



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

**BACHELOR OF COMPUTER SCIENCE
(GRAPHICS AND MULTIMEDIA SOFTWARE)
WITH HONOURS COMPUTING**

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PROJECT: DESIGN THINKING

**SECP 1513 TECHNOLOGY AND INFORMATION SYSTEM
SECTION 09**

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1.0 Introduction

While students pursue their academic journey on campus, reference books, textbooks, and notes play a crucial role. However, first-hand university-level reference books are expensive for students coming from a normal background. Additionally, graduate students or students who have completed their coursework are struggling to deal with the textbooks they purchased. In this technology-driven era, students are concerned about distinguishing between trustworthy and untrustworthy websites or dealers when purchasing reference materials or notes. Here we are, figuring out a solution and presenting the phases we will conduct our prototype, a platform that is trustworthy and solves the problems discovered.

2.0 Log Journal

Date	Progress
30 October 2025	Brainstorming Ideas & Decision
19 November 2025	Finishing details of the Second-hand Reference Resources Platform
31 December 2025	Division of Tasks & Open Questionnaire via Google Form
1 January 2026	Discussion about details of Prototype, Report and Video
2 January 2026	Complete prototype
4 January 2026	Sharing of thoughts and reflection throughout the project

2.1 Brainstorm Idea

On 30 October 2025, our group initiated a brainstorming session via a WhatsApp group chat and decided to create a prototype for a second-hand reference book and notes trading platform. At first, we came up with four brainstorming ideas listed below:

1. Campus Waste Classification & Recycling Assistant

Problem: Unclear waste classification on campus, low recycling rates and a lack of environmental awareness among students.

Solution: Design an engaging and incentive-based waste classification system or app.

Ideate: Brainstorm ideas such as AR waste recognition, points-to-gift redemption, and inter-dormitory recycling competitions.

Prototype: Sketch the app interface or create a physical model of a "smart sorting bin."

2. Student Second-hand Textbook Trading Platform

Problem: New textbooks are too expensive for students, while channels for selling old books are limited and information is often mismatched.

Solution: Create a secure and convenient campus-based second-hand book trading platform (such as a Mini-program or a community-based app).

Ideate: Brainstorm features such as barcode scanning to identify books, a credit rating system, and designated offline pickup points.

Prototype: Design the platform's functional flowcharts and wireframes for the main pages.

3. Student Mental Health Support Mini-program

Problem: Students face high academic pressure, but the channels for seeking psychological help are limited or carry a social stigma.

Solution: Design an anonymous mini-program that provides "lightweight" psychological support, mindfulness exercises, and resource links.

Ideate: Brainstorm features like daily mood logging, 5-minute mindfulness audio clips, an anonymous "tree hole" (confession wall), and direct links to help hotlines.

Prototype: Draw storyboards for the mini-program and UI sketches.

4. Smart Scheduling & Study Group Matching System

Problem: Students often face course selection conflicts and struggle to find like-minded study partners.

Solution: A system that can intelligently recommend schedules and match study groups.

Ideate: Brainstorm features like interest tag input for automatic matching and visual course conflict detection.

Prototype: Design the system's algorithm logic diagram (even a simple rule-based one) and the user interface.

After comparing the suitability of the problem statement and perspective-taking for each idea, our group agreed to proceed with idea No. 2. This is because we believe idea No. 2 has short-term efficacy in achieving the goal of creating a scam-free platform that helps students resolve issues when buying or selling reference materials.



Figure A: Messages of brainstorming and analysis between Idea 2 and Idea 3

2.2 Refining brainstormed concepts

On 19 November 2025, our group finalized the refinement of the brainstormed concepts previously discussed regarding the second-hand academic materials platform. The concept was approved and proceeded to the next stage.



