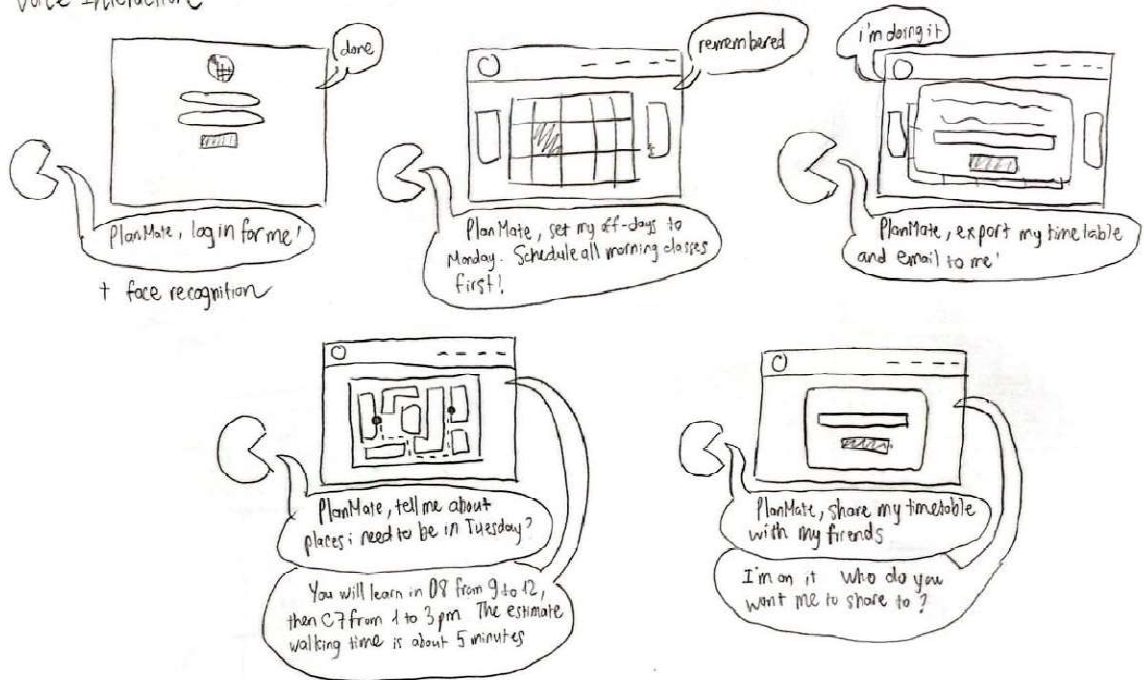


Figure 2: Voice Interaction App with examples

Gesture-Based Interaction + Projection Mapping

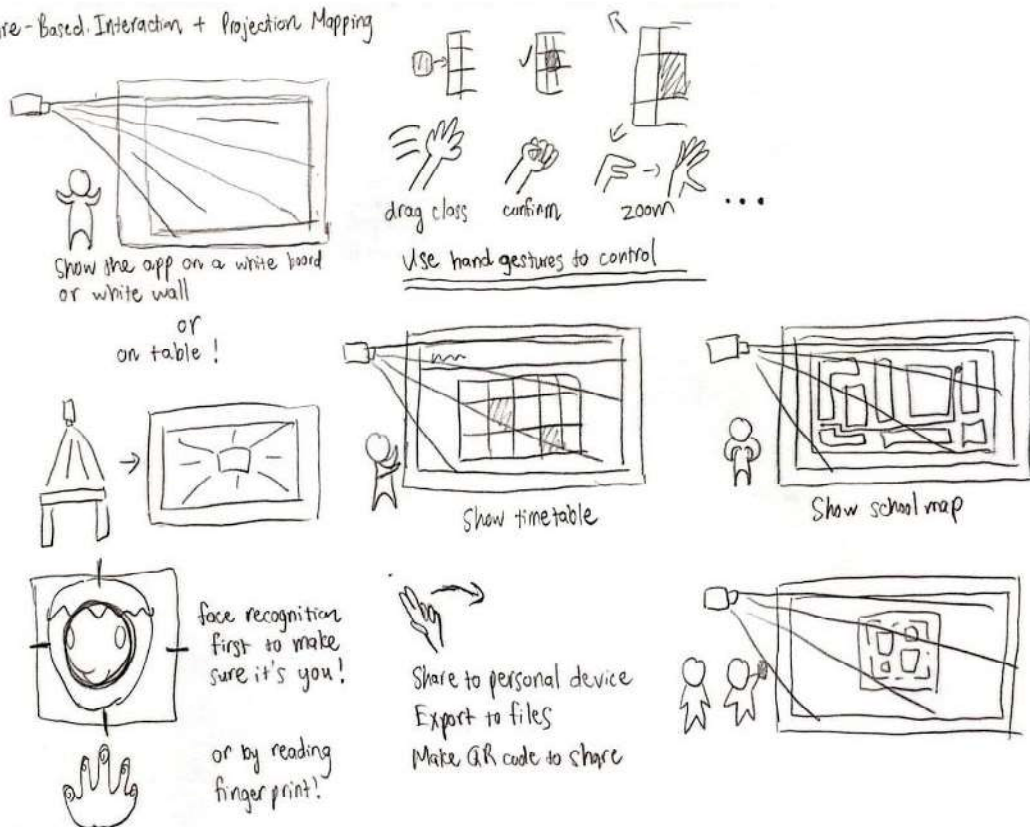


Figure 3: Gesture-Based Interaction + Projection Mapping realization with examples

