SECP1513-06 Technology and Information System

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Project Design Thinking

UTM Campus Second-Hand Trading Platform

Group 3

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1.0 Introduction

Design thinking is a problem-solving approach that focuses on understanding users' needs and developing practical solutions through creativity and collaboration. In today's fast-changing technological environment, students are required not only to master technical knowledge but also to develop skills such as critical thinking, teamwork, communication, and innovation. Therefore, design thinking has become an important learning method in higher education.

This project applies the design thinking process to address a real problem faced by students and staff at Universiti Teknologi Malaysia (UTM), which is the lack of a safe and reliable campus second-hand trading platform. Currently, many students rely on social media to buy and sell used items such as textbooks, electronic devices, and daily necessities. However, these platforms often cause problems such as unclear seller identity, transaction risks, poor item categorization, and lack of trust between users.

To solve this problem, our team followed the five phases of design thinking: Empathy, Define, Ideate, Prototype, and Test. Through interviews, surveys, brainstorming sessions, and prototype testing, we developed a solution that focuses on user safety, trust, and ease of use. This report documents the full design thinking process, supported by

evidence collected at each phase, and demonstrates how teamwork and structured thinking contributed to the final solution.

2.0 Design thinking step

Our design thinking process strictly follows five phases, each systematically executed to address the development requirements of the campus second-hand trading platform at Universiti Teknologi Malaysia (UTM):

Phase 1: Empathy

Through face-to-face interviews and online questionnaire surveys, we directly engaged with 15 UTM students and faculty members and collected over 150 valid responses. Key findings include: high user concerns about transaction risks (especially financial losses), distrust in seller identity authenticity, difficulties in searching due to disorganized product categories, and a lack of reliable evaluation mechanisms. These insights helped us construct three representative user personas, reflecting the specific needs of different groups within the UTM community.

Phase 2: Define

Based on survey data, we precisely defined the core problem as: "UTM students and faculty need a trading platform with security safeguards, identity verification, clear organization, and trust mechanisms to address

the fundamental issues of financial risks, identity uncertainty, information chaos, and lack of reliable feedback in current second-hand transactions."

Phase 3: Ideate

During collective brainstorming sessions, we generated over 70 functional ideas. Through multiple rounds of screening and prioritization, we ultimately identified the platform’s five core features:

1. Transaction Guarantee Mechanism (Return Guarantee): Establishing a platform-mediated refund guarantee system.
2. UTM Identity Verification System (UTM ID Verification): Mandatory 3. campus identity verification.
3. Smart Product Categorization: A multi-level, structured classification system.
4. User Feedback & Reputation System: Two-way evaluation and reputation scoring system.
5. Temporary deposit mechanism of transaction amount

Phase 4: Prototype

We adopted a progressive prototyping approach, starting with paper wireframes and gradually evolving to high-fidelity digital prototypes. The final prototype visualized the four core features, including:

UTM Single Sign-On (SSO) integration interface

Demonstration of the escrow deposit process

Smart categorization navigation system

Reputation scoring and review display modules

Phase 5: Test

We recruited 8 real users on the UTM campus for usability testing. The results showed: the Transaction Guarantee Mechanism received the highest value recognition (92% of testers indicated it would significantly increase their willingness to use the platform), UTM Identity Verification was considered foundational for building trust (88% of testers deemed it necessary), Clear Product Categorization greatly enhanced user experience efficiency, and the User Feedback System was identified as key to continuous platform optimization. Feedback from testing has been directly applied to functional iterations.