Figure B: Cover of presentation idea

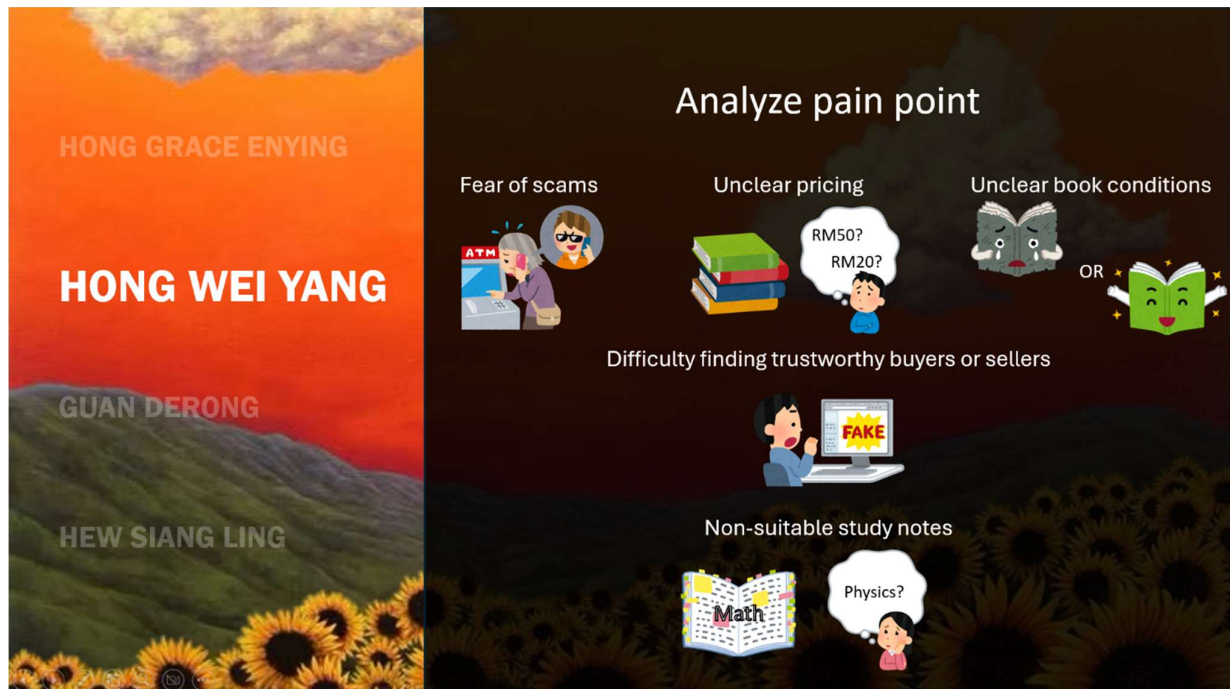


Figure C: Sample of slide about the pain point analysed

2.3 Division of Tasks & Open Questionnaire via Google Form

On December 31, 2025, the tasks were listed and divided among the members to facilitate collaboration and progress. At the same time, a Questionnaire was conducted to collect data and opinions from students on campus.

