



Faculty of Computer Science and Information Technology

**PRELOVE UNIMAS - A PLATFORM
FOR PRELOVED ITEMS EXCHANGE**

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Bachelor of Software Engineering with Honours
2025

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FOR PRELOVED ITEMS EXCHANGE**

EZYAN TASNEEM BINTI EZANI

This project is submitted in partial fulfilment of the requirements for the degree of
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**PRELOVE UNIMAS - PLATFORM
UNTUK PENUKARAN BARANGAN TERPAKAI**

EZYAN TASNEEM BINTI EZANI

Projek ini merupakan salah satu keperluan untuk
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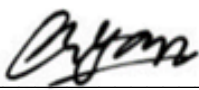
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ABSTRACT

PreLove UNIMAS is an online platform designed exclusively for UNIMAS students to facilitate the buying and selling of preloved items within the university community. Developed using the Rapid Application Development (RAD) methodology, PreLove UNIMAS emphasizes a user-centric design to meet the specific needs of students as the potential users. The platform includes user-friendly features such as user verification through UNIMAS student ID, items categorization, and secure communication via WhatsApp linked button. Extensive data gathering through surveys and questionnaires which help informed the requirements and functionalities, ensuring the platform aligns with user preferences and needs. The project includes a robust system architecture and user interfaces, and essential backend functionalities for seamless operations. By promoting sustainability and convenience, PreLove UNIMAS aim to foster a culture of reuse and reduces waste within the campus community. This project demonstrates the effective application of modern software development practices to address a real-world problem and provides a foundation for future enhancements to benefit students.

ABSTRAK

PreLove UNIMAS adalah satu platform dalam talian yang direka khas untuk pelajar UNIMAS bagi memudahkan pembelian dan penjualan barangan terpakai dalam komuniti universiti. Dirangka menggunakan kaedah *Rapid Application Development (RAD)*, projek ini menekankan reka bentuk yang mementingkan pengguna dan prototaip untuk memenuhi keperluan khusus pelajar. Platform ini mengintegrasikan ciri-ciri seperti pengesahan pengguna melalui ID mahasiswa UNIMAS, pengkategorian, barang, dan komunikasi yang selamat melalui butang rangkaian WhatsApp. Pengumpulan data secara menyeluruh melalui kajian selidik memastikan keperluan dan fungsi platform sejajar dengan pilihan pengguna. Projek ini merangkumi seni bina sistem yang kukuh, antara muka yang terperinci, dan fungsi *backend* yang penting untuk operasi yang lancar. Dengan mempromosikan kelestarian dan kemudahan, PreLove UNIMAS menggalakkan budaya penggunaan semula dan mengurangkan pembaziran dalam komuniti kampus. Projek ini menunjukkan aplikasi yang berkesan dengan pembangunan perisian moden untuk menyelesaikan masalah nyata dan menyediakan asas untuk penambahbaikan masa depan demi manfaat pelajar.

TABLE OF CONTENTS

THESIS STATUS ENDORSEMENT FORM.....	iv
DECLARATION.....	v
ACKNOWLEDGEMENT.....	vi
ABSTRACT.....	vii
ABSTRAK.....	viii
TABLE OF CONTENTS.....	ix
LIST OF FIGURES.....	xii
LIST OF TABLES.....	xiv
LIST OF ABBREVIATIONS.....	xv
CHAPTER 1 : INTRODUCTION.....	1
1.1 Introduction.....	1
1.2 Problem Statement.....	2
1.3 Project Scope	3
1.4 Aims and Objectives	3
1.5 Brief Methodology.....	4
1.5.1 Requirements Planning	5
1.5.2 User Design.....	5
1.5.3 Construction.....	5
1.5.4 Cutover.....	5
1.6 Significance of Project.....	6
1.7 Project Schedule.....	6
1.8 Expected Outcome.....	6
1.9 Report Outline.....	7
1.10 Chapter Summary	8
CHAPTER 2 : LITERATURE REVIEW	9
2.1 Background Study Sustainability in Higher Education	9
2.2 Background of Existing System.....	11
2.2.1 General Pre-Loved Item Exchange Platform: Mudah.my	12

2.2.2	Sustainability-Focused System for Second-Hand Clothing: Refash.my	14
2.2.3	University-Specific Exchange Platform: Berkeley Reuse	15
2.3	Comparison Between Existing Systems and Proposed System	18
2.4	Proposed System Justifications	21
2.5	Chapter Summary	22
CHAPTER 3 : METHODOLOGY		23
3.1	Introduction	23
3.2	Rapid Application Development (RAD)	24
3.2.1	Phase 1: Requirements Planning	25
3.2.2	Phase 2: User Design	42
3.3	Chapter Summary	59
CHAPTER 4 : IMPLEMENTATION		60
4.1	Overview	60
4.2	Software Development	60
4.2.1	Technology Stack	61
4.3	Phase 3: Construction (Implementation)	66
4.3.1	File Structure	66
4.3.2	User Authentication Module	66
4.3.3	User Profile Module	69
4.3.4	Item Management Module	70
4.3.5	Explore & Search Module	72
4.3.6	Admin Dashboard Module	73
4.3.7	Static Pages Module	75
4.4	Chapter Summary	77
CHAPTER 5 : TESTING AND EVALUATION		78
5.1	Introduction	78
5.2	Phase 4: Cutover (Functional Testing)	78
5.2.1	Testing Methodology	81
5.2.2	Testing Instructions	81
5.3	Test Cases of PreLove UNIMAS	82
5.3.1	Authentication Module	82
5.3.2	User Profile Module	84

5.3.3	Item Management Module	85
5.3.4	Explore & Search Module	86
5.3.5	Admin Dashboard Module.....	88
5.3.6	Static Pages Module.....	89
5.4	User Acceptance Testing (UAT)	91
5.4.1	Overview	91
5.4.2	Testing Methodology	91
5.4.3	User Acceptance Test Result.....	92
5.4.4	Improvement Recommendations	101
5.5	Chapter Summary	101
CHAPTER 6 : CONCLUSION AND FUTURE WORKS		102
6.1	Overview	102
6.2	Objective Achievement.....	102
6.3	Project Limitations.....	104
6.3.1	Technical Limitations.....	104
6.3.2	Operational Challenges.....	104
6.4	Future Works.....	105
6.5	Chapter Summary	106
APPENDICES		110
Appendix A: Gantt Chart for FYP 1 and FYP 2 Project Schedule.....		110
Appendix B: Questionnaire for Requirements		111
Appendix C: User Acceptance Testing (UAT) Feedback Form		117

LIST OF FIGURES

Figure 1.1: Rapid Application Development (RAD) Diagram (Source: Plutora, 2019).....	4
Figure 2.1: SDG 12 Logo (Source: United Nations, 2015)	9
Figure 2.2: SDGs Initiative Implementation Model: Penta Helix Approach (Source: Universiti Malaysia Sarawak, 2023).....	10
Figure 2.3: Mudah.my Logo (Source: Mudah.my, n.d.)	12
Figure 2.4: Refash.my Logo (Source: REFASH Malaysia, n.d.).....	14
Figure 3.1: Rapid Application Development (RAD) Diagram (Source: Plutora, 2019).....	24
Figure 3.2: Pie Chart of Respondents' Demographic.....	26
Figure 3.3: Pie Chart of Respondents' Current Stay	26
Figure 3.4: Pie Chart of Respondents' Experience on Preloved Items	27
Figure 3.5: Bar Chart of Respondents' Causes on Selling Preloved Items	28
Figure 3.6: Bar Chart of Respondents' Common Items to Sell or Give Away.....	28
Figure 3.7: Bar Chart of The Importance of User Verification Feature	29
Figure 3.8: Bar Chart of The Importance of Items Categorization Feature	30
Figure 3.9: Bar Chart of The Importance of Search and Filter Feature	30
Figure 3.10: Bar Chart of The Importance of New Listings Notification Feature.....	31
Figure 3.11: Bar Chart of The Preferred Communication Method.....	32
Figure 3.12: Bar Chart of Features to Ensure Trust and Safety on the Platform	32
Figure 3.13: Bar Chart of Challenges Faced When Selling or Giving Away Preloved Items .	33
Figure 3.14: Bar Chart of Challenges Faced When Buying Preloved Items	34
Figure 3.15: List of Additional Features Suggestion	35
Figure 3.16: List of Potential Concerns	36
Figure 3.17: Flowchart of PreLove UNIMAS	43
Figure 3.18: Use Case Diagram of PreLove UNIMAS	44
Figure 3.19: Sequence Diagram for Register/Login and Logout.....	48
Figure 3.20: Sequence Diagram for Managing Items.....	49
Figure 3.21: Sequence Diagram for Admin Monitoring.....	50
Figure 3.22: Class Diagram of PreLove UNIMAS.....	51
Figure 3.23: System Architecture of PreLove UNIMAS	52
Figure 3.24: Login and Registration Page	53
Figure 3.25: Homepage.....	54
Figure 3.26: User Profile Page.....	55
Figure 3.27: Post Item Page.....	56
Figure 3.28: Explore Page.....	57
Figure 3.29: View Item Details	58
Figure 4.1: XAMPP Logo	62
Figure 4.2: Visual Studio Code Logo.....	62
Figure 4.3: phpMyAdmin Logo.....	63
Figure 4.4: Git & GitHub Logo	63
Figure 4.5: Hostinger Logo.....	64
Figure 4.6: File Structure Hierarchy	66

Figure 4.7: Registration Page.....	67
Figure 4.8: Verification Input Page.....	67
Figure 4.9: Login Page.....	68
Figure 4.10: Forgot Password Page	68
Figure 4.11: Profile Page	69
Figure 4.12: Edit Profile Page.....	70
Figure 4.13: Upload Item and Edit Item Pages.....	71
Figure 4.14: Explore Page.....	72
Figure 4.15: Item Details Page.....	73
Figure 4.16: Admin Manage Users Page	73
Figure 4.17: Admin Manage Items Page.....	74
Figure 4.18: Admin Manage Inquiries Page	74
Figure 4.19: Viewing Inquiry.....	75
Figure 4.20: Homepage.....	76
Figure 4.21: About Us Page	77
Figure 5.1: Pie Chart of Successful Registration	92
Figure 5.2: Pie Chart of PIN verification received	93
Figure 5.3: Bar Chart of Registration Rating.....	93
Figure 5.4: Pie Chart of Login without errors.....	94
Figure 5.5: Pie Chart of Forgot Password function	94
Figure 5.6: Bar Chart of Login Rating.....	94
Figure 5.7: Pie Chart of the ease of Edit and Delete Listings.....	95
Figure 5.8: Pie Chart of Update reflection in Profile.....	95
Figure 5.9: Bar Chart of Item Management Rating	96
Figure 5.10: Pie Chart of Search Bar Accuracy	96
Figure 5.11: Pie Chart of Category Filtering	97
Figure 5.12: Bar Chart of Explore Page Rating.....	97
Figure 5.13: Pie Chart of Item Details	98
Figure 5.14: Pie Chart of Redirection of WhatsApp Button.....	98
Figure 5.15: Bar Chart of Overall Platform Experience	99
Figure 5.16: Bar Chart of Interface Visual.....	99
Figure 5.17: Bar Chart on Page Loading Time	99
Figure 5.18: Pie Chart of System Crashes Report	100
Figure 5.19: Pie Chart of PreLove UNIMAS recommendation to peers	100
Figure 5.20: Improvement Recommendations.....	101