3.0 Problem Solution and Team Working

Problem:

In the campus environment, a large number of unused items such as textbooks, electronic devices, and daily necessities are generated every semester. However, there is currently no unified and secure second-hand trading platform within the campus. Students and lecturers often rely on social media for transactions, which, although convenient, results in low communication efficiency and difficulties in ensuring transaction safety and reliability.For example, it is difficult to verify whether the trading parties are campus members, and it is also challenging to accurately determine the condition of the items being traded. Due to the lack of proper identity verification and transaction protection mechanisms, disputes and trust issues may arise. Therefore, we believe that a platform is needed to verify user identity and safeguard transaction payments to improve the security and reliability of campus second-hand trading.

solution:

To address the issues identified, this project proposes the development of a campus second-hand trading platform for students and lecturers. The platform uses student or staff ID authentication to ensure that users are genuine campus members, thereby enhancing

transaction security. Users can post and browse second-hand items and communicate through the platform's built-in messaging system, reducing information fragmentation.In addition, the platform introduces a payment holding mechanism, where transaction funds are temporarily held by the platform before the transaction is completed. The payment is released to the seller only after the buyer confirms that the item is in satisfactory condition. This approach helps reduce transaction risks, increase user trust, and improve both safety and efficiency.The platform mandates real-name authentication using UTM student IDs or staff numbers, ensuring all participants are genuine members of the university community and building a trusted trading environment from the ground up.Buyers and sellers can provide mutual reviews after transaction completion. The review content and reputation scores are publicly visible, forming a continuously accumulating credit profile that provides reliable references for future transactions.

Team Working:

In this project, team members first discussed the problem to determine the overall direction of the solution and then divided tasks based on individual strengths and project requirements. Some members were responsible for user needs research and problem analysis to ensure

the solution reflected real campus situations, while others focused on detailed solution development and implementation planning. Throughout the project, continuous discussion and communication allowed the team to refine and improve the solution to better meet user needs. Effective teamwork and collaboration enabled the project to be completed on time and enhanced the overall completeness, feasibility, and consistency of the proposed solution.

4.0 Design Thinking Assessment Points, When Should Assessment Happen

The Design Thinking process for the UTM Campus Second-Hand Trading Platform incorporates both formative and summative assessments.

a. During the Transition Between Design Thinking Phases (Formative Assessment)

1.From Empathy to Define:

- Assessment Points: Do the user personas (e.g., Thrifty Undergrad, Relocating Postgrad) accurately synthesize the interview and survey data from real UTM students and faculty? Is the final problem statement user-centric, specific, and inspiring?

- Evidence for Assessment: Review of interview transcripts, affinity maps, and the draft problem statement to ensure it directly stems from identified user pains.

2.From Define to Ideate:

- Assessment Points: Is the problem statement clear and focused enough to provide effective boundaries for brainstorming? Does the team share a unified understanding of the core challenge?
- Evidence for Assessment: Team discussion and alignment check on the problem statement before beginning ideation sessions.

3.From Ideate to Prototype:

- Assessment Points: Did the brainstorming sessions generate a sufficient quantity and diversity of ideas (e.g., 70+ ideas for features)? Were the selection criteria (user value, feasibility, campus relevance) applied effectively to converge on the four core features (Return Guarantee, UTM ID Verification, etc.)? Do the chosen features directly address the problem defined in Phase 2?

- Evidence for Assessment: Review of brainstorm outputs (Miro board screenshots, idea lists) and the rationale document for selecting the final feature set.

4.From Prototype to Test:

- Assessment Points: Is the prototype (e.g., Canva interactive model) of sufficient fidelity to test the key user flows related to the core features? Does it allow users to experience the UTM ID login, explore categories, and understand the transaction guarantee process?
- Evidence for Assessment: Internal walkthrough of the prototype to verify it is test-ready for the key scenarios identified.

5. 0 Design Thinking Evidence

This section presents evidence collected from each phase of the design thinking process, showing how the team developed a user-centered solution.

5.1 Empathy Phase

The empathy phase focused on understanding the concerns of UTM students regarding campus second-hand trading.

Evidence:

- Online questionnaire responses
- Team discussion notes

Sample questions:

- What problems do you face when buying or selling second-hand items?
- Do you trust sellers on social media platforms?
- What features do you expect from a campus trading platform?

Key findings:

- Users worry about scams and financial loss.
- Seller identity is not trusted.

- Item searching is inefficient.
- No reliable review system exists.