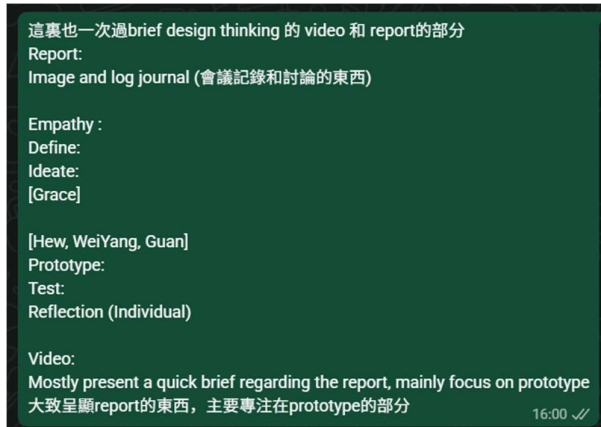


Figure D: Sample of division tasks

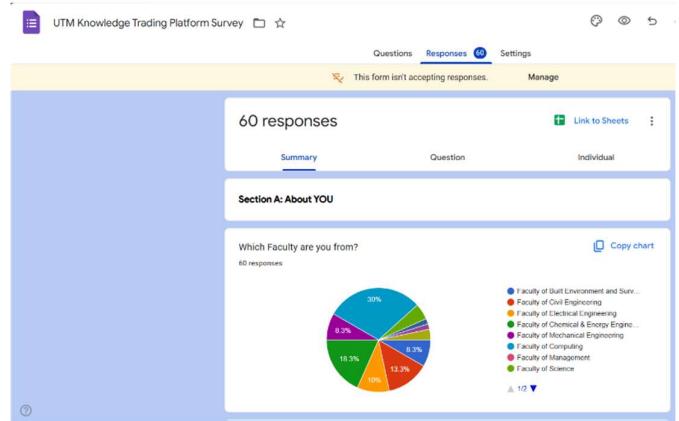


Figure E: Completion of 60 respondents via Google Form

2.4 Discussion about details of Prototype, Report and Video

On January 1, 2026, our group held a final discussion to finalize the details regarding the prototype, report, and video, aiming to refine our framework and make better progress.



Figure F: Group photo of final discussion

2.5 Completion Prototype

Meanwhile, the final prototype will be finalized one day after our final discussion, which is scheduled for January 1, 2026. The prototype features allow users to search by course/subject/publication year, with search results displaying images and seller ratings. Users can edit their profiles (for buying and selling) (user ratings will display user history, reviewers, and comments). Upload books for sale (the system will automatically provide AI-powered pricing suggestions). The chat function will provide suggested meeting locations. Once both parties agree, one party will determine the time and place. Users can click the "Go" button, and the map will display the route. Once both parties arrive, the system will display a "Confirm" button. If this button is clicked within 5 minutes, the transaction is successful. After the transaction is completed, both the buyer and seller can rate each other.

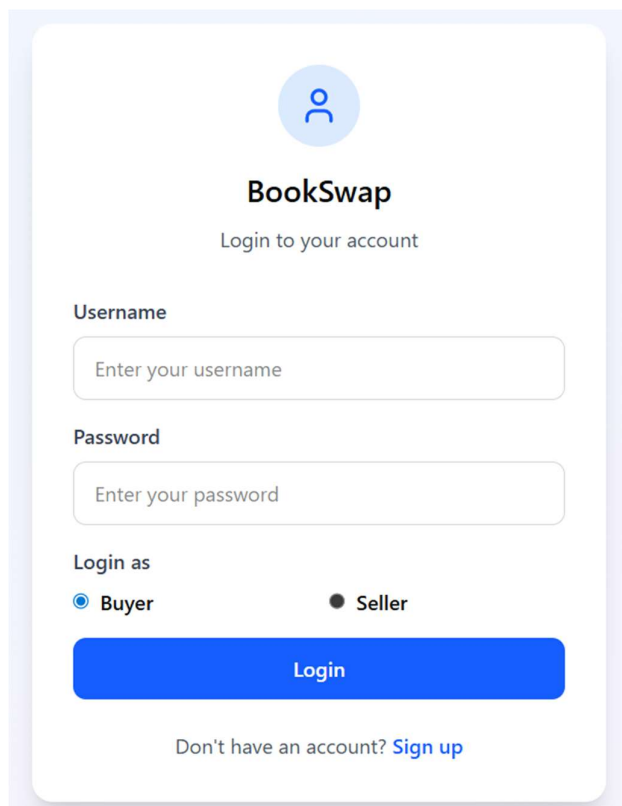
A login page for a platform called BookSwap. At the top, there is a blue circular icon with a white person silhouette. Below it, the text "BookSwap" is displayed in a bold, black font, followed by "Login to your account" in a smaller, lighter font. The page contains two input fields: "Username" with the placeholder text "Enter your username" and "Password" with the placeholder text "Enter your password". Below these fields, there is a "Login as" section with two radio buttons: "Buyer" (which is selected) and "Seller". At the bottom of the form is a large blue button labeled "Login". Below the button, there is a link that says "Don't have an account? Sign up".

Figure G: Starting page of login an account

2.6 Sharing and Reflect Session

S3 Hew Siang Ling

What is your goal/dream with regard to your course/program?

-Participating in this project aims to solidify my design and problem-solving skills, ultimately enabling me to create more digital products, such as interfaces, applications, or interactive experiences. I am particularly interested in products that are not only visually appealing but also user-centric. I hope this course will help me clarify my career development direction.