LIST OF TABLES

Table 2.1: Comparison Between Existing Systems and Proposed System	18
Table 3.1: Software Requirements of PreLove UNIMAS.	40
Table 3.2: Functional Requirements of PreLove UNIMAS.....	41
Table 3.3: Use Case Description for Register/Login	45
Table 3.4: Use Case Description for Browse and Search Items	45
Table 3.5: Use Case Description for Post Items	45
Table 3.6: Use Case Description for Complete Purchase	46
Table 3.7: Use Case Description for Manage Listings	46
Table 3.8: Use Case Description for File Reports.....	46
Table 3.9: Use Case Description for Admin Monitoring	47
Table 3.10: Use Case Description for System Maintenance.....	47
Table 3.11: Use Case Description for Analytics and Resolve Issues	47
Table 4.1: Frontend Technology Stack	61
Table 4.2: Backend Technology Stack.....	61
Table 4.3: Development Tools of the System	61
Table 5.1: Modules for Functional Testing	81
Table 5.2: Test Case of User Registration.....	82
Table 5.3: Test Case of Login Validation	83
Table 5.4: Test Case of Password Recovery	83
Table 5.5: Test Case of Profile Viewing & Editing.....	84
Table 5.6: Test Cases of Item Upload/Edit/Delete	85
Table 5.7: Test Cases of Category Browsing	86
Table 5.8: Test Cases of Keyword Search Functionality	87
Table 5.9: Test Cases of Viewing Item Details	87
Table 5.10: Test Cases of User & Inquiries Management.....	88
Table 5.11: Test Cases of Item Moderation.....	89
Table 5.12: Test Cases of Homepage Content	89
Table 5.13: Test Cases of About Us Page Content.....	90
Table 6.1: Objectives and Achievement.....	102

LIST OF ABBREVIATIONS

ABBREVIATION	FULL FORM
AI	Artificial Intelligence
AJAX	Asynchronous JavaScript and XML
COD	Cash on Delivery
CRUD	Create, Read, Update, Delete
CSS	Cascading Style Sheets
DB	Database
DIY	Do It Yourself
DOM	Document Object Model
EPA	Environmental Protection Agency
FPX	Financial Process Exchange
FR	Functional Requirement
FYP	Final Year Project
GIF	Graphics Interchange Format
HTML	Hypertext Markup Language
HTTPS	Hypertext Transfer Protocol Secure
ID	Identification / Identifier
IDE	Integrated Development Environment
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
JPG/JPEG	Joint Photographic Experts Group
MB	Megabyte
OTP	One-Time Password
PDF	Portable Document Format
PHP	PHP: Hypertext Preprocessor
PIN	Personal Identification Number
PNG	Portable Network Graphics
RAD	Rapid Application Development
SDG	Sustainable Development Goals
SQL	Structured Query Language
UAT	User Acceptance Testing
UCLA	University of California, Los Angeles
UI	User Interface
UNIMAS	Universiti Malaysia Sarawak
URL	Uniform Resource Locator
UX	User Experience
VSC	Visual Studio Code

CHAPTER 1 : INTRODUCTION

1.1 Introduction

According to Steven Cohen (2022), there has been a growing awareness of the need for sustainable practices in recent years. This is also evident among university communities, where students frequently relocate or transition out of their academic environment. At Universiti Malaysia Sarawak (UNIMAS), many students face the challenge of managing their possessions, especially those who are graduating or returning to West Malaysia. Without a reliable platform to sell or donate their belongings, students often end up discarding useful items like furniture, books, and household goods, which not only creates inconvenience but also leads to unnecessary waste, contradicting sustainability efforts.

Second-hand or preloved buying is the purchase of an item that is not new, already been used or that was previously in the possession of another person (Oxford, 2019). The platform is a web-based marketplace specially tailored for UNIMAS students to buy and sell preloved or second-hand items easily. By providing a community-specific platform, PreLove UNIMAS aims to simplify the buying and selling process for students who are looking to pass on items they no longer need or decluttering. Users will have register on the platform, and their student status will be verified using their UNIMAS matric number. Through this secure verification, students can confidently connect within a trusted community.

PreLove UNIMAS not only addresses the need for convenience but also actively supports Sustainable Development Goal (SDG) 12, which emphasizes responsible consumption and production (United Nations, 2015). By promoting the reuse of items within the campus community, the platform reduces waste, minimizes the need for new resources, and encourages students to adopt sustainable living practices. Sellers can list items for sale, and interested buyers can contact them directly through a WhatsApp link, streamlining transactions without any intermediaries. This ease of use is essential for students who have time constraints and are

looking for a quick, efficient way to connect with potential buyers or sellers within their immediate campus community.

1.2 Problem Statement

UNIMAS students, especially the graduating ones and those returning to West Malaysia, often struggle to sell or donate their still-good used items like furniture, books, and household goods before leaving. This inconvenience frequently results in items being discarded, contributing to waste. Current findings in second-hand market studies shows the need for platforms that provide both convenience and security, as these factors greatly impact users' willingness to engage in sustainable practices like reuse and item circulation within communities (Raszka & Borusiak, 2020). However, there is no dedicated, secure, and student-centred platform to facilitate buying and selling preloved items within the UNIMAS community currently.

Existing platforms such as selling through Telegram, Facebook or WhatsApp group chats may feel impersonal or unsafe, lacking a verification system that assures users they are engaging with fellow UNIMAS students. The absence of a platform that fosters trust and a sense of community further discourages students from seeking sustainable ways to manage their items. Additionally, without a student-centred marketplace, the campus community misses an opportunity to promote sustainable practices, such as item reuse and recycling, which are critical in reducing waste. Therefore, there is a pressing need for a platform that not only facilitates item exchange but also builds a trusted, sustainable marketplace within the UNIMAS campus.

1.3 Project Scope

Target Users: UNIMAS students looking to buy or sell preloved items within the campus community.

Main Features:

- Item listing with categorization for easy browsing.
- Direct communication between buyers and sellers via WhatsApp linked button.
- Secure user registration and profile management.
- Search functionality for quick item discovery.
- Image upload support for product listings.

Sustainability Focus: Encourages responsible consumption and waste reduction by facilitating the reuse of items.

Community Engagement: Builds a trusted environment where students can trade items safely.

Limitations: Restricted to UNIMAS students, ensuring a closed and secure marketplace.

1.4 Aims and Objectives

The main goal of this project is to create a secure, user-friendly platform that promotes sustainability and facilitates a sense of community. Specifically, the objectives are to:

- **Develop a Dedicated Platform:** Create a secure, web-based platform specifically for UNIMAS students to buy and sell preloved items. The platform will include features like matric number verification and direct contact via WhatsApp to simplify transactions.
- **Promote Sustainable Practices (SDG 12):** Encourage the reuse of items to reduce waste on campus, aligning with Sustainable Development Goal (SDG) 12, which focuses on responsible consumption and production (United Nations, 2015).

- **Foster Community Engagement:** Build a trusted marketplace where students can safely interact, enhancing a sense of community and supporting sustainable living by tracking user engagement metrics such as the number of listings and user interactions.

1.5 Brief Methodology

This project will use the Rapid Application Development (RAD) with four main phases: Requirement Planning, User Design, Construction, and Cutover (Plutora, 2019). Given the project's focus on delivering a functional and user-friendly website in a relatively short timeframe, RAD allows for faster iterations and adjustments based on user feedback, ensuring that the final product meets student needs effectively.

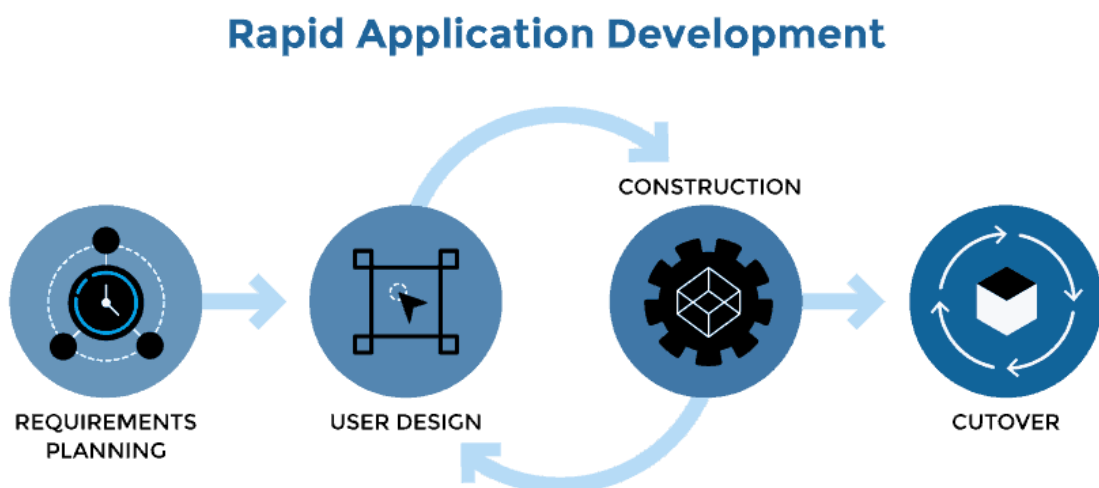


Figure 1.1: Rapid Application Development (RAD) Diagram (Source: Plutora, 2019)

1.5.1 Requirements Planning

- Gather initial requirements through surveys and questionnaires with potential users (i.e., UNIMAS students) to understand their needs for buying and selling preloved items.
- Define core features, including user registration with email and matric number verification, item listings, and WhatsApp contact options.

1.5.2 User Design

- Create interactive prototypes and user interface mock-ups to visualize the platform's flow and functionality.
- Sample feedback collection from the survey to refine the user experience and design elements.

1.5.3 Construction

- Develop the front-end and back-end components in short, iterative cycles, focusing on rapid development of essential features.
- Conduct unit testing during development to ensure the functionality of modules like item posting, contact options, and user verification.

1.5.4 Cutover

- Perform comprehensive system functional testing, followed by user acceptance testing (UAT) to ensure the platform meets user expectations.
- Deploy the final version and provide ongoing support for any bug fixes and enhancements based on user feedback.