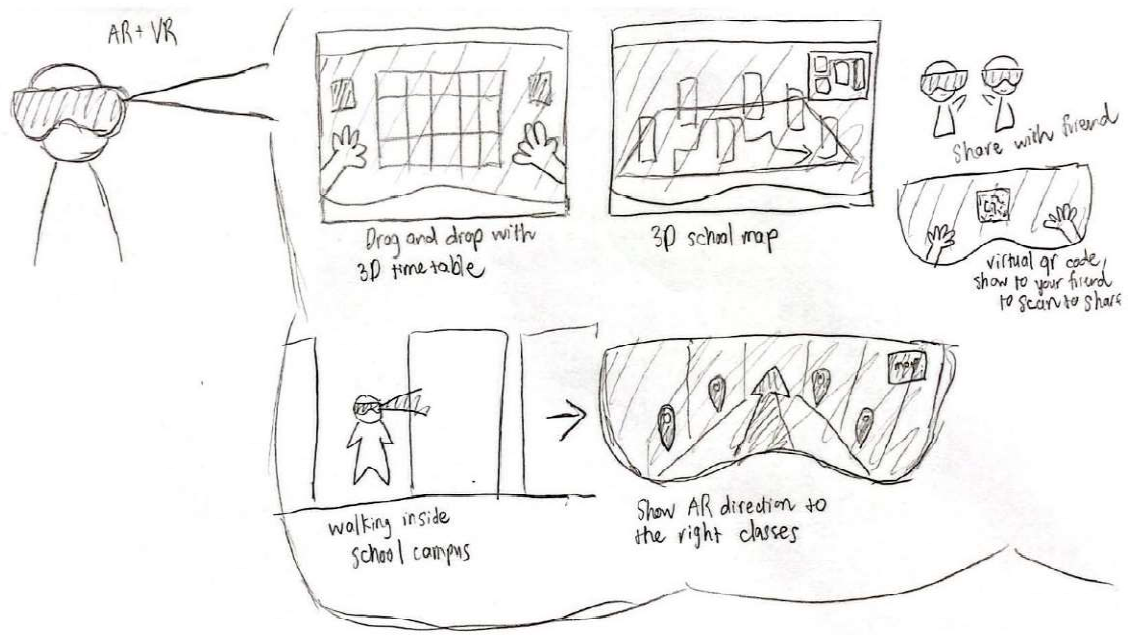


Figure 4: AR + VR Walkthrough with examples

Holographic Display + Gamification

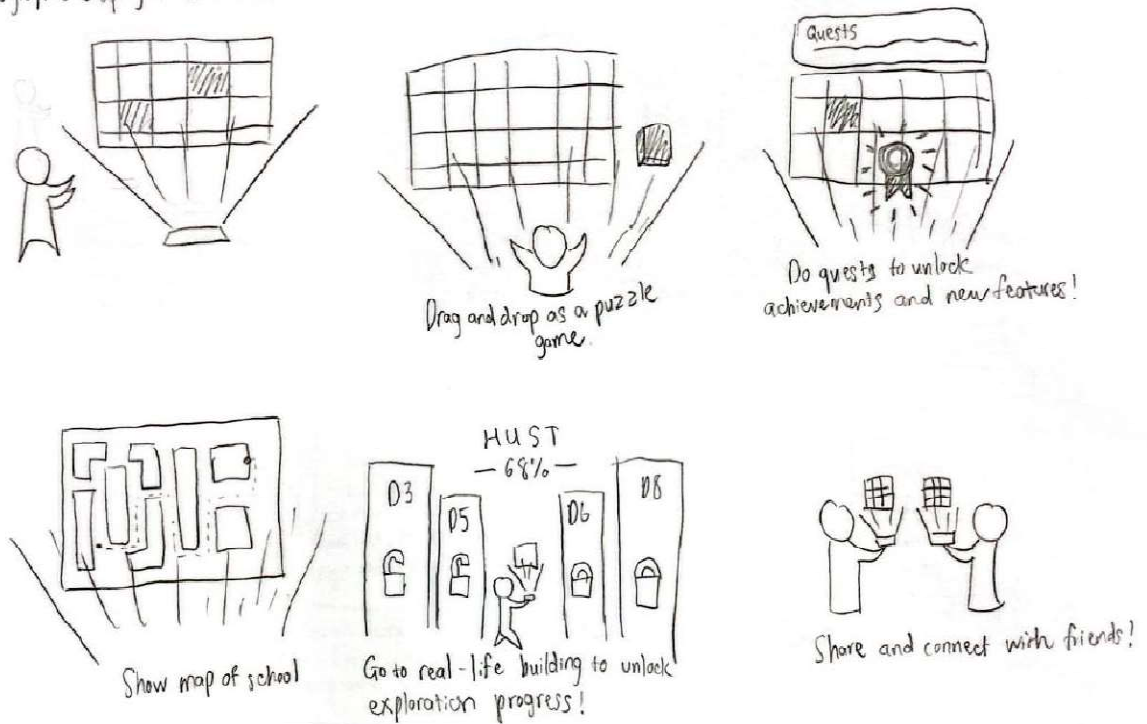


Figure 5: Hologram Display + Gamification realization with examples

3 SELECTED STORYBOARD

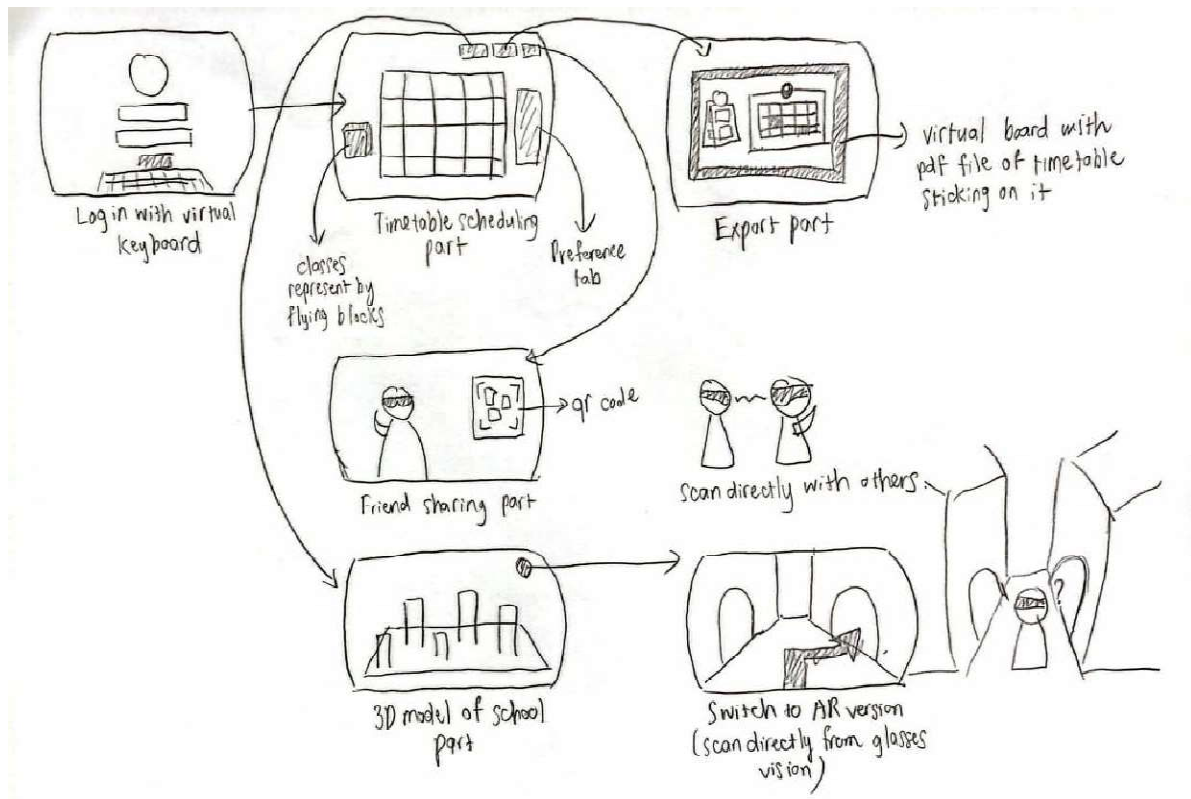


Figure 6: AR + VR concept storyboard