How does this design thinking impact on your goal/dream with regard to your program?

-Design thinking helps me understand problems from the user's perspective. It guides me to think more clearly, refine my ideas step by step, and design purposefully to support my long-term goals.

What is the action/improvement/plan necessary f...[Read more](#)

22:07

👍

S3 Hong Wei Yang

What is your goal/dream with regard to your course/program?

After finishing this course, I hope to be able to create useful, practical solutions that solve real problems, and land a creative, meaningful job in this industry.

How does design thinking impact your goal/dream with regard to your program?

It teaches me not to just rely on my own ideas. I need to understand the user first, try out different ideas, and make prototypes to test them. This will help me create work that's more reliable and better received in the real world.

What is the action/improvement/plan necessary for you to improve your potential in the industry?

Figure H: Hew and Wei Yang sharing their thought about the design thinking project

3.0 Detailed descriptions include problem, solution and teamwork

3.1 Problem Background

Within the Higher Education (HE) community, where students are encouraged to engage in self-study under the guidance of lecturers, the significance of reference materials is well established. However, new textbooks and reference materials are found to be expensive for students nowadays. Furthermore, there are limited channels for selling specific old course textbooks after students have completed their courses.

As a result, old reference materials are frequently discarded after use according to the research. This failure to re-enter used materials into the secondary market creates a massive surplus of redundant physical media. This inefficiency exacerbates the demand for raw paper pulp, driving unnecessary deforestation and indirectly placing a burden on the ecosystem. Moreover, the information between buyers and sellers remains fragmented and unmatched. This often leads to miscommunication and tension between individuals when transactional expectations are not met.

3.2 Solution

Our group decided to proceed with the development of a secure and student-friendly platform designed to protect both buyers and sellers when trading reference materials. To support our campus community, we adopted a user-centric approach to develop a prototype for a second-hand textbook trading platform specifically tailored for university students.

To ensure our solution fully addresses user needs, we analysed the primary pain points currently facing students. These include a fear of scams, a lack of price transparency, ambiguous book conditions, and the difficulty of locating trustworthy buyers or sellers. Additionally, we identified that students often struggle to find relevant and high-quality study notes, which our platform aims to address.

4.0 Record of Phases

Timeline	Phases
Week 1 (27 – 30 October 2025)	Ideate
Week 2-4 (3 – 19 November 2025)	Define
Week 5-6 (24 November – 1 December 2025)	Empathize
Week 7-10 (8 – 31 December 2025)	Empathize / Ideate / Prototype Prep
Week 11 (2 – 5 January 2026)	Test / Reflect

5.0 Empathy

We conducted a questionnaire among 60 randomly selected students from the UTM campus, representing different faculties. Approximately 30% of students are from the Faculty of Computing, while the other students are from the Faculty of Chemical & Energy Engineering and the Faculty of Civil Engineering, followed by students from other faculties. These students are the majority from Year 1, comprising 60% of the student body. This reflected the alignment between our problem statement and the freshmen's actual experiences, ensuring robust qualitative feedback through the questionnaires. It can be concluded that Year 1 students are primarily facing difficulties with notes and references.

Which Faculty are you from?

60 responses

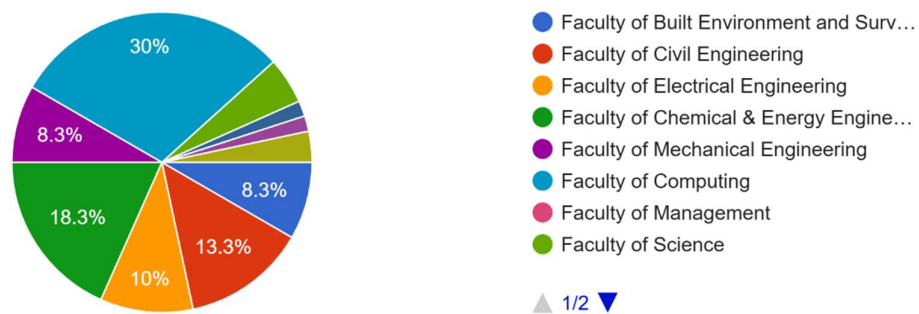


Figure b Percentage of students from different faculty

Which Year of Study are you currently in?