1.6 Significance of Project

By encouraging students to recycle and reuse items rather than dispose of them, PreLove UNIMAS contributes to a greener campus environment and fosters a sense of community. The platform also aligns with the global Sustainable Development Goals (SDGs), as it promotes resource reuse, reduces the demand for new products, and minimizes waste. Understanding the values that drive sustainable choices is crucial for platforms like PreLove UNIMAS in promoting long-term, environmentally conscious purchasing behaviours among students. This aligns with global policy efforts to reduce waste and foster sustainable consumption for future generations (Taylor et al., 2023). PreLove UNIMAS will contribute significantly by providing an efficient marketplace for students, enhancing sustainable consumption on campus, and strengthening a sense of connection within the UNIMAS community.

1.7 Project Schedule

The project schedule is structured according to the TMF4913 Final Year Project (FYP) course timeline where each phase of software development is carefully planned to align with the course's deadlines, ensuring timely completion of all chapters, deliverables, and reports. This schedule encompasses the entire duration of both FYP 1 and FYP 2. For a detailed breakdown, refer to the Gantt Chart provided in **Appendix A**.

1.8 Expected Outcome

The PreLove UNIMAS platform is expected to deliver several impactful outcomes that enhance sustainability and usability within the UNIMAS community. Key anticipated results include:

- **Functional Platform:** A fully operational PreLove UNIMAS website where students can register, verify their UNIMAS status, and list or browse preloved items.

- **Verified Student Community:** A secure sign-up and verification system using Student ID ensuring that only UNIMAS students can access and use the platform, fostering trust within the community.
- **Efficient Item Management:** A user-friendly interface where sellers can easily add, update, and remove listings, while buyers can contact them directly via WhatsApp.
- **Reduction in Campus Waste:** By promoting the reuse of items, the platform contributes to decreased waste on campus, supporting sustainable consumption practices.

1.9 Report Outline

Chapter 1: Introduction

Introduces the PreLove UNIMAS platform, addressing the problem of waste caused by students discarding items. It outlines the project's goals, scope, methodology, significance, and expected outcomes, with a focus on promoting sustainable practices.

Chapter 2: Literature Review

Reviews existing studies on second-hand marketplaces, sustainability, and student behaviours. It identifies gaps in current platforms and establishes the need for a tailored solution like PreLove UNIMAS.

Chapter 3: Methodology

Details the adoption of the Rapid Application Development (RAD) model, explaining the phases and tools used to develop a responsive platform efficiently.

Chapter 4: Implementation

Covers the implementation of the platform, focusing on its architecture, user interface, and key functionalities like matric number verification and WhatsApp integration.

Chapter 5: Testing and Evaluation

Describes the testing processes used to assess the platform's performance and usability, including user feedback and recommendations for improvement.

Chapter 6: Conclusion and Future Works

Summarizes the project's achievements and its alignment with SDG 12. It highlights the platform's impact on sustainability at UNIMAS and suggests future enhancements.

1.10 Chapter Summary

This chapter provides an overview of the PreLove UNIMAS project, highlighting the growing awareness of sustainable practices and the need for a dedicated platform for students to buy and sell preloved items. It discusses the problem of waste generated by students leaving the university without options to recycle or donate their possessions and introduces PreLove UNIMAS as a solution. The chapter includes a detailed problem statement, project scope, aims, and objectives, along with a brief methodology using the Rapid Application Development (RAD) model. The significance of the project is discussed in relation to sustainability goals, and the project schedule outlines key milestones for completion.

CHAPTER 2 : LITERATURE REVIEW

2.1 Background Study

Sustainability in Higher Education

Universities play a pivotal role in driving sustainability by integrating environmental consciousness into their operations, policies, and community engagement. As part of the global commitment to the United Nations Sustainable Development Goals (SDGs), 12: Responsible Consumption and Production, it highlights the need for efficient resource utilization, waste reduction, and fostering a circular economy (United Nations, 2015). Higher education institutions like Universiti Malaysia Sarawak (UNIMAS) are most likely could be the key contributors to these efforts, shaping future leaders and innovations for a sustainable world.



Figure 2.1: SDG 12 Logo (Source: United Nations, 2015)

Waste Management Challenges in Sarawak

Sarawak, like many regions, faces increasing challenges in managing waste. Rapid urbanization, population growth, and changing consumption patterns have led to a surge in waste production. According to reports, waste generation in Sarawak has increased significantly, with a notable reliance on landfills for waste disposal (Rakan Sarawak, 2024). This reliance creates environmental and logistical concerns, as landfills often contribute to pollution and are not a long-term sustainable solution, as highlighted by Tang (2020). The absence of accessible platforms for exchanging or reselling items, especially within localized communities like universities, exacerbates this issue.

UNIMAS and Sustainability

UNIMAS has taken proactive measures to address these challenges through its Sustainability Masterplan 2021–2025 and Low-Carbon Roadmap 2030 (Kabit et al., 2022). UNIMAS Sustainability (2024) highlights efforts under SDG 12 to promote responsible consumption and production within the university context, aiming to achieve:

- A 40% reduction in waste by 2030 (baseline: 2022).
- The establishment of an Integrated Waste Management Centre to handle waste collection, sorting, recycling, and composting.
- Policies promoting ethical sourcing, minimal use of plastics, and sustainable procurement.



Figure 2.2: SDGs Initiative Implementation Model: Penta Helix Approach (Source: Universiti Malaysia Sarawak, 2023)

Despite these efforts, a gap remains in tackling reusable waste, such as clothing, books, and electronics, which often end up discarded prematurely. Addressing this gap is critical for UNIMAS to align with the principles of SDG 12 and foster a circular economy.

The Role of Second-Hand or Prelove Platforms

Second-hand or prelove platforms are increasingly recognized as an effective tool to minimize waste by enabling the resale, donation, or exchange of second-hand items (Turunen & Gossen,

2024). These platforms extend the lifecycle of products, reduce demand for new goods, and contribute to waste diversion from landfills. They also encourage community participation, empowering individuals to make sustainable consumption choices as mentioned by Steven Cohen (2022).

Prelove UNIMAS: A Campus-Specific Solution

The Prelove UNIMAS initiative provides a targeted solution to waste challenges within the university by creating an accessible platform for the campus community to exchange preloved items. This project directly supports Sarawak's need for improved waste management while aligning with UNIMAS' sustainability goals. By reducing waste generated on campus and promoting a culture of reuse, Prelove UNIMAS contributes to:

- Enhancing the university's waste diversion efforts.
- Raising awareness about responsible consumption and its environmental benefits.
- Supporting Sarawak's broader sustainability objectives by showcasing a replicable model for localized waste reduction initiatives.

It is proven that Prelove UNIMAS bridges the gap between waste generation challenges in Sarawak and UNIMAS' commitment to sustainable development, fostering a responsible and eco-conscious campus community.

2.2 Background of Existing System

In developing Prelove UNIMAS, it is important to consider the functionalities and features of existing platforms that facilitate second-hand item exchange. The following systems each categorized in General Pre-Loved Item Exchange Platforms, Sustainability-Focused Systems for Second-Hand Clothing, and University-Specific Exchange Platforms provide a range of insights that can guide the design and implementation of a university-based second-hand exchange platform for UNIMAS students.

2.2.1 General Pre-Loved Item Exchange Platform: Mudah.my



Figure 2.3: Mudah.my Logo (Source: Mudah.my, n.d.)

Mudah.my is one of Malaysia’s largest online platforms for buying and selling second-hand goods, (Mudah.my, n.d.). Mudah.my is an online marketplace for buying and selling goods, products, and services like real estate, automotive, careers, and business services, connecting Malaysians and global users (Kauser et al., (2018). It serves a broad demographic, from individuals to businesses, and features items ranging from electronics to vehicles and household goods. The platform is widely used by Malaysians and is known for its user-friendly interface and extensive item categories.

Launched in 2006, Mudah.my derives its name from the Malay word “*Mudah*,” meaning “easy,” which reflects the platform’s goal of simplifying buying and selling processes (Mudah.my, n.d.). As part of Carousell, one of the world’s largest and fastest-growing marketplace platforms in Southeast Asia, Mudah.my benefits from a robust technological infrastructure and a wide-reaching audience, (Mudah.my, n.d.).

Key Features:

- **Item Listings:** Users can list second-hand items for sale, either via images or detailed descriptions, categorized by product types.
- **Buyer-Seller Interaction:** The platform allows users to communicate directly through in-built messaging, fostering negotiations between buyers and sellers.

- **Local Transactions:** Users can arrange for in-person exchanges or shipping, making it a convenient solution for local second-hand item trade.
- **Sustainability Integration:** Though primarily a marketplace, Mudah.my indirectly promotes sustainability by encouraging the reuse and recycling of products, helping to reduce waste and unnecessary consumption.

Advantages and Disadvantages:

Mudah.my is a widely used online marketplace in Malaysia, offering a platform for users to buy and sell a variety of products and services. The platform is user-friendly, featuring an intuitive interface and search filters that simplify navigation and enhance the overall experience. Its extensive user base increases the chances of successful transactions for buyers and sellers (Ask.com, n.d.). Additionally, Mudah.my allows users to post advertisements for free, making it an attractive option for individuals and small businesses. With a wide range of categories such as vehicles, properties, and electronics, the platform caters to diverse needs.

However, Mudah.my has its challenges. The lack of physical storefronts makes users vulnerable to fraud, and despite measures like SafeDeal, buyer protection remains limited compared to other e-commerce platforms (Mudah.my, 2018). Users have also reported difficulties managing advertisements, including restrictions after account deletions. Furthermore, the quality of customer service has been highlighted as an area for improvement. While Mudah.my is convenient and effective, users are advised to exercise caution and verify the legitimacy of listings to mitigate potential risks.

2.2.2 Sustainability-Focused System for Second-Hand Clothing: Refash.my



Figure 2.4: Refash.my Logo (Source: REFASH Malaysia, n.d.)

Refash.my is a platform dedicated to promoting sustainable fashion, enabling users to buy and sell pre-loved clothing while addressing environmental concerns associated with fast fashion. Founded in 2016 by Aloysius Sng, the platform was inspired by his wife's unworn wardrobe, which highlighted the potential in giving clothing a second life (REFASH Malaysia, n.d.). Since its inception, Refash has diverted over 8.2 million pieces of clothing from landfills, demonstrating its commitment to reducing textile waste. In just seven years, Refash has found new homes for over 3 million fast-fashion pieces, revolutionizing the way people engage with second-hand fashion (REFASH Malaysia, n.d.).

Key Features:

- **Pre-Loved Clothing:** Refash.my provides a curated marketplace for second-hand clothing, offering categories like dresses, tops, pants, and accessories.
- **Eco-Friendly Messaging:** The platform emphasizes recycling clothing to reduce textile waste, promoting eco-conscious consumption.
- **Community Engagement:** It builds a community of environmentally aware users who actively participate in sustainable fashion practices.