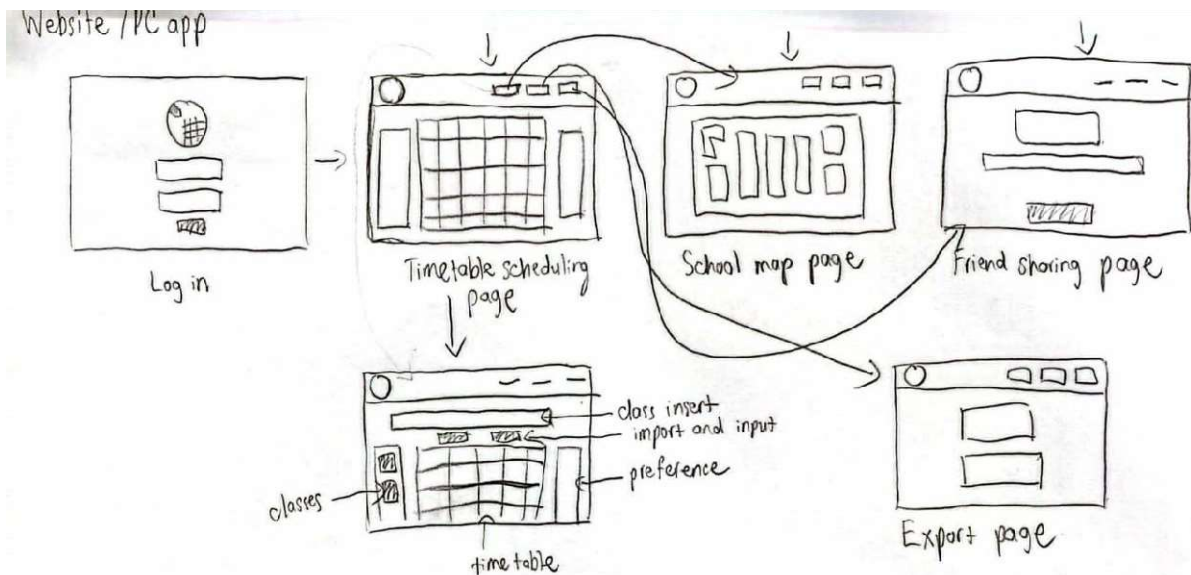


Figure 7: Main storyboard with main pages only of Website

4 FINAL INTERFACE

After careful consideration of user needs and practicality, we've decided to finalize the interface as a website/PC app rather than AR/VR, ensuring broader accessibility and a more efficient, user-friendly experience for HUST students.