60 responses

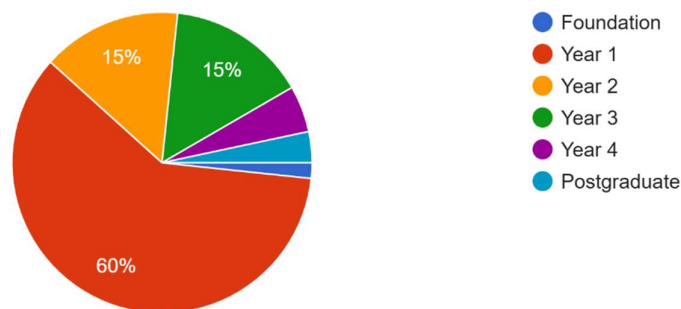


Figure a Percentage of students from different years

Approximately 50% of the students spend less than RM50 on their reference materials per semester, followed by 35% of the students who spend between RM50 and RM150 on them, and 11%.7% of them spend between RM150 and RM250. Half of the students spend less money on it, we may conclude that they might have received or bought their resources from their seniors based on the pie chart that included 55% given by their seniors for free or sold to them via any platform with 35%. From the chart, approximately 50% of the chances that the books are keeping with them in their shells or even store rooms.

How much of average spend on textbooks and reference materials per semester?
60 responses

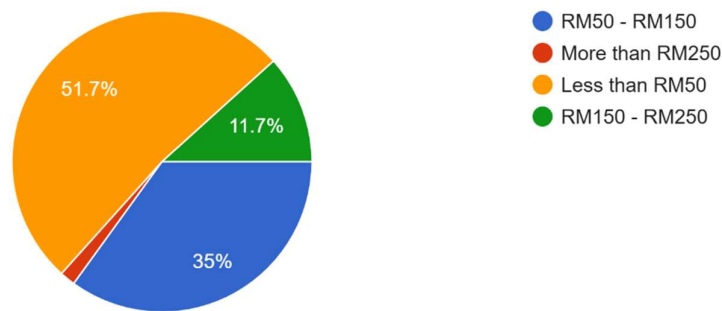


Figure c Percentage of students spend on their reference material per semester

What do you usually do with your textbooks/notes after the semester ends?
60 responses

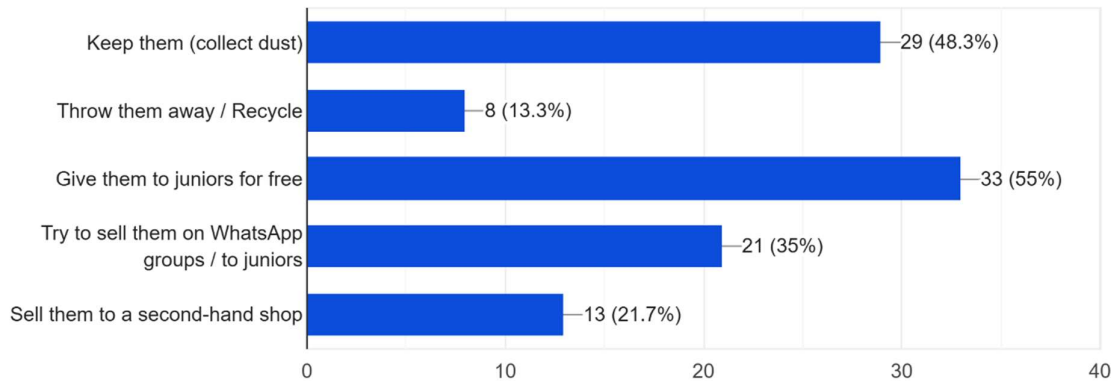


Figure d Percentage of ways dealt after finishing using reference materials

The questionnaire confirms a high demand for second-hand academic resources within the Higher Education (HE) community. However, the issues preventing it, such as challenges in matching a suitable buyer with sellers for a specific course were cited by 46.7% of respondents. Furthermore, a trust deficit remains a notable concern, with 19% of fraudulent activities and ambiguity regarding the physical condition of the books. These barriers are significant in pursuing and encouraging students to obtain a safe environment in the second-hand academic materials market.