- **Sustainability Integration:** Refash.my's operations directly contribute to sustainability by extending the life of garments and reducing the environmental impact of fashion production.

Advantages and Disadvantages:

Refash Malaysia promotes sustainable fashion by encouraging the reuse of clothing, reducing textile waste, and supporting eco-friendly shopping practices. It provides affordable pricing for shoppers, offering high-quality pre-loved clothing at lower costs compared to retail prices. The platform simplifies the selling process for users, handling tasks like pricing and listing, making it a hassle-free experience (Versay, 2022). Additionally, Refash offers the flexibility of both online platforms and physical stores, catering to diverse customer preferences (Lemon8 App, n.d.).

Sellers on Refash may experience dissatisfaction due to low payouts, as some have reported receiving minimal compensation for their items (Lemon8 App, n.d.). Items may also be rejected if they don't meet Refash's criteria, which can be frustrating for those looking to declutter their wardrobe. Furthermore, sellers have limited control over pricing, leading to possible disappointment if prices set by Refash are lower than expected. While Refash aims to maintain high-quality standards, inconsistencies in the condition of received items have occasionally been noted by buyers.

2.2.3 University-Specific Exchange Platform: Berkeley Reuse

Berkeley Reuse is an exchange platform at the University of California (UCLA), Berkeley, focused on sustainability and waste reduction. ReUSE's website (n.d.) mentioned that the initiative began as the Re-Used Stuff Emporium, where students organized occasional material exchanges in the early 2000s. It later grew into a structured system with a permanent ReUSE Store and several ReUSE Stations strategically placed across the campus (ReUSE, n.d.). These

stations and events enable the donation, exchange, and reuse of materials like office supplies, books, clothing, and electronics, aligning with the university's zero-waste and circular economy goals. Today, Berkeley Reuse continues to serve the campus community by providing accessible and affordable second-hand goods while promoting environmental sustainability.

Key Features:

- **Campus-Based Trading:** Students can list, donate, or trade items, including textbooks, electronics, dorm furniture, and clothing, fostering a sustainable community within the university.
- **ReUSE Store:** A central store in the Martin Luther King Jr. Student Union offers reusable items such as clothing, small household items, and electronics at affordable prices, typically under \$3 (ReUSE, n.d.).
- **ReUSE Stations:** Shelving units located in campus buildings allow students and staff to donate and pick up items conveniently, ensuring accessibility and frequent use.
- **Community Engagement Events:** Activities such as the Reader Giveaway at the semester's start and workshops on creative reuse encourage larger-scale participation and awareness of sustainability.
- **Sustainability Impact:** Berkeley Reuse directly supports the university's zero-waste initiatives by reducing landfill waste, minimizing new purchases, and promoting a culture of reuse and recycling.

Advantages and Disadvantages:

Berkeley ReUSE and UCLA's sustainability initiatives contribute significantly to environmental responsibility by promoting waste reduction and resource conservation. These programs effectively divert reusable items from landfills, fostering a circular economy while conserving valuable resources that would otherwise be required to produce new items (ReUSE, n.d.). Additionally, they encourage community engagement, creating a culture of sustainability within university campuses and inspiring active participation from students, faculty, and staff. Moreover, the availability of free or low-cost reusable items offers financial benefits, making these initiatives even more appealing to participants (ReUSE, n.d.).

However, these programs face several challenges that must be addressed for long-term success. Implementing large-scale reuse initiatives requires substantial expertise and storage capacity, which can be difficult to manage. Short-term agreements can further hinder long-term planning and stability, limiting the growth potential of these programs (EPA, 2021). Inconsistent execution has occasionally led to unmet sustainability goals, highlighting the need for stronger implementation strategies. Furthermore, communication gaps may reduce the overall impact, as lack of awareness or involvement can diminish community participation (EPA, 2021). Despite these challenges, with proper attention and improvements, such programs hold immense potential for driving sustainable practices.

2.3 Comparison Between Existing Systems and Proposed System

Table 2.1: Comparison Between Existing Systems and Proposed System

Feature	Mudah.my	Refash.my	Berkeley Reuse	PreLove UNIMAS
Purpose	General marketplace for buying and selling second-hand goods across various categories.	Dedicated to promoting sustainable fashion through second-hand clothing exchange.	Peer-to-peer exchange platform supporting zero-waste initiatives for the university community.	Facilitate the reuse of goods within the UNIMAS campus.
Target Audience	General public in Malaysia, including individuals and businesses.	Environmentally conscious consumers seeking affordable and sustainable fashion.	Students, staff, and faculty at the University of California, Berkeley.	Exclusively for UNIMAS students and staffs.
Platform	Website and mobile app with responsive design.	Website and mobile app with emphasis on mobile experience.	Website with basic web functionality; physical stores for item exchanges.	A responsive website targeting ease of use.
Authentication	- Email and social media login options. - Password recovery tools. 2FA optional.	- Email-based registration - Secure authentication via OAuth. - Password strength check.	- Email-based user access. - Restricted to campus email domains for security.	Use UNIMAS ID -based authentication to restrict access to campus users.
Search Functionality	Advanced search with location, price range, categories, and keywords.	- Custom filters for clothing sizes, brands, and colours. - Predictive search suggestions	- Basic keyword search. - Filter by category and availability	Search functionality with basic filters for categories

Feature	Mudah.my	Refash.my	Berkeley Reuse	PreLove UNIMAS
Recommendation Engine	AI-driven product recommendations based on user behaviour.	Personalized product recommendations based on purchase history.	No recommendation system implemented.	No recommendation system implemented
User Profiles	Profile pages with user reviews, ratings, and transaction history.	Seller dashboards to manage items and monitor performance.	Basic user accounts tied to campus email.	Enable users to create simple profiles showing listings and sold counts.
Listing Management	- Multimedia support for listings (images, videos, etc.). - Auto-expiration of inactive ads.	- Bulk upload for sellers. - Automated categorization and tagging.	Basic text-based listings with optional images.	Allow users to add, edit, and delete their own listings.
Payment Integration	No integrated payment system (rely on user-arranged transactions).	- Secure payment gateways (Stripe, PayPal). - Invoicing and refund support.	Mostly donation-based or barter exchange; no payment processing.	Not required. Use direct communication for item exchange.
Chat System	In-app messaging for buyers and sellers.	- Direct messaging with chat history. - Automated quick replies for sellers.	No in-app chat; relies on email or physical meetups.	No chat system
Notifications	Push notifications for new messages, saved searches, and promotions.	Alerts for price drops, new arrivals, and sales campaigns.	Basic email notifications for important updates.	No notifications system.

Feature	Mudah.my	Refash.my	Berkeley Reuse	PreLove UNIMAS
Moderation Tools	Automated content review for inappropriate listings.	Admin dashboard for approving seller registrations and monitoring inventory.	Volunteer-managed moderation system for listings.	Simple admin tools to reply to inquiries and remove inappropriate contents.
Integration Options	- Google Maps for location-based searches. - Payment API for future integration.	- API integrations for sustainability metrics and payment. - Social media integration.	Minimal API use; integrates with campus services like Cal Zero Waste.	Limited to essential integrations like UNIMAS email services or campus-specific systems.
Security Measures	- HTTPS encryption. - Secure user authentication and session timeout.	- PCI-DSS compliance for payment data. - Secure inventory and user data storage.	- HTTPS encryption. - Basic security for campus use.	Basic measures like database protection, and controlled user access
User Reviews & Ratings	Buyer/seller rating system to build trust.	Customer feedback system for individual items and sellers.	No review or rating feature implemented.	No review or rating feature implemented.
Scalability	Built to handle large-scale user traffic (Carousell integration).	Scalable for regional and global markets.	Limited scalability; focused on local campus needs.	Design for campus use without the need for large-scale expansion.
Unique Features	- AI-based fraud detection. - Location-aware ad placements.	- Interactive inventory updates. - Detailed eco-footprint reports for users.	- Integration with physical donation. - Community focus	A sustainability information to show campus contributions to waste reduction.

2.4 Proposed System Justifications

PreLove UNIMAS is a platform dedicated to fostering sustainability within the university by facilitating the exchange of second-hand goods among students and staff. Its purpose is inspired by Berkeley Reuse, which effectively promotes community-driven reuse within a campus. To ensure exclusivity, the platform uses UNIMAS ID-based authentication, creating a safe and trusted environment for transactions. Unlike larger platforms like Mudah.my, PreLove UNIMAS focuses solely on campus users, which simplifies operations and ensures a localized impact. With a responsive website design, the platform is accessible across devices, prioritizing ease of use for its audience.

Key features are designed to maintain simplicity while addressing core user needs. A keyword-based search with category filters, modeled after Mudah.my, makes it easy for users to locate items without overwhelming them with options. Users can manage their listings independently, with features like adding, editing, or deleting items, ensuring flexibility and convenience. Simple user profiles include basic details and item listings, helping users foster trust within the community. To avoid unnecessary complexity, advanced features such as recommendation engines or integrated chat systems are excluded, relying instead on direct communication via other communication platforms.

PreLove UNIMAS incorporates thoughtful administrative tools and security measures to maintain a user-friendly platform where admins can approve listings and remove inappropriate contents, keeping the marketplace safe and relevant. Basic security measures like HTTPS encryption and controlled access safeguard user data while keeping costs manageable. Notifications will be replaced with the in-platform updates board, where users can see updates, such as system-wide announcements. This feature simplifies communication by removing the need for email or push notifications while keeping users informed. Similarly, the platform

avoids payment integration, allowing users to arrange transactions directly, aligning with its simple and community-focused approach.

The platform is intentionally designed for scalability within the campus, ensuring it remains manageable and cost-effective. By combining the strengths of Mudah.my, Refash.my, and Berkeley Reuse, PreLove UNIMAS provides a tailored, efficient, and impactful solution for promoting reuse and sustainability within the university community.

2.5 Chapter Summary

This chapter explored the significance of sustainability in higher education, with a particular emphasis on UNIMAS and its potential to encourage it within the campus community. Established platforms like Mudah.my, Refash.my, and Berkeley Reuse were examined to identify design elements and operational frameworks that may help in PreLove UNIMAS development. Through comparative analysis, this chapter identified essential features that contribute to the effectiveness of similar existing systems, focusing on creating a user-friendly and secure website. These findings offered essential assistance for designing PreLove UNIMAS and its functionality, ensuring that it fits the UNIMAS community's specific requirements. The platform is envisioned as an accessible and engaging solution that encourages sustainable practices and aligns with the principles of the Sustainable Development Goals (SDGs).

CHAPTER 3 : METHODOLOGY

3.1 Introduction

This chapter outlines the development methodology used in developing the PreLove UNIMAS platform. Software development methodology is a set of principles, concepts, approaches, methods, and tools that guide the development process (Yakovyna et al., 2020). It offers a defined framework for maintaining consistency and quality throughout the project's lifecycle. For PreLove UNIMAS, analysing project requirements is crucial to determine the best methodology. The Rapid Application Development (RAD) approach was chosen for developing PreLove UNIMAS because it is suitable for projects with well-defined and simply understandable requirements.