AR + VR Walkthrough

Pros	Cons
<p>Immersive Experience: Users can interact with the timetable and map in a more engaging and realistic way.</p> <p>Intuitive Interaction: AR/VR offers natural ways to manipulate objects (e.g., drag and drop or gesture control) that could simplify task completion.</p> <p>Multi-Tasking Capability: With AR, users can view multiple layers of information, such as timetable data and campus map, at once.</p> <p>Personalized Environment: VR creates a custom, personal space where users can feel more connected to the app and their tasks.</p> <p>Innovative Appeal: VR and AR are innovative, which could attract tech-savvy users and differentiate the app in the market.</p> <p>Visualized Campus Map: AR can superimpose the campus map directly into the user's environment, allowing for real-time, contextual navigation.</p> <p>Potential for Gamification: Can integrate game-like elements, making the process of viewing timetables or navigating campus more enjoyable.</p> <p>Reduced Cognitive Load: The immersive nature of AR/VR can help reduce cognitive load by presenting visual information in a spatial context, making it easier to understand.</p> <p>Engaging Feedback: Provides haptic, auditory, and visual feedback, making interactions more engaging and satisfying.</p>	<p>High Development Costs: Developing AR/VR interfaces requires specialized technology and resources, which can be costly.</p> <p>Hardware Requirements: Users need access to AR glasses, VR headsets, or compatible smartphones, which limits accessibility.</p> <p>Learning Curve: Users unfamiliar with AR/VR may face a steep learning curve to understand how to interact with the system.</p> <p>Complexity in Design: The interface needs to be designed for a 3D environment, which can be difficult and time-consuming.</p> <p>Limited by Space and Movement: Users may feel constrained by the physical space required for AR/VR, especially in public or crowded areas.</p> <p>Potential Motion Sickness: VR systems can cause motion sickness in some users, which limits prolonged use.</p> <p>Accessibility Issues: Users with physical or visual impairments may struggle with AR/VR systems.</p> <p>Energy Consumption: VR/AR systems, especially on mobile devices, consume a significant amount of battery power.</p> <p>Overwhelming for Some Users: Immersion can be overwhelming for users who prefer simpler, less immersive experiences.</p> <p>Lack of Final Design: Difficult to judge aesthetic appeal as VR/AR prototypes often lack detailed design elements (e.g., colors, textures).</p>

Website/PC App

Pros	Cons
<p>Accessibility: Can be used on any standard device, making it more accessible to a broader audience.</p> <p>Familiarity: Users are accustomed to interacting with websites and PC apps, leading to faster adoption and fewer misunderstandings.</p> <p>Easy to Update: Websites and PC apps can be updated easily and frequently without requiring users to install new versions.</p> <p>Device Independence: Available on various devices (desktop, laptop, tablet, and mobile browser), offering flexibility in use.</p> <p>Cost-Effective: Developing a website/PC app is typically less expensive than creating AR/VR experiences.</p> <p>No Special Hardware Requirements: Users only need a basic computer or mobile device, making it highly accessible.</p> <p>Scalability: Web and PC apps are more scalable, allowing for expansion of features or integration with other systems more easily.</p> <p>Easy Navigation: Traditional 2D UI design is easier to navigate and use for most users, providing a familiar environment.</p> <p>Consistent User Experience: The experience is consistent across devices, and users don't need to worry about VR or AR hardware compatibility.</p> <p>More Control Over Interface Design: Web/PC apps allow for fine control over the design and layout, ensuring a clean and user-friendly interface.</p>	<p>Limited Interactivity: Compared to AR/VR, websites and PC apps are less interactive and immersive.</p> <p>Non-Immersive: The lack of immersion may make the user experience feel less engaging, especially for tech-savvy users.</p> <p>Requires Internet Connection: Websites rely on internet connectivity, which can be a limitation for users with unstable connections.</p> <p>Smaller Engagement: Users may not feel as invested or engaged as they would with an immersive VR/AR experience.</p> <p>Less Innovative: While functional, websites and PC apps are generally seen as less innovative or exciting compared to AR/VR alternatives.</p> <p>Limited Visual Appeal: Traditional design may feel flat or outdated compared to the dynamic, 3D nature of AR/VR.</p> <p>Dependence on Screen Size: Web/PC apps require users to interact with them via a screen, which may not offer the same level of contextual interaction as AR.</p> <p>Not Always Mobile-Optimized: Websites, especially those not responsive, may not work as effectively on mobile devices, limiting usability for mobile users.</p> <p>Limited User Feedback: Unlike AR/VR, there's less tactile or immersive feedback from interactions with a screen.</p> <p>Navigation Issues for New Users: New users might struggle with understanding the layout or missing some features, leading to confusion or frustration.</p>

Ultimately, we decided to develop PlanMate as a website/PC app rather than an AR/VR interface. This choice ensures a more accessible and user-friendly experience for HUST students, allowing them to easily navigate and interact with the application. The app will include key features such as a **Login** page, which allows users to securely access their

personalized timetables, and a **Timetable** page for managing and viewing courses and class schedules. Additionally, the **Share** page will enable students to share their timetables with friends or colleagues, while the **Export** page provides the ability to export timetables to PDF for future reference. The **Map** page will display campus maps with class locations, making it easier for students to navigate the university. These features are designed to streamline the course registration process, offering students a comprehensive and efficient way to plan and visualize their timetables.

5 LOW-FIDELITY PROTOTYPE

Our low-fidelity prototype was created by sketching each page and its various states on A5 paper. We focused on representing the core features and interactions of the app, ensuring a clear flow between pages and states. After sketching, we scanned the drawings and uploaded them to FigJam within Figma. This allowed us to map out the relationships between different pages and states visually, providing an interactive flowchart of how users would navigate through the app. This method enabled us to quickly iterate and refine the user experience before moving on to higher-fidelity design stages.