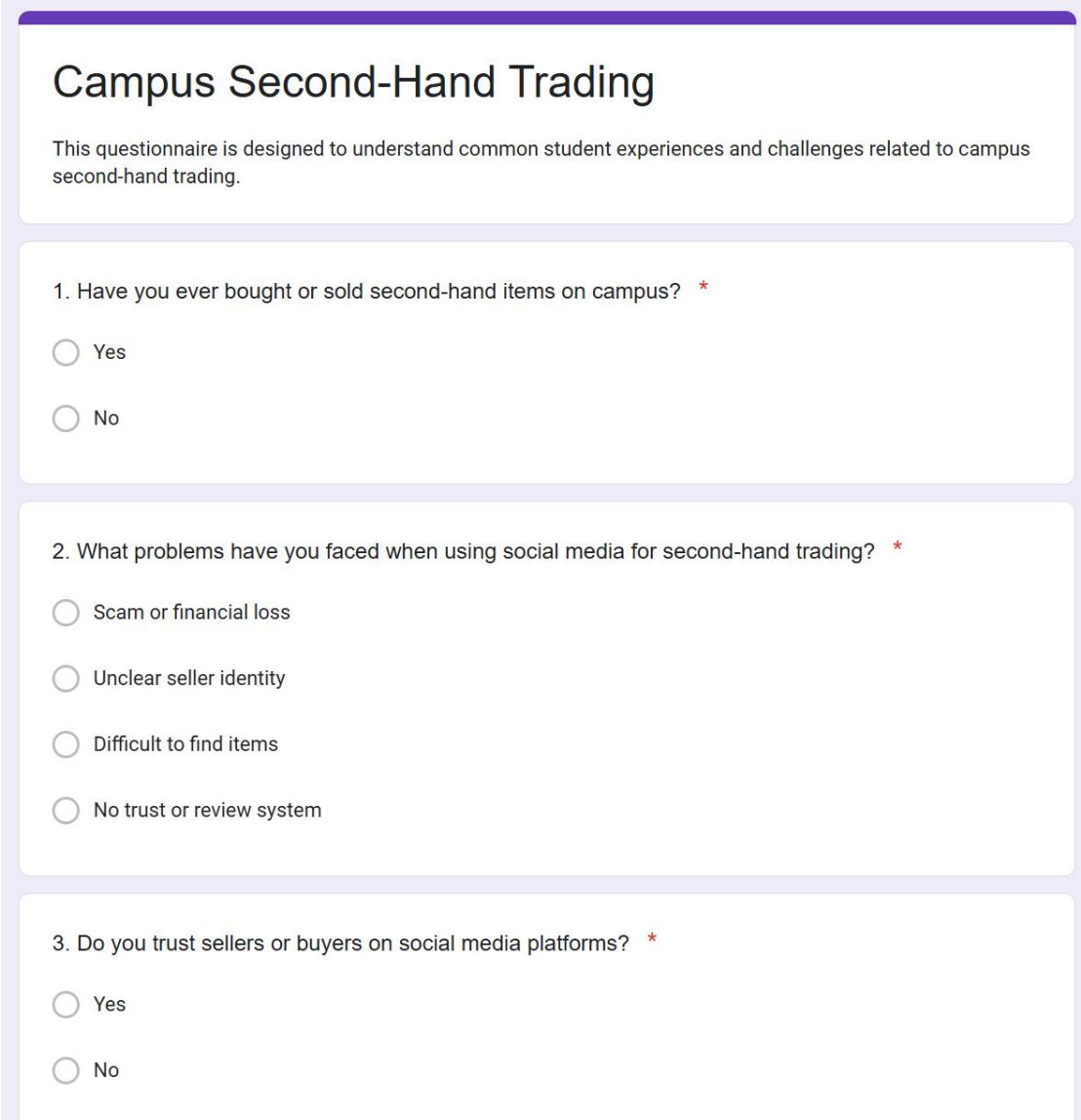


Figure 1: Online questionnaire questions and user profile used to understand student needs in campus second-hand trading.