Rapid Application Development (RAD) is a methodology that uses organized methodologies, prototyping, and collaborative application development to speed up the development process (Qodim et al., 2019). In RAD, requirements are established at the start of each iteration, reducing the complexity of developing several systems while allowing for flexibility and adaptation (Adanna & Nonyelum, 2020). It emphasizes iterative development, allowing for delivery of working solutions while incorporating user feedback at each stage. RAD methodology aligns with the project's objective to deliver a functional, user-friendly platform tailored to UNIMAS students within a short timeframe.

3.2 Rapid Application Development (RAD)

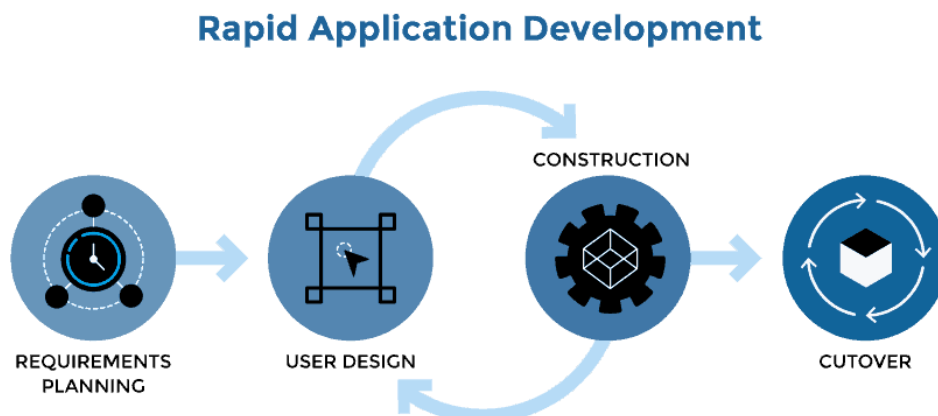


Figure 3.1: Rapid Application Development (RAD) Diagram (Source: Plutora, 2019)

For the development of PreLove UNIMAS, the Rapid Application Development (RAD) methodology was chosen due to its iterative and user-focused approach. As illustrated in Figure 3.1, this methodology allows the project to progress efficiently through four structured phases which are Requirements Planning, User Design, Construction, and Cutover (Plutora, 2019). By emphasizing collaboration, prototyping, and iterative improvement, RAD ensures that the platform evolves in alignment with user needs and expectations, making it an ideal fit for a project catering to UNIMAS students.

The RAD approach focuses on delivering functional systems rapidly by breaking the development process into manageable phases. This methodology supports flexibility for future changes and allows multiple iterations without restarting the entire process. It enables the admin to incorporate user feedback consistently, ensuring that the final product addresses user requirements effectively. The use of RAD accelerates development while maintaining high quality, making it particularly suitable for time-sensitive projects like PreLove UNIMAS. Figure 3.1 illustrates the RAD framework, which serves as the foundation for the design and implementation of this platform.

3.2.1 Phase 1: Requirements Planning

The first phase of this project development focuses on gathering information to define and finalize the requirements, objectives, expectations, and timelines for PreLove UNIMAS. Requirements serve as the foundation for development, acting as key milestones to ensure the creation of successful and functional software components (Crowder & Hoff, 2022). This step is crucial to ensure that the platform is developed with a clear purpose and aligns with its intended goals and meet the needs of their users. The process begins with a discussion with Final Year Project (FYP) supervisor to review the proposed system and comprehensively understand its scope and functionality.

To establish relevance and provide context, research is conducted on existing systems to analyse their strengths and weaknesses, which will aid in developing a more effective and user-friendly university-based platform. Feedback from potential users which is UNIMAS students is gathered to understand their needs and expectations. By the end of this phase, the project's requirements are clearly defined and approved, laying the foundation for the platform's core features and functionalities.

3.2.1.1 Questionnaire and Data Requirements

To understand the needs and preferences of UNIMAS students for buying and selling preloved items, a survey was conducted using a structured questionnaire. A total of 80 respondents, all of whom are UNIMAS students, participated in the survey. The questionnaire, designed with both close-ended and open-ended questions, aimed to gather insights into their expectations, challenges, and desired features for a platform like PreLove UNIMAS. The survey was conducted via Google Forms and distributed through UNIMAS student WhatsApp groups, allowing easy access and participation. This online distribution method ensured a wider reach among students while making it convenient for them to respond at their own pace. The collected

data serves as a foundation for tailoring the platform to meet the specific requirements of its target users effectively. Refer to **Appendix B** for the pre-filled questionnaire.

Close-Ended Questions

Where are you from?

80 responses

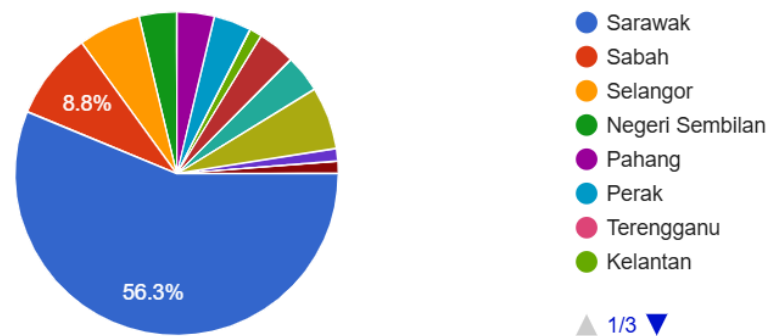


Figure 3.2: Pie Chart of Respondents' Demographic

The survey revealed that 56.3% of respondents are from Sarawak, the majority demographic of UNIMAS students as shown in Figure 3.2. However, 43.7% of respondents are from outside Sarawak, highlighting the diverse backgrounds of the student population. This diversity underscores the importance of designing PreLove UNIMAS to be inclusive, addressing the varied needs of users from different regions.

Where do you currently stay during your studies at UNIMAS?

80 responses

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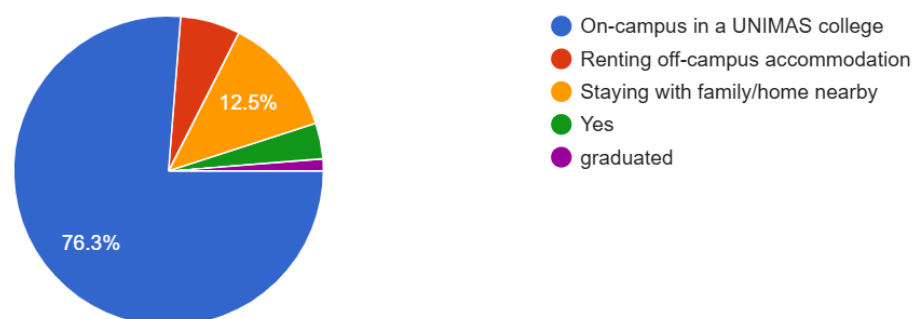


Figure 3.3: Pie Chart of Respondents' Current Stay

Based on Figure 3.3, This finding suggests that most potential users may face space limitations for storing items and would benefit from convenient options for buying and selling preloved items. To address this, PreLove UNIMAS should prioritize features that enhance convenience for on-campus users, such as quick item exchanges, accessible meeting points, and a focus on decluttering. These features will align with the practical needs of most of its target audience.

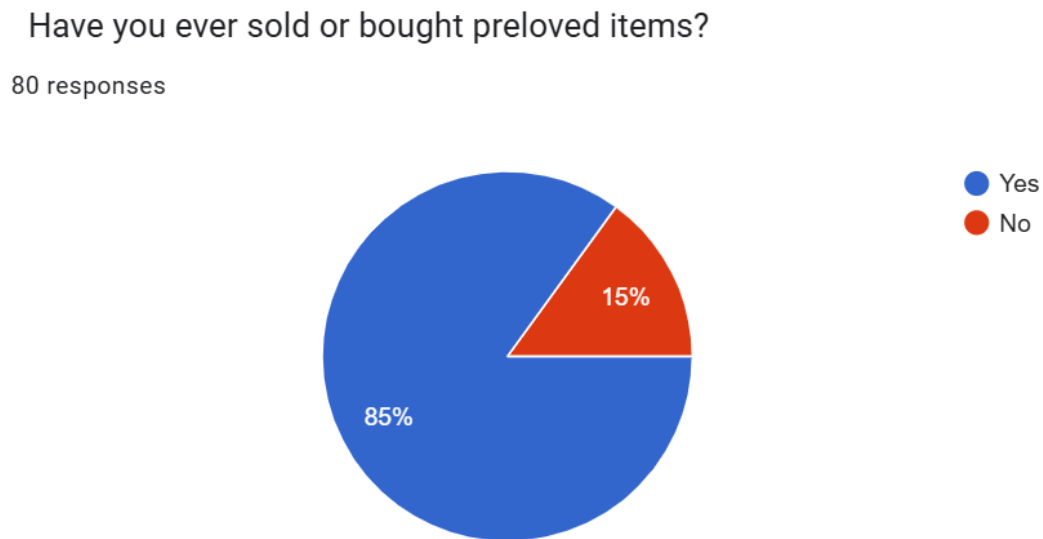


Figure 3.4: Pie Chart of Respondents' Experience on Preloved Items

As illustrated in Figure 3.4, 85% of respondents have previously sold or bought preloved items, indicating a strong existing interest in preloved or second-hand item transactions among UNIMAS students. This high level of engagement highlights the demand for a dedicated platform to facilitate these exchanges more efficiently. The findings validate the relevance of PreLove UNIMAS, as it aligns with the current behaviours and preferences of its target audience, providing a centralized, user-friendly solution for buying and selling preloved items.

What motivates you to sell or give away your preloved items? (Select all that apply)

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80 responses

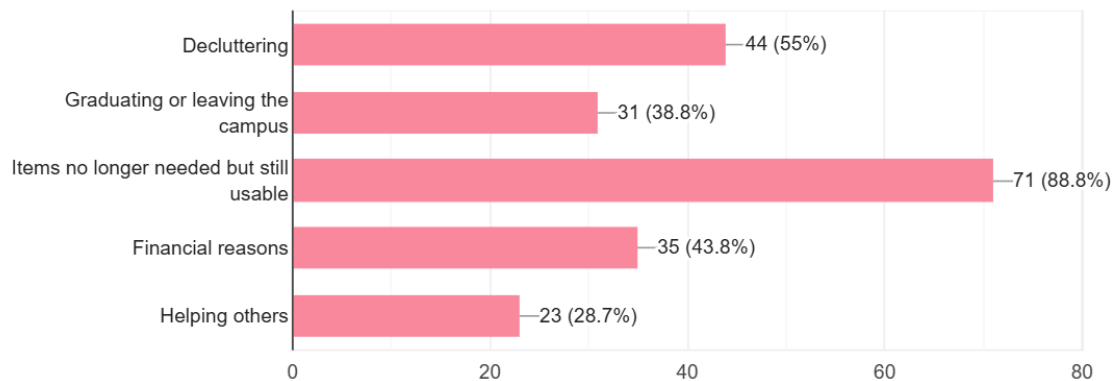


Figure 3.5: Bar Chart of Respondents' Causes on Selling Preloved Items

Shown in Figure 3.5, with 88.8% citing the desire to dispose of usable items no longer needed, 55% motivated by decluttering, and 38.4% prompted by graduating or leaving campus. These insights underscore the importance of PreLove UNIMAS as a practical solution for students managing their belongings, especially during transitional periods. By emphasizing features that cater to decluttering and easing the process of parting with items, the platform can become an essential tool for students preparing to leave campus or seeking a more organized living space.