For a better experience, please visit: [Link](#).

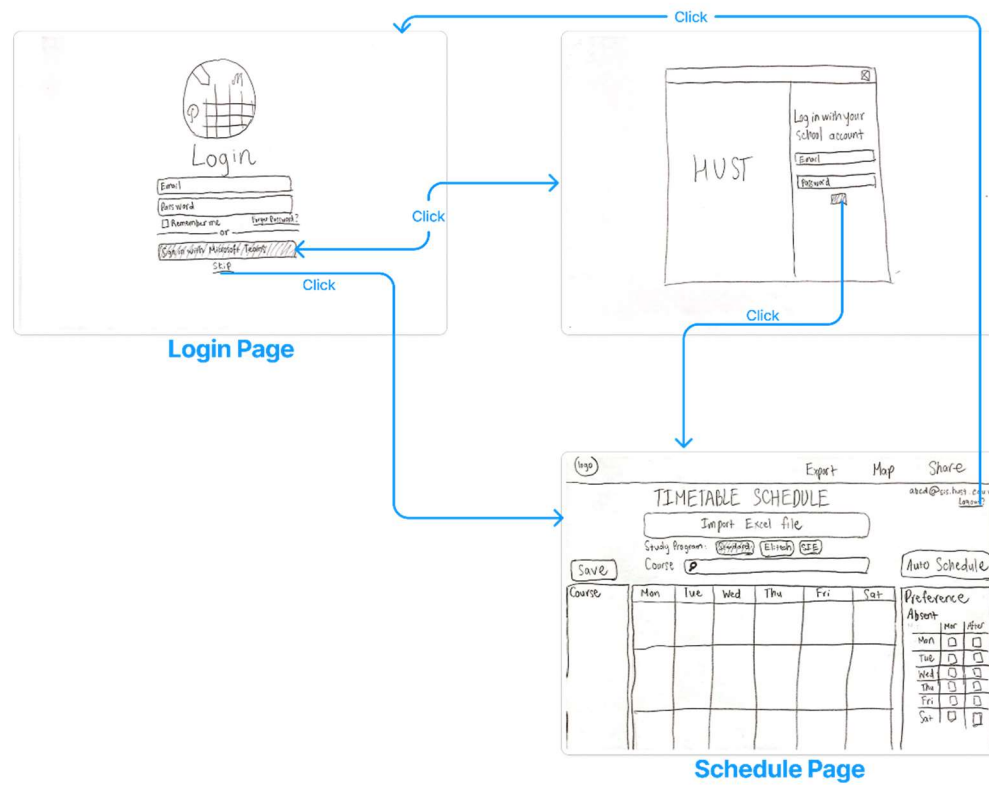


Figure 8: Login flow

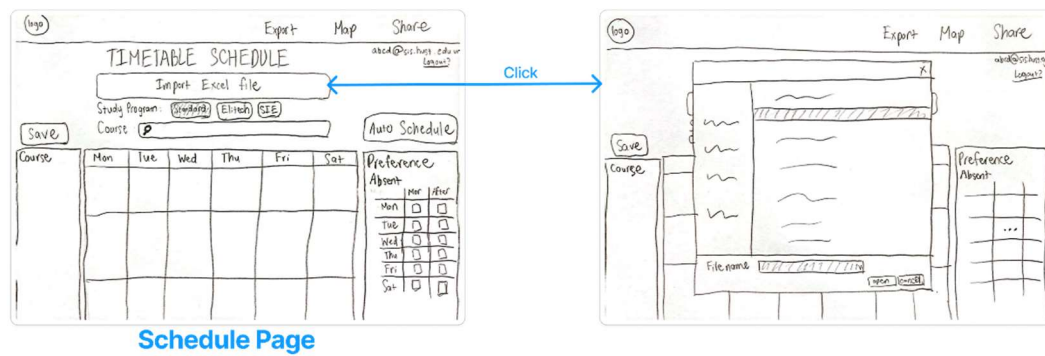


Figure 9: Import Excel file flow

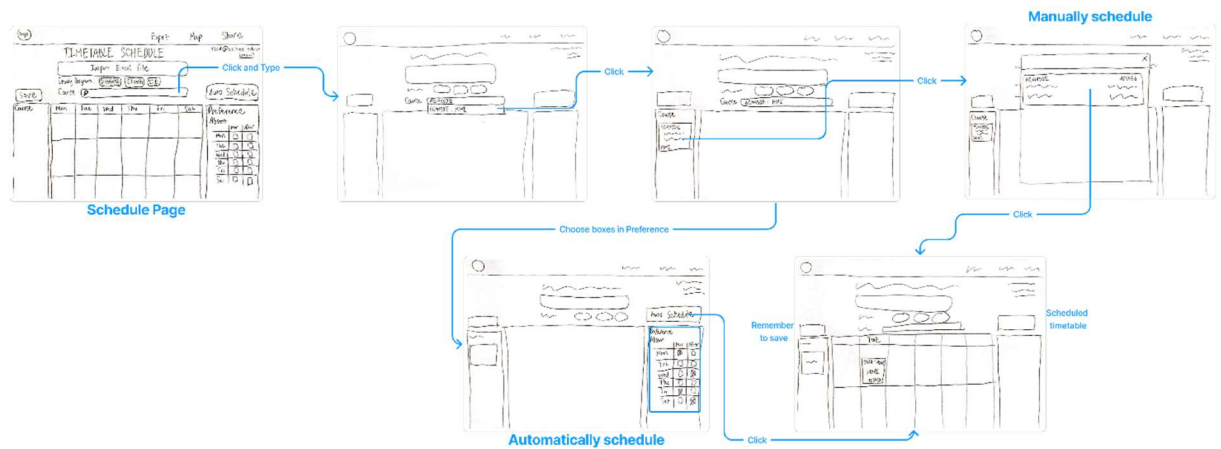


Figure 10: Manually and Automatically schedule flow

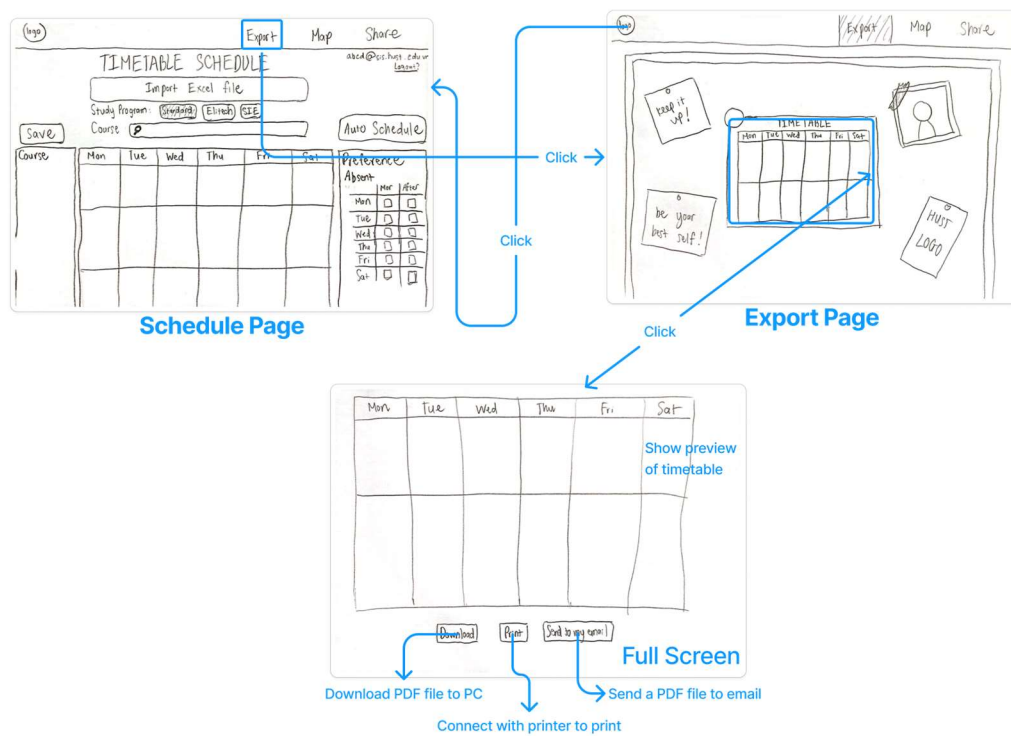


Figure 11: Export flow

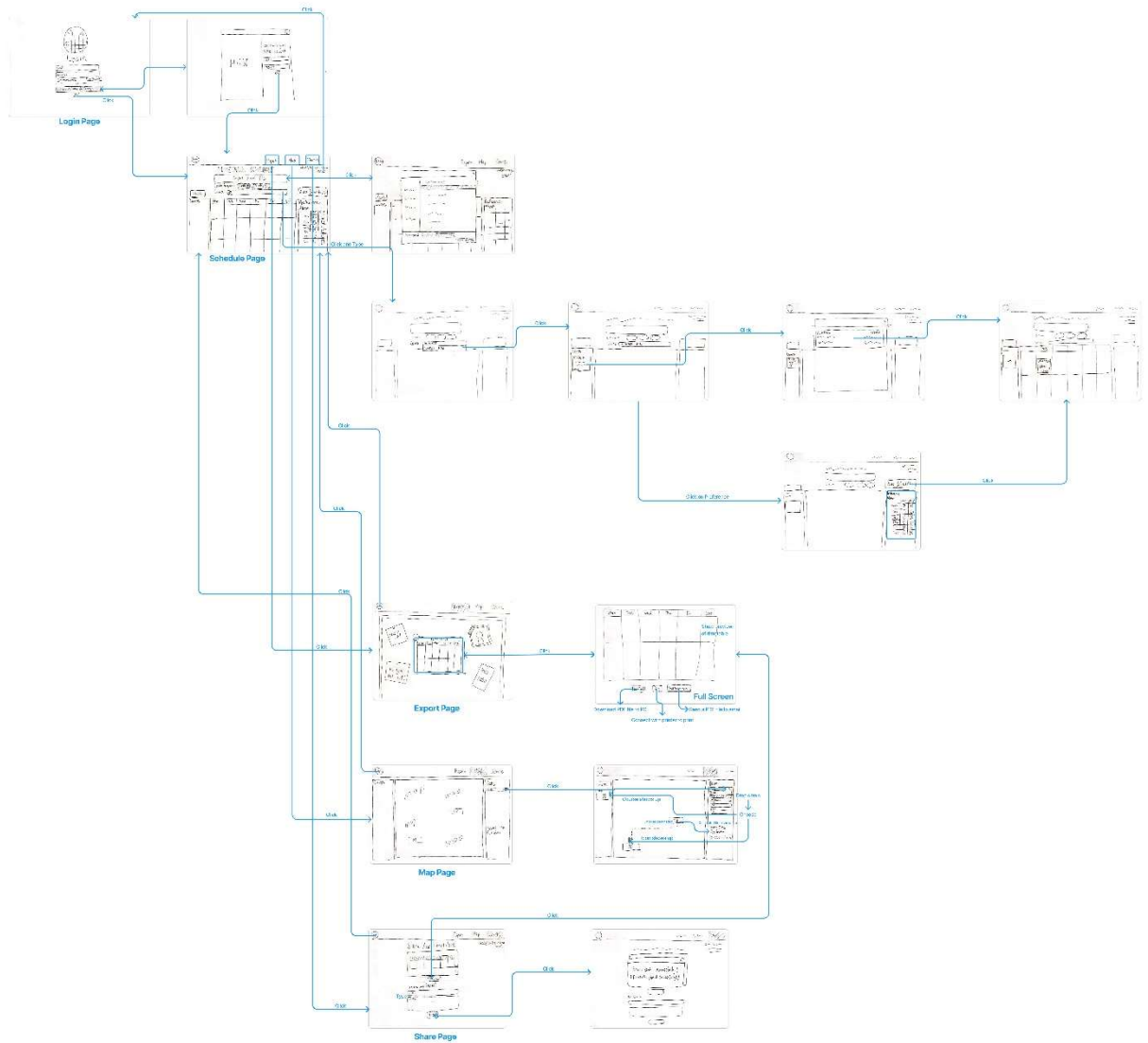


Figure 14: Low-fi prototype full version (recommend to have a look at the Figma link above for better experience)

6 TESTING METHODOLOGY

6.1 Participants

We interviewed:

- Vu Duc Duy, 20 years old, a student in SOICT, HUST, Hanoi.
- Pham Viet Tra My, 21 years old, a student in Banking Academy, Hanoi.
- Do Phuong Nhi, 21 years old, a student in University of Exeter, England.

We selected these participants based on their diverse backgrounds and relevant experiences to ensure a broad range of perspectives. Vu Duc Duy, a student at SOICT, HUST, represents the target audience of HUST students who would directly benefit from

the PlanMate app. Pham Viet Tra My, a student at the Banking Academy in Hanoi, brings a different university experience and can provide insights from a different academic environment. Do Phuong Nhi, a student at the University of Exeter in England, offers an international perspective, helping us understand potential usability challenges and preferences that may arise when students from different educational systems use the app. This diversity allows us to gather a comprehensive understanding of user needs and expectations.

6.2 Environment