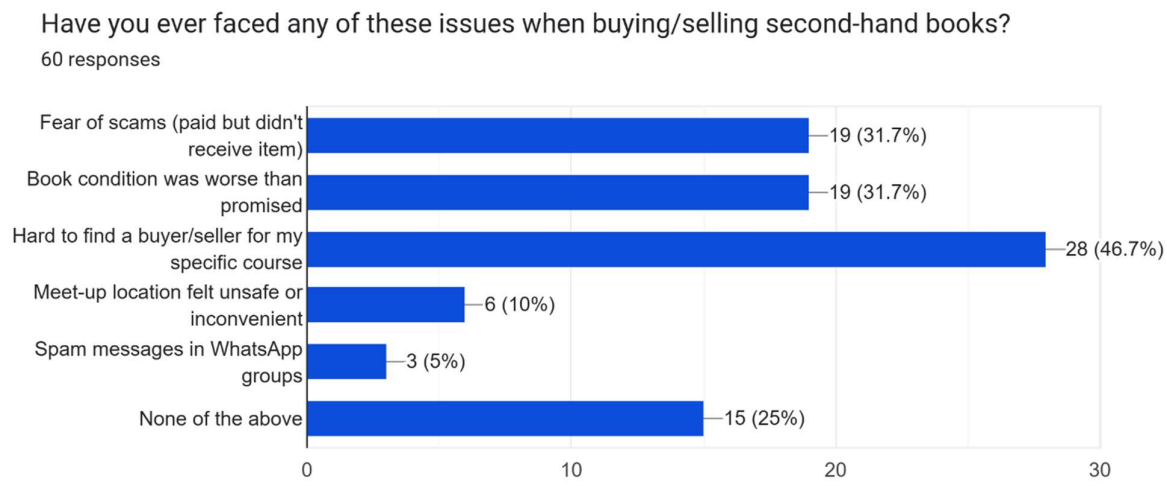


Figure F: Fragments of issues faced when buying/ selling second-hand academic materials

The transition from our Empathy to Define phase revealed a 'trust gap' in peer-to-peer transactions. According to the quotes, *"It is difficult to find trustworthy seniors selling the specific notes/books I need."* Thirty-two out of 60 respondents remained neutral, indicating a high level of market ambivalence – students are neither satisfied nor dissatisfied due to the lack of a dedicated platform. This strengthens the motivation for a platform that is student-friendly, aiming to enhance the peaceful environment among students and to utilize their resources in a safer and more effective manner.

"It is difficult to find trustworthy seniors selling the specific notes/books I need."

60 responses

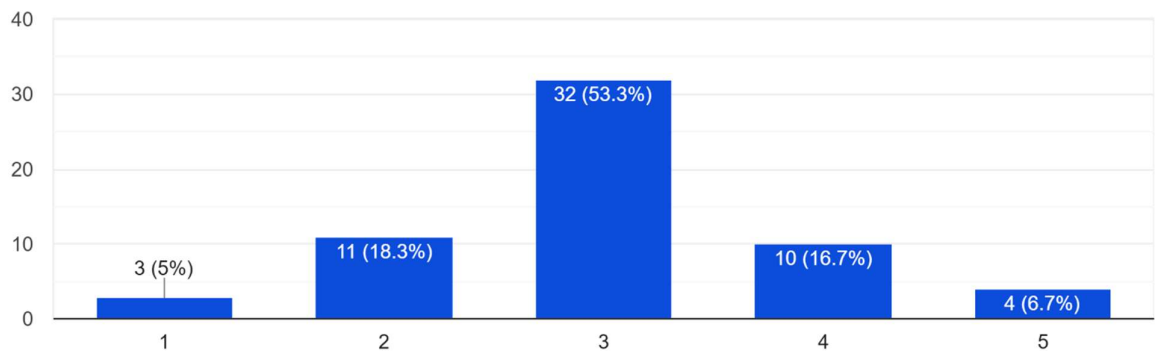


Figure G: Percentage of relatable from the quotes

Which feature would make you feel safest when trading?