What types of items are you most likely to sell or give away? (Select all that apply)

[Copy chart](#)

80 responses

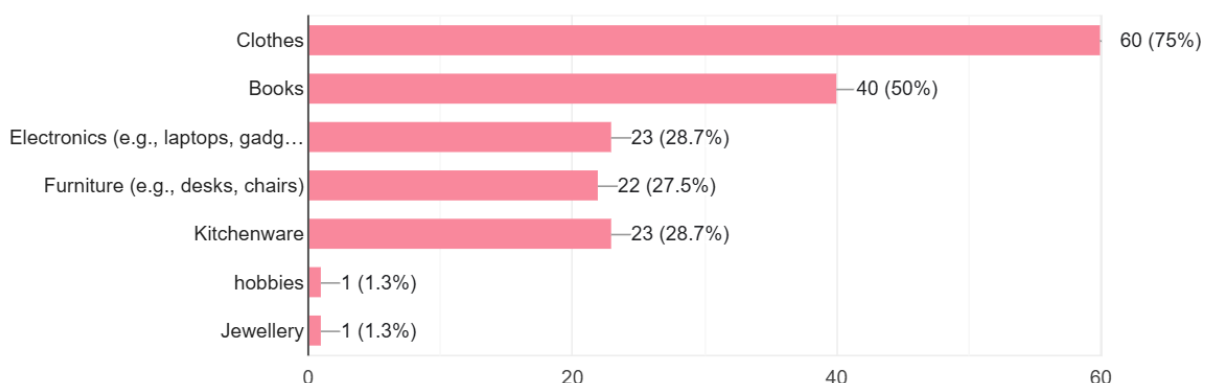


Figure 3.6: Bar Chart of Respondents' Common Items to Sell or Give Away

The survey results in Figure 3.6 indicate that the most traded items among UNIMAS students are clothes. These insights emphasize the importance of PreLove UNIMAS featuring dedicated categories for these popular item types, allowing users to efficiently browse, list, and search. By aligning the platform with these preferences, the app can effectively address student needs, making it easier to find or rehome essential preloved items.

User verification via student email/matriculation number

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80 responses

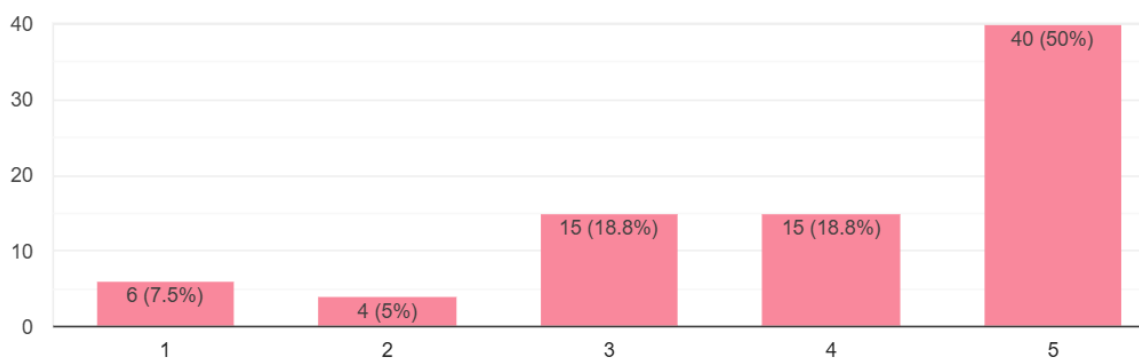


Figure 3.7: Bar Chart of The Importance of User Verification Feature

From Figure 3.7, 50% of respondents strongly agree on the importance of user verification through student emails or matriculation numbers. This highlights the role of verification in ensuring the app remains exclusive to UNIMAS students. By implementing this feature, PreLove UNIMAS can create a secure and trusted platform, where users feel confident engaging in transactions within a closed and verified community.

Item categories for easier browsing

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80 responses

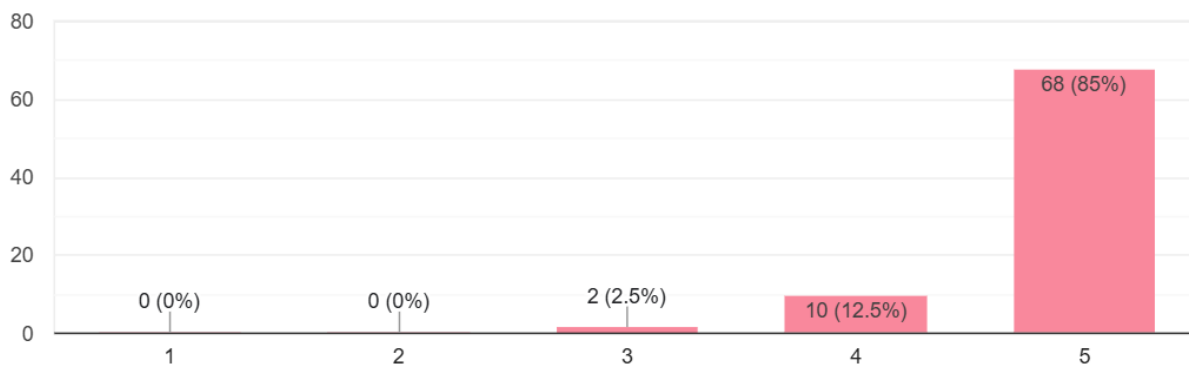


Figure 3.8: Bar Chart of The Importance of Items Categorization Feature

As shown in Figure 3.8, majority strongly agree on the importance of item categories for easier browsing which shows the need for clear and intuitive categorization within the app, allowing users to navigate effortlessly. By organizing items into well-defined categories, PreLove UNIMAS can enhance user experience, ensuring students can quickly and efficiently locate the items they need.

Search and filter functionality

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80 responses

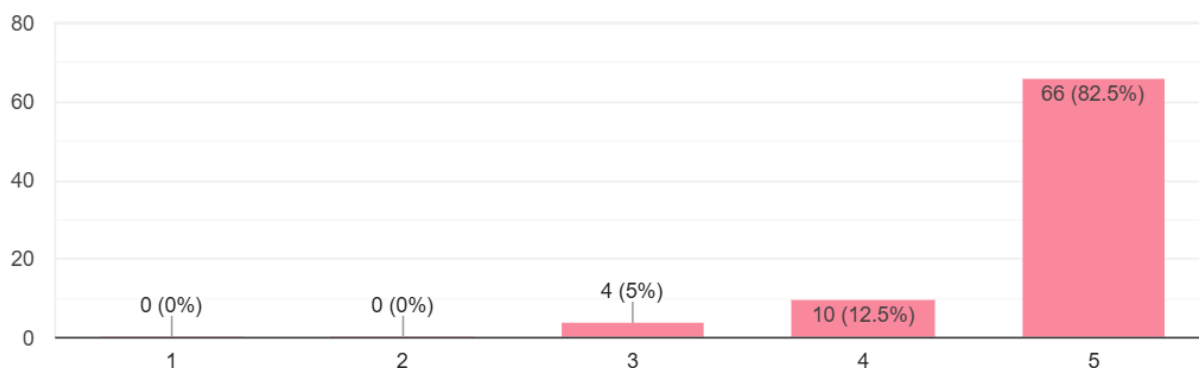


Figure 3.9: Bar Chart of The Importance of Search and Filter Feature

The importance of search and filter features for usability have been proven in Figure 3.9 which highlights the necessity of incorporating robust search and filtering tools in the platform. These features will enable students to efficiently locate specific items, customize their browsing preferences, and enjoy a seamless shopping experience on the platform.

Notifications for new listings

 [Copy chart](#)

79 responses

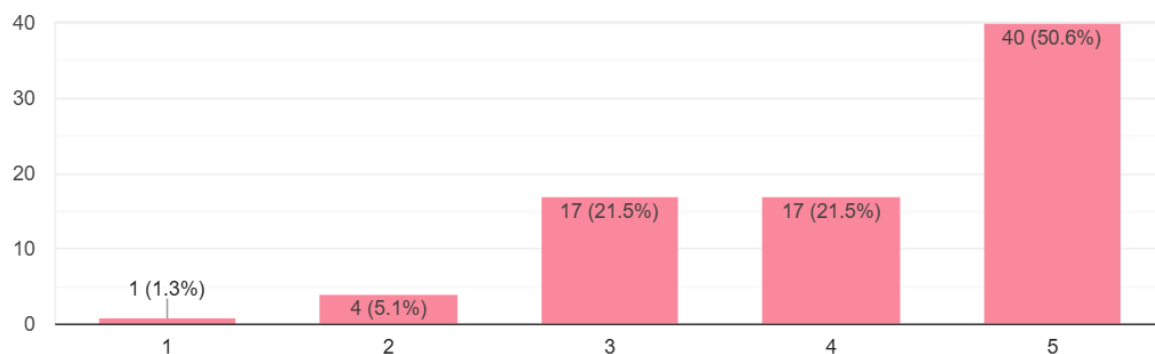


Figure 3.10: Bar Chart of The Importance of New Listings Notification Feature

From Figure 3.10, it is noted that while notifications are valued, they may not be essential for all users since only 50.6% of respondents agree on its importance. To address this, PreLove UNIMAS should offer customizable notification settings, allowing students to choose whether they want updates about new items. This approach balances the need for engagement with respect for individual preferences, ensuring the feature remains useful without overwhelming users.

How would you prefer to communicate with buyers/sellers?