Sample user profile:

- **User:** UTM undergraduate student
- **Age:** 20–23

- **Background:** Lives on campus, limited budget
- **Needs:** Safe transactions, verified users, clear categories, trusted reviews

5.2 Define Phase

Based on empathy findings, the main problem was defined as:

UTM students and staff need a secure campus second-hand trading platform that verifies user identity, reduces transaction risks, and improves trust compared to social media trading.

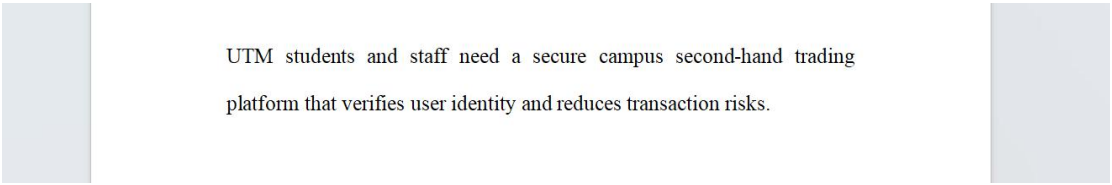


Figure 2: Defined problem statement based on empathy findings and user concerns.

5.3 Ideate Phase

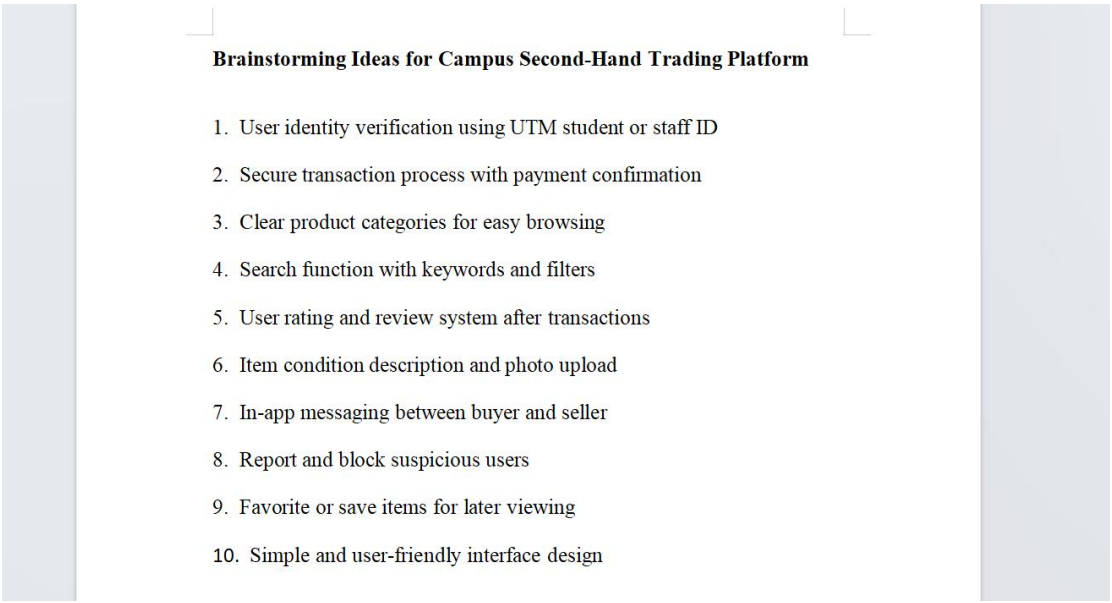
Brainstorming sessions were conducted to generate solution ideas.

Evidence:

- Brainstorm notes

- Idea lists

Around 10 ideas were generated during brainstorming. The main ideas selected include identity verification, secure transaction process, clear item categorization, and user review system.



Brainstorming Ideas for Campus Second-Hand Trading Platform

1. User identity verification using UTM student or staff ID
2. Secure transaction process with payment confirmation
3. Clear product categories for easy browsing
4. Search function with keywords and filters
5. User rating and review system after transactions
6. Item condition description and photo upload
7. In-app messaging between buyer and seller
8. Report and block suspicious users
9. Favorite or save items for later viewing
10. Simple and user-friendly interface design

Figure 3: Brainstorming ideas generated during the ideation phase.