60 responses

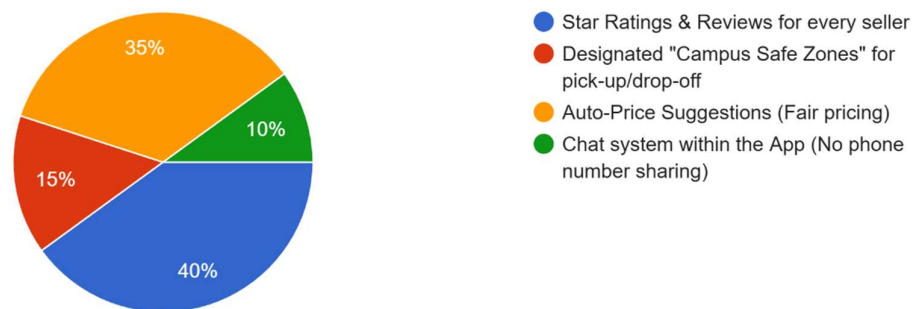


Figure H: Features that is encouraged in the prototype application

If there was a UTM-exclusive app that verified Student IDs and had a "Seller Trust Rating," how likely would you use it?

60 responses

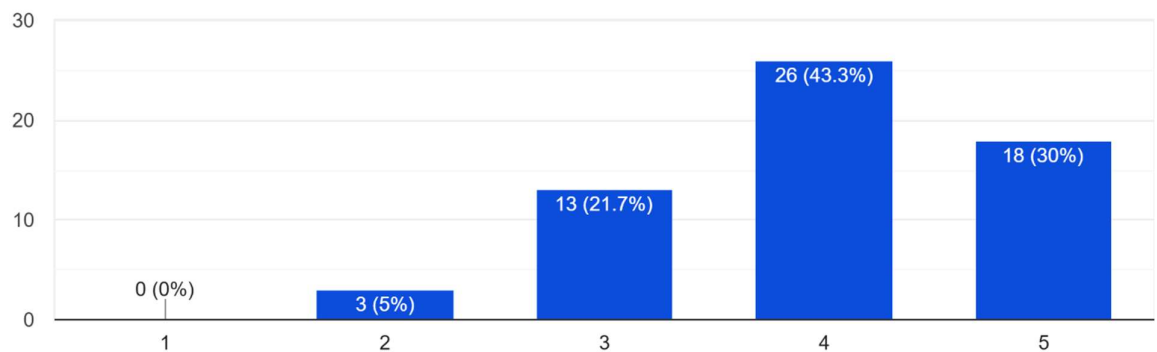


Figure I: Shows that try worthing for an app help on second-hand reference resources

6.0 Define

This is a trustworthy, easy-to-use and efficient platform designed to help university students buy, sell and match used textbooks and study notes.

In short, the platform aims to solve the inherent inefficiencies and trust issues in traditional textbook transactions, creating a convenient and secure platform for students to trade second-hand academic materials.

7.0 Ideate: Brainstorm process

- Trust and rating system

The implementation of a peer-to-peer rating mechanism fosters accountability and cultivates a secure trading environment by quantifying seller reliability.

- Pick-up/ drop-off points on campus

Strategically designated logistics nodes across campus enhance transactional convenience and mitigate security risks associated with meeting in isolated locations.

- Sort by course / subject / published year / price / condition

Advanced filtering parameters enable users to systematically organize search results, thereby optimizing the information retrieval process based on specific academic requirements.

- Auto price suggestion

The integration of an automated pricing algorithm provides market-aligned benchmarks, enabling users to set competitive prices based on historical transaction data.

8.0 Prototype: How the prototype is developed

This mobile application prototype aims to demonstrate the core processes of buying and selling used books. The main goal of the prototype is to visualize user interactions, system flows, and key functionalities without implementing a complete backend system.