The environment for the user testing was set up in a quiet, controlled space to ensure participants could focus on the tasks without distractions. We arranged the paper prototypes on a table, where each participant could comfortably interact with them. The testing area was designed to be spacious and well-lit, with enough room for the participants to easily navigate through the paper screens while following the script. This setup allowed for clear observation of user behaviors and interactions as they manually simulated actions on the prototypes. The environment was kept simple to maintain the focus on usability and task completion rather than aesthetics.

6.3 Tasks

The three tasks in the user testing were:

- **Export the Timetable to PDF:** Participants were asked to save their personalized timetable as a PDF for future use or sharing.
- **View the Campus Map with Class Locations:** Participants navigated the campus map to locate their class locations.
- **Generate and View a Personalized Timetable:** Participants used the app to automatically generate a timetable based on their preferences and view the results.\

6.4 Procedure

6.4.1 Introduction

- Welcome participant and explain purpose (testing PlanMate prototype).
- Emphasize testing the prototype, not their skills.
- Obtain consent for participation and note-taking.

6.4.2 Set up

- Arrange paper prototype elements logically.
- Explain roles (facilitator, computer, observer).
- Briefly outline the 3 tasks.

6.4.3 *Task Execution*

- Task 1: Export timetable to PDF.
- Task 2: View campus map with class locations.
- Task 3: Generate and view personalized timetable.
- Observe user behavior and note challenges.

6.4.4 *Feedback*

- Ask about likes, dislikes, and moments of confusion.
- Collect suggestions for improvement.

6.4.5 *Conclusion*

- Thank participant and explain how feedback will help refine PlanMate.

6.5 **Test Measures**

- Success: Task completion within a reasonable time frame without significant confusion or errors.