5.4 Prototype Phase

A website prototype was developed to visualize the solution.

Evidence:

- Digital wireframes
- Website prototype screens

The prototype demonstrates user verification, product browsing, item posting, and transaction flow.

Interactive prototype link:

https://http-second-hand-website.my.canva.site/

Figure 4: Homepage design of the campus second-hand trading platform prototype.

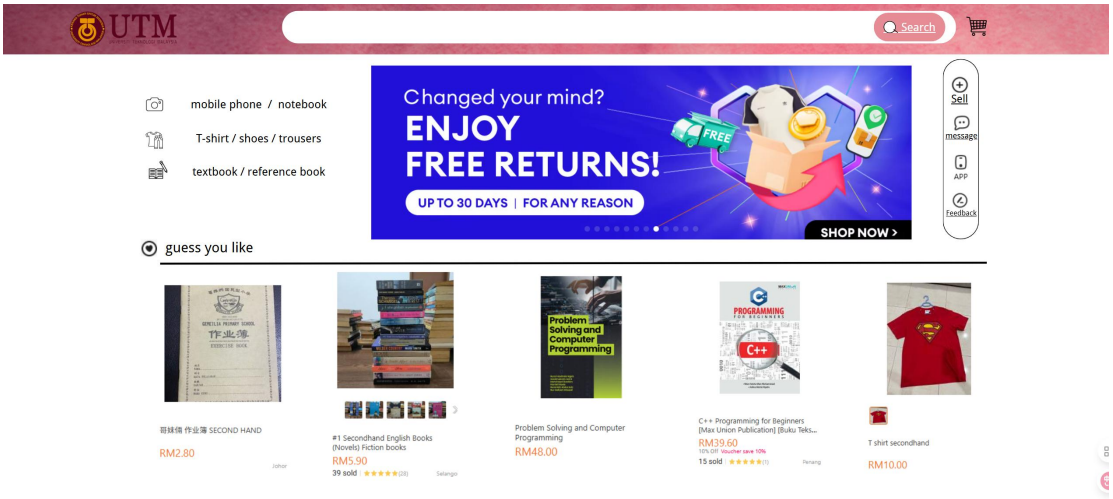


Figure 5: Product category and browsing interface in the website prototype.

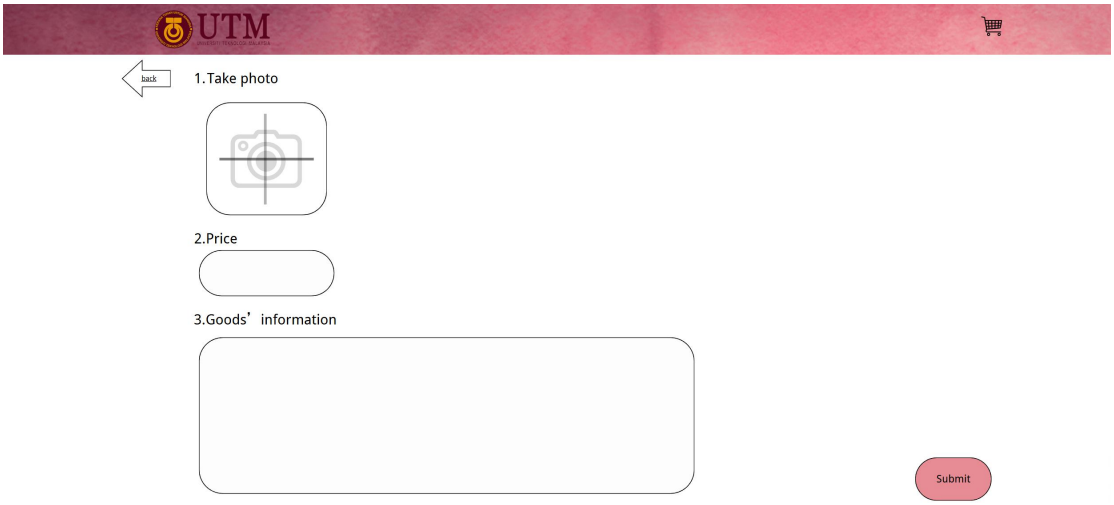


Figure 6: Item posting page showing how users upload second-hand products.