Designed using Figma, the prototype focuses on building a high-fidelity mobile interface. It includes basic functionalities such as user login and registration (for buyers and sellers), search and sorting features, user profiles, seller store management, a chat system, and a transaction confirmation process.

Key interfaces were developed, including:

- Buyer and Seller Login and Registration Page
- Search Results and Sorting Options (Courses, Subjects, Publication Year)
- Book List Displays Seller Avatar and Star Rating
- User Profile Page Displays Role Switching (Buyer/Seller), Rating History, and Reviews
- "My Shop" Page Allows Sellers to Upload Books and Provides AI-Based Price Suggestions
- Chat Interface Provides Pickup and Delivery Location Suggestions
- Map Navigation and Transaction Confirmation Page

This prototype emphasizes user flow and usability, enabling users to simulate the entire transaction process from searching for books to confirming a successful transaction.

Prototype Link: [Prototype Shortcut](#)

9.0 Test: Test the prototype for the user

To evaluate the prototype's usability, navigation clarity, and overall user experience, we invited a small group of users to participate in a testing session. These users were tasked with completing common tasks such as searching for books, viewing seller profiles, chatting, and simulating transactions.

During testing, we observed user interactions with the application and gathered feedback through informal interviews. Tested features included sorting search results, switching between buyer and seller roles, and scheduling times and locations using the chat function.

We also tested the transaction process, which requires users to set a meeting location, receive notifications on the day of the transaction, view routes on a map, and click a confirmation button within a specified time frame. After the simulated transaction, users rated the buyer and seller's rating system.

Based on user feedback, the application was considered easy to understand and practical. We also provided suggestions, such as improving button visibility and simplifying certain navigation steps. These improvements will be taken into consideration in future development.

10.0 Reflection

Hong Grace Enying: I aimed to enhance my ability to interpret data instantly and gain a deeper theoretical understanding of Information Systems through the course. This design thinking approach gave me the opportunity to immerse myself in the project, identifying key matters and pain points, and applying the knowledge we had learned, such as the SDLC cycle. I believe I need to improve my leadership and communication skills to lead the team more effectively and provide clear instructions or present strong, structured ideas when sharing my thoughts.

Hew Siang Ling: I aimed to solidify my design and problem-solving skills, ultimately enabling me to create more digital products, such as interfaces, applications or interactive experiences. I am particularly interested in products that are visually appealing and user-centric. Design thinking helps me understand problems from the user's point of view. It guides me to think more clearly, refine my ideas step by step and design purposefully to support my long-term goals. I plan to enhance my skills through practical experience, take on small projects, and actively incorporate feedback to improve my abilities.

Hong Wei Yang: After completing this course, I hope to be able to create useful, practical solutions that address real problems and secure a creative, meaningful job in this industry. It teaches me not to just rely on my own ideas. I need to understand the user first, try out different ideas, and make prototypes to test them. This will help me create work that's more reliable and better received in the real world. Treat every course project like a real task and put serious effort into it. Look for internships or small real-world projects outside of class to gain experience. Organize my work and project process to show when applying for jobs. Consult with teachers and industry professionals to learn about their work practices and receive valuable advice.

Guan, Derong: I hope to enhance my technical skills and divergent thinking ability by taking this course. In the future, I can develop my own software and find a path that I truly like. This taught me not to think alone all the time, but to pay attention to combining the needs of users and constantly test and adjust after completion to achieve the best result. One should not merely learn what is taught in class; it is even more important to pay attention to various practical cases. By focusing on these cases, one can fully utilize their theoretical knowledge.

11.0 Division Tasks

Phase / Task	Person in Charge (PIC)	Report Deliverables
Log Journal & Meeting Records	All Members	Photos of brainstorming, meeting minutes, and screenshots of discussions.
1. Empathize	Grace	Deliver questionnaire and analyse data
2. Define	Grace	Problem statement and identify pain points
3. Ideate	Grace	Brainstorming sketches and selecting the best idea.
4. Prototype	Hew Siang Ling	Design the prototype and features
5. Test	Hew, Wei Yang, Guan	User feedback results and a checklist of improvements made.
Individual Reflection	Individually	Personal learning experience, challenges faced, and how they were overcome.