- Error: Misclicks, failure to complete the task, misunderstanding of instructions, or difficulty locating key elements.

6.6 **Team Member Role**

- Nguyen Gia Bao: Observer/Note-taker.
- Nguyen Do Hoang Minh: Facilitator/Note-taker.
- Nguyen Huu Phong: Facilitator/Computer.

7 **RESULT**

We asked participants to talk aloud as they used the prototype, which helped us understand what worked well and what didn't. Here is a summary of the feedback we got:

All participants:

- Found the concept of the app useful and relevant.
- Liked the idea of the campus map.
- Appreciated the idea of a streamlined and clean interface.
- Found the 'Save' button difficult to locate.
- Felt the app would benefit from more consistent navigation features, such as a 'Home' tab instead of clicking the logo.
- Loved the idea of 'Friend Sharing' function.

Two participants:

- Mistakenly clicked the 'Share' button instead of the 'Export' button.
- Commented on the placement of critical buttons (like 'Export' and 'Save').
- Mentioned that the overall task flow was simple to follow once they figured out the necessary actions.
- Suggested that the 'Download' and related button should be right under the timetable instead.
- Thought the bulletin-board-theme 'Export' was cool and unique.

One participant:

- Didn't see the 'Preference' part to use.
- Accidentally manually scheduled timetable instead of using auto schedule function.
- Got confused at the 'List of classes' window.
- Got confused at the bulletin-board-theme 'Export' page.
- Didn't know how to use the 'Moving Time Estimate' function.

8 DISCUSSION

The results of the usability testing highlighted several key insights into the effectiveness and areas for improvement of the low-fidelity prototype of PlanMate.