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80 responses

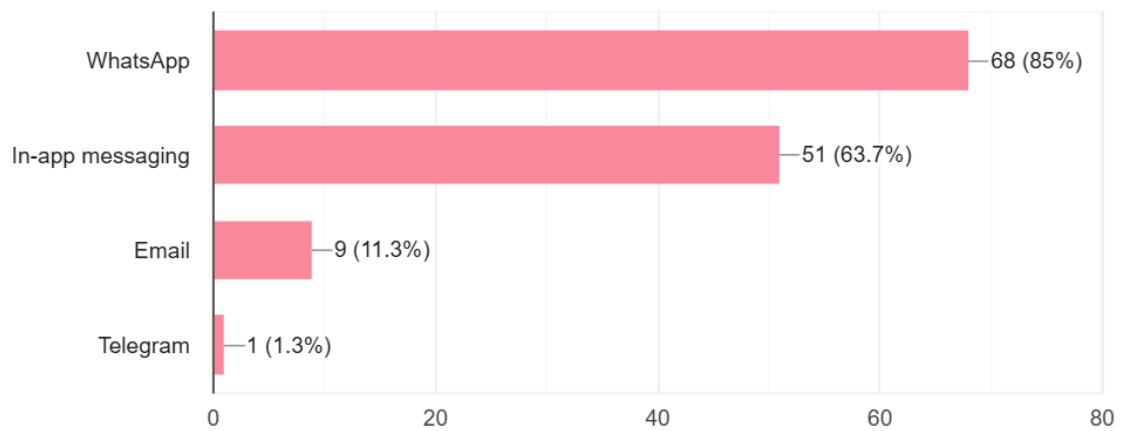


Figure 3.11: Bar Chart of The Preferred Communication Method

The survey shows in Figure 3.11 that 85% of respondents prefer WhatsApp as their primary communication method for interacting with buyers and sellers. This highlights the importance of integrating WhatsApp into the platform, ensuring seamless and efficient communication.

What should the platform include to ensure trust and safety?

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80 responses

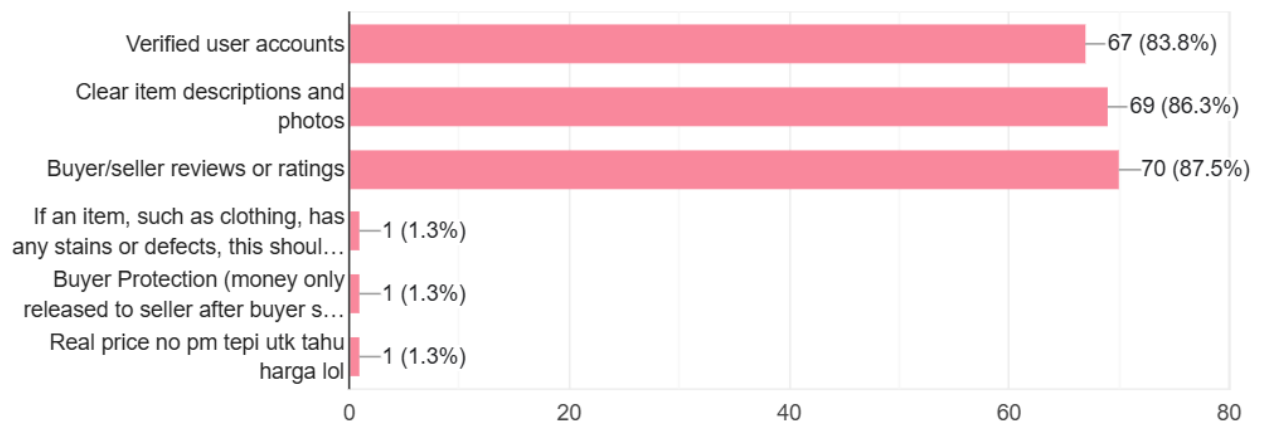


Figure 3.12: Bar Chart of Features to Ensure Trust and Safety on the Platform

To ensure trust and safety, respondents emphasized in Figure 3.12 the importance of verified user accounts, and highlighted the need for clear item descriptions, photos, and buyer/seller reviews or ratings. Incorporating an item condition rating out of 10 for items like clothing further enhances transparency. These features will foster a secure and reliable environment, reduce misunderstandings, and boost user confidence in transactions.

What challenges do you face when selling or giving away preloved items? (Select all that apply)

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80 responses

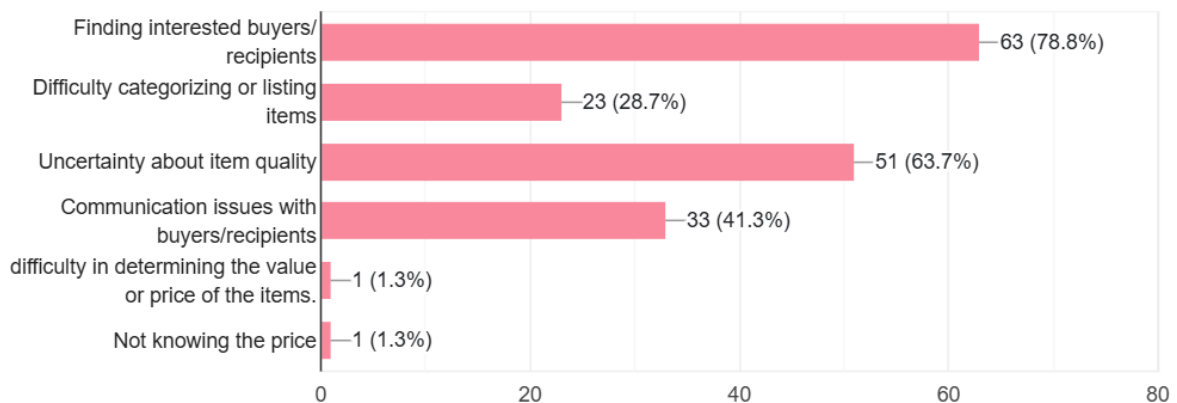


Figure 3.13: Bar Chart of Challenges Faced When Selling or Giving Away Preloved Items

Based on Figure 3.13, the primary challenge faced by respondents when selling or giving away preloved items is finding interested buyers or recipients, with 78.8% identifying this as a major issue. Additionally, 63.7% expressed concerns about uncertainty regarding item quality. These challenges highlight the importance of integrating features such as targeted notifications to connect sellers with potential buyers effectively and providing tools to ensure transparency in item descriptions and conditions.

What challenges do you face when buying preloved items? (Select all that apply)

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80 responses

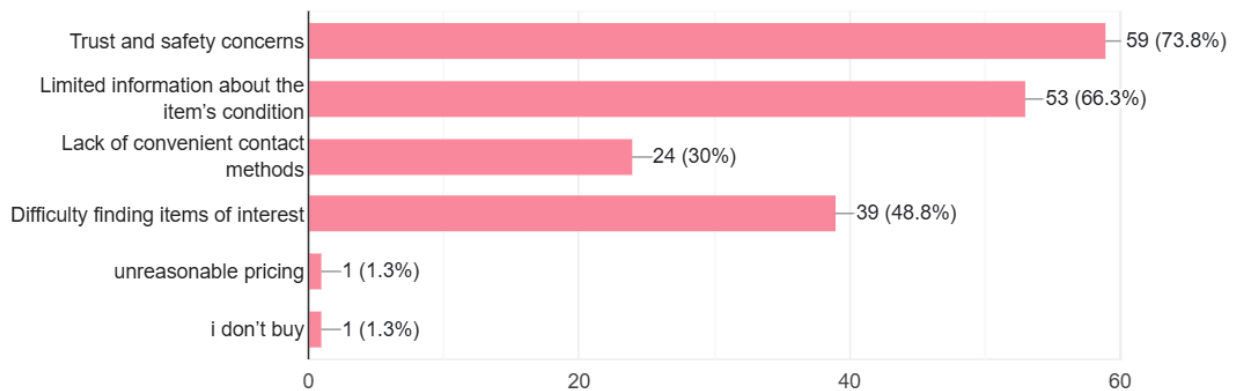


Figure 3.14: Bar Chart of Challenges Faced When Buying Preloved Items

When buying preloved items, respondents identified in Figure 3.14 that trust and safety concerns (73.8%) and limited information about item condition (66.3%) as the top challenges. To address these issues, the app should include features such as user reviews, verified listings, and detailed item descriptions, creating a safer and more transparent platform for transactions among students.

The questionnaire results provided valuable insights into the preferences, challenges, and expectations of UNIMAS students regarding buying and selling preloved items. These findings highlight the importance of features like verified user accounts, detailed item descriptions, search and filter options, and seamless communication tools. By addressing these needs, PreLove UNIMAS can create a user-centric platform that fosters trust, convenience, and accessibility, effectively catering to the unique requirements of its student community.

Open-Ended Questions

To gain insights into user expectations and concerns regarding the PreLove UNIMAS platform, two open-ended questions were posed. The responses received were diverse, reflecting the varying needs and preferences of users. To better understand these responses, they were

analysed and categorized into themes, which provide a clearer picture of areas for improvement and potential challenges to address. The categorization highlights the key suggestions and concerns, serving as a foundation for future enhancements to the platform.