5.5 Test Phase

The prototype was tested through user interaction and feedback.

Evidence:

- User feedback forms
- Testing notes

Results:

- Identity verification increased user confidence.
- Secure transactions improved trust.
- Clear categories improved usability.

Feedback was used to refine the prototype.

Feedback Item	Result
Easy to use	Yes
Clear layout	Yes
Useful features	Yes

Figure 7: User feedback collected after testing the website prototype.

6.0Reflection(INDIVIDU)

Songhuaixu

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

My major is computer science and technology(Network and Security).My immediate goal is to learn more professional knowledge and achieve a higher GPA.My Long-term goal is to become a cybersecurity engineer capable of building secure and trustworthy digital systems.

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

In this project, I realized the importance of information security.Through the survey, I found that this is the need of almost every user.Previously, I focused more on technical aspects such as encryption algorithms and vulnerability defense. However, through this project, I understood that security mechanisms must be balanced with user experience.

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

In future coursework or internships, I will actively seek projects that require designing security architectures from scratch, especially those involving identity systems, payment processes, or data privacy. I aim to

take on roles such as a security design consultant in these projects to hone my ability to translate security requirements into functional features.

YUAN WENYAO:

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

My goal in this course is to understand the basics of technology and information systems and learn how systems can solve real problems. I hope to improve my problem-solving skills and apply what I learn in my future career related to technology or information systems.

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

This design thinking project helped me realize that understanding users is very important when solving problems. It taught me to think step by step and consider different perspectives before making decisions. This way of thinking is useful for my studies and future work.

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

To improve myself, I plan to practice my technical skills and communication skills more. I will also learn from feedback and apply design thinking in future projects to better prepare for real-world challenges.

LUO CIMEI

My goal in this program is to acquire fundamental knowledge and practical skills related to my field of study and apply them in both learning and future work. Although my specific career direction is still under exploration, I aim to develop problem-analysis and problem-solving abilities so that I can adapt to different technical and practical requirements.This design thinking project helped me realize that completing a project is not only about finishing assigned tasks, but also about understanding the source of the problem and the real needs of users. In designing the campus second-hand trading platform, we were required to consider the perspectives of students and teachers instead of focusing only on system functions.Through this course project, I became more aware of the importance of practical tasks in professional learning. In future coursework and related activities, I will place greater emphasis on reflecting on project experiences and improving my

professional skills and learning efficiency, in order to better meet future academic and work requirements.

SHI KAIYUAN

I want to better adapt to the group assignment mode and enhance my communication skills with the group members. In this project, I learned the importance of design thinking. When creating the website, I realized that the user experience is extremely crucial. This way of thinking has made me pay more attention to others' opinions when thinking about problems. Later, I plan to continue learning how to build a real website and strengthen my teamwork skills.

7.0 The task for each member

Songhuaixu:

Organize team meetings, develop the project timeline, and monitor task progress.Lead the design and execution of user research during the Empathy phase.Write the "Introduction" and "Overview of Design Thinking Phases" sections of the report.

SHAI KAIYUAN:

Design technical implementation plans for platform features (e.g., UTM identity authentication, payment escrow mechanism).Analyze security and privacy protection requirements, proposing feasible technical

safeguards.Conduct technical feasibility assessments and prototype functional validation during the Test phase.

YUAN WENYAO:

Gather outputs from each phase (interview records, prototype diagrams, test feedback, etc.) and organize them into report materials.

Lead the overall writing, formatting, and polishing of the report to ensure coherence and compliance with formatting standards.

Luocimei:

Lead brainstorming sessions during the Ideate phase, organize functional ideas, and participate in the selection process.Consolidate research data and spearhead the formulation of the problem statement in the Define phase.