8.1 Efficiency

Although users were able to complete basic tasks, they struggled with efficiency due to misclicks and navigation confusion. Several participants had to backtrack or retrace steps, causing delays in task completion. This suggests that while the core functions of the app were understood, the flow of interactions could be smoother. Improving the visual hierarchy and navigation could help reduce unnecessary delays.

8.2 Clarity and Intuitiveness

While the app showed potential, it was clear that users needed to engage in significant trial-and-error to complete tasks. Many errors occurred due to unclear button placements and confusion regarding the app's flow. The absence of step-by-step instructions or clear guidance hindered task clarity. This suggests a need for a more intuitive design with better labeling and instructional cues, particularly for users who are interacting with the app for the first time.

8.3 Button Placement and Navigation

Misclicks on buttons like the 'Share' instead of 'Export' indicate a need for better button placement and clearer labeling. The lack of a 'Home' tab and breadcrumb trails also created challenges in navigating between tasks. These improvements would simplify task transitions and reduce cognitive load for users. Ensuring that buttons and navigation elements are consistently placed will help make the app more intuitive.

8.4 Feature Guidance

Tasks that involved setting preferences and using the campus map presented challenges for users. There was a need for clearer guidance, such as tooltips or tutorials, to assist first-time users in understanding how to use more complex features. This would ensure users can fully utilize all the app's functionalities without confusion.

8.5 What Testing Couldn't Reveal

While the prototype provided valuable insights into user interaction, certain aspects of the app were not tested due to its low-fidelity nature. For instance, the lack of color and final design elements meant that user feedback on the aesthetic appeal wasn't captured. Furthermore, the testing focused only on first-time use, so the app's long-term usability remains unclear. Additionally, the prototype did not simulate real-world usage scenarios with larger datasets or multiple users, leaving performance and scalability untested. Lastly, edge cases, such as conflicting preferences or incomplete timetable files, were not fully explored.

8.6 Conclusion

The testing results provided important guidance for improving the PlanMate app. By refining button placement, enhancing navigation, and providing better feature guidance, we can create a more efficient and intuitive experience for users. Additionally, further testing with higher-fidelity prototypes and real-world scenarios will be needed to assess the app's aesthetic appeal, long-term usability, and scalability.

APPENDIX

Severity Ratings Breakdown:

- 0 (No Issue): No significant problem, the feature was understood or appreciated.
- 1 (Minor Issue): Low impact, no serious disruption to the task flow.
- 2 (Moderate Issue): Some difficulty or confusion, but manageable.
- 3 (Major Issue): Significant confusion or frustration, important issue affecting task completion.
- 4 (Critical Issue): A critical flaw or error that prevents successful completion of the task or severely impacts the user experience.

Duy

Incident	Description	Severity (0-4)
1. Save Button Location	Found the 'Save' button difficult to locate.	3
2. Navigation Consistency	Felt the app would benefit from more consistent navigation features, such as a 'Home' tab instead of clicking the logo.	2
3. Export Button Misclick	Mistakenly clicked the 'Share' button instead of the 'Export' button.	3
4. Task Flow	Commented that the overall task flow was simple to follow once they figured out the necessary actions.	1
5. Download Button Placement	Suggested that the 'Download' and related buttons should be right under the timetable instead.	2
6. Friend Sharing Function	Loved the idea of the 'Friend Sharing' function.	0

My

Incident	Description	Severity (0-4)
1. Preference Section	Didn't see the 'Preference' part to use.	4
2. Navigation Consistency	Felt the app would benefit from more consistent navigation features, such as a 'Home' tab instead of clicking the logo.	2
3. Class List Confusion	Got confused at the 'List of classes' window.	3
4. Task Flow	Commented that the overall task flow was simple to follow once they figured out the necessary actions.	1

5. Moving Time Estimate	Didn't know how to use the 'Moving Time Estimate' function.	3
6. Export Page	Thought the bulletin-board-theme 'Export' was cool and unique.	0

Nhi

Incident	Description	Severity (0-4)
1. Save Button Location	Found the 'Save' button difficult to locate.	3
2. Manual Scheduling	Accidentally manually scheduled timetable instead of using the auto-schedule function.	3
3. Export Button Misclick	Mistakenly clicked the 'Share' button instead of the 'Export' button.	3
4. Export Page Confusion	Got confused at the bulletin-board-theme 'Export' page.	2
5. Download Button Placement	Suggested that the 'Download' and related buttons should be right under the timetable instead.	2
6. Navigation Consistency	Felt the app would benefit from more consistent navigation features, such as a 'Home' tab instead of clicking the logo.	2

BLANK CONSENT FORM

Consent Form

This student team is interviewing and observing as part of the coursework for Human - Machine Interaction course AC4150E at HUST. Participants provide data that is used to understand the possible opportunities of the design. Data may be collected by interview, observation and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers Gia Bao NGUYEN, Do Hoang Minh NGUYEN, Huu Phong NGUYEN, the instructor of AC4150E:

Thi Thanh Hai TRAN

Viet-Tung NGUYEN

Hanoi University of Science and Technology

Participant anonymity will be maintained by the separate storage of names from data. Data will only be identified by the participant's number. No identifying information about the participants will be available to anyone except the student researchers and their supervisors/teaching staff.

I hereby acknowledge that I have been given an opportunity to ask questions about the nature of the research and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the team's research. I also give permission for images or audio/video recordings of me being interviewed to be used in presentations or publications, as long as I am not personally identifiable in the images/video. I understand that I may withdraw my permission at any time.

Name _____

Participant Number _____

Date _____

Signature

Witness name _____

Witness signature