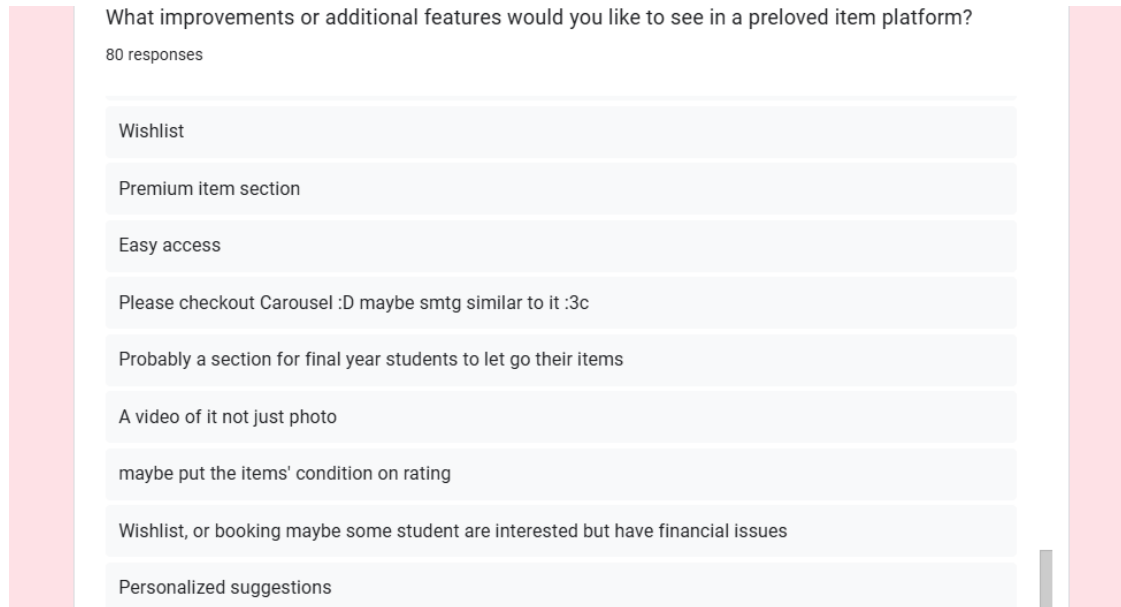


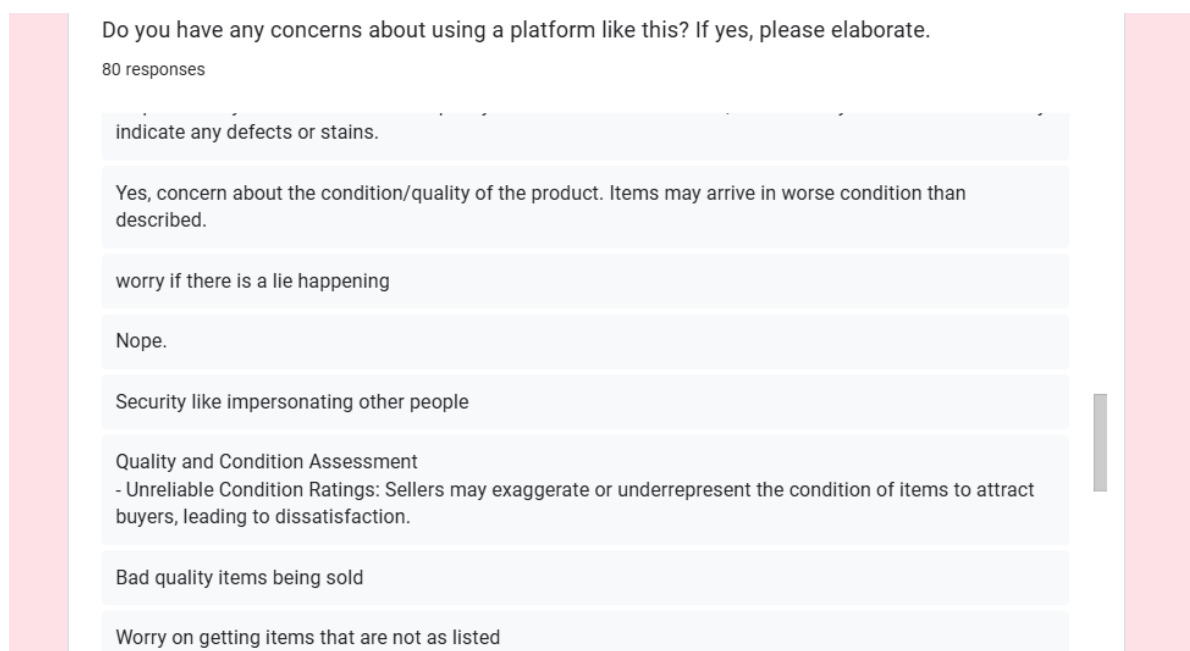
Figure 3.15: List of Additional Features Suggestion

The feedback gained as in Figure 3.15 can be categorized into the following areas:

1. **User Interface:** Suggestions include a clean and interactive UI, clear price tags, category-based browsing, and smooth navigation to improve usability and accessibility.
2. **Listing Features:** Recommendations for uploading multiple images, video integration, item condition ratings, and quality verification to enhance item transparency and buyer confidence.
3. **Search and Recommendations:** Requests for advanced filters (e.g., price range, categories), smart AI-driven recommendations, and wish list functionalities with alerts to provide a personalized and efficient shopping experience.
4. **Payment and Security:** Secure payment methods, fraud prevention, and safety measures for scam protection to establish trust and reliability on the platform.

5. **Buyer-Seller Interaction:** Features for effective communication, free delivery options, and safe meet-up locations within campus to foster convenience and secure transactions.
6. **Exclusive Features:** Premium sections for exclusive items, rewards or points systems, and subscription-based benefits to incentivize engagement and platform loyalty.
7. **Additional Ideas:** DIY/style inspirations, personalized suggestions, and updates when items are sold or discounted to cater to creative and practical needs.

These categories highlight the multifaceted expectations users have for PreLove UNIMAS. Implementing these improvements could significantly enhance user satisfaction, streamline processes, and create a secure, and engaging experience for both buyers and sellers.



Do you have any concerns about using a platform like this? If yes, please elaborate.

80 responses

- Indicate any defects or stains.
- Yes, concern about the condition/quality of the product. Items may arrive in worse condition than described.
- worry if there is a lie happening
- Nope.
- Security like impersonating other people
- Quality and Condition Assessment
- Unreliable Condition Ratings: Sellers may exaggerate or underrepresent the condition of items to attract buyers, leading to dissatisfaction.
- Bad quality items being sold
- Worry on getting items that are not as listed

Figure 3.16: List of Potential Concerns

From Figure 3.16, which is the second open-ended question, there are several feedback that can be categorized:

1. **Safety and Trust:** Concerns about scams, security risks, impersonation, and verifying seller authenticity were prominent. Many users stressed the need for secure payment options and delivery processes, such as cash-on-delivery (COD).

2. **Product Quality and Transparency:** Worries about unreliable condition ratings, misleading descriptions, and receiving items in worse conditions than expected. Highlighted the importance of providing clear, accurate item details, including defects.
3. **Buyer-Seller Interaction:** Issues related to poor communication between buyers and sellers, such as unclear item availability and delays in decision-making, were raised.
4. **Platform Limitations:** Lack of a dedicated platform for selling preloved items in UNIMAS was noted. Suggestions included blacklist features for scammers and content moderation to prevent prohibited items.
5. **Ease of Use:** Concerns over time-wasting processes and unclear transaction policies were mentioned.
6. **Exclusive Features:** A verified seller system, buyer reviews, and email verification for users to ensure platform credibility were appreciated.

By addressing these concerns, PreLove UNIMAS can build user trust and engagement by implementing features like secure payment gateways, detailed product verification, a user-friendly interface, and efficient communication tools would significantly improve the platform's functionality and user experience.

Findings From the Survey

Based on the survey findings, the features to be included and to not be prioritized in PreLove UNIMAS are carefully selected and defined to address the core needs and preferences of UNIMAS students while ensuring a user-friendly and functional platform.

Features to Include

1. **User Verification System:** A user verification system using student ID, is crucial to create a safe and exclusive environment for UNIMAS students. This feature builds trust and ensures only verified members can access the platform.

2. **Categorization and Filters:** Clear item categorization and robust filtering options are essential to enhance navigation and browsing. This aligns with the respondents' strong preference for intuitive features that make finding specific items quicker and easier.
3. **Detailed Item Listings:** Providing comprehensive item details, including photos, condition ratings, and descriptions, will address concerns about transparency and quality assurance. This feature ensures users can make informed decisions and reduces uncertainties during transactions.
4. **Integrated Communication via WhatsApp:** Since WhatsApp is the preferred communication method for 85% of respondents, integrating it will enable seamless buyer-seller interactions, making the platform convenient and familiar for users.
5. **Customizable Notifications:** Customizable notifications will allow users to stay informed about new listings without feeling overwhelmed. This balances engagement with user preferences for control over updates.
6. **Trust and Safety Features:** Buyer and seller reviews, along with fraud prevention measures, will foster a trustworthy environment, addressing concerns about scams and unreliable interactions.

Features Not Prioritized

1. **Premium Sections and Subscriptions:** While premium features were suggested, the platform will initially focus on inclusivity and core functionality. Avoiding paid features ensures that all students can access the platform without additional costs, encouraging wider participation.
2. **Video Integration for Listings:** Although video integration could enhance transparency, it is not prioritized due to potential complications in the listing process and the additional resources required for hosting videos. Photos and detailed descriptions will suffice in the early stages.

3. **AI-Driven Recommendations:** Advanced features like AI-driven recommendations, while valuable, are excluded for the initial launch due to their complexity and the resource intensity of implementation. These can be considered for future updates after the platform stabilizes.
4. **Free Delivery Options:** Logistical challenges make free delivery options impractical at this stage. Instead, the platform will focus on facilitating meetups within the campus to ensure convenience for both buyers and sellers.

The survey findings provided clear insights into the expectations and challenges faced by UNIMAS students when buying and selling preloved items. By prioritizing core features, PreLove UNIMAS will effectively address the needs and expectations from potential users. Non-essential and resource-intensive features are deferred to maintain simplicity and ensure a successful launch.

3.2.1.2 Software Requirements

Lim, Henriksson, and Zdravkovic (2021) stated that software requirements define the purpose, guiding the development and design process to achieve the intended goals of the system. The software requirements for PreLove UNIMAS define the technical specifications and system attributes necessary to support its functionality and performance. These include software components, database design, user interfaces, and security measures. By adhering to these specifications, the platform will achieve reliability, scalability, and efficiency, ensuring a user-friendly experience tailored to the needs of the UNIMAS student community. The following Table 3.1 outlines the software requirements of PreLove UNIMAS.

Table 3.1: Software Requirements of PreLove UNIMAS.

Category	Requirement	Description	Justification
Front-end Framework	HTML, CSS, JavaScript	Enables a responsive and user-friendly interface for users to interact with the platform.	These are standard technologies for creating interactive and visually appealing interfaces.
Back-end Framework	PHP	Provides server-side logic and Whatsapp linked button for seamless communication between client and server.	PHP is widely used for building dynamic web applications and is easy to integrate with MySQL.
Database	MySQL	Stores user data, item listings, preferences, and system configurations.	MySQL is reliable, scalable, and supports structured data for item and user management.
Authentication	UNIMAS email and UNIMAS ID verification	Handles user login and registration using university credentials.	Ensures trust and exclusivity by verifying users as UNIMAS students.
Hosting Platform	Hostinger	Deploys the application and ensures high availability and scalability.	This platform provides reliable hosting with flexible scaling and cost-effective options.
Programming Language	JavaScript	Utilized for both front-end and back-end development.	JavaScript enables full-stack development, improving consistency and reducing context-switching.
Version Control	Git with GitHub	Tracks changes, allows for backups, and showcases development progress.	Ensures team collaboration, version management, and recovery options.
Communication Link	WhatsApp linked button	Enables direct communication between buyers and sellers for negotiations.	WhatsApp is widely used by students and facilitates seamless communication.
Testing	User-Acceptance Testing	Used for testing functionality, efficiency, and overall system performance.	Ensures the platform works as intended and is free from critical bugs before deployment.
Responsive Design	Bootstrap	Ensures the platform works seamlessly across mobile, tablet, and desktop devices.	Bootstrap simplifies responsive design and ensures compatibility with various devices.
Language Support	English and Bahasa Malaysia	Ensures inclusivity for both local and international students.	Supports a diverse student population by offering a multilingual platform.

3.2.1.3 Functional Requirements

As shown in Table 3.2, the functional requirements for PreLove UNIMAS outline the essential features the platform must deliver to meet user expectations and ensure smooth operations. These requirements focus on key functionalities such as user management, item management and administrative control. By defining these processes, the system will cater to the unique needs of UNIMAS students, providing a secure environment for buying, selling, and exchanging preloved items.

Table 3.2: Functional Requirements of PreLove UNIMAS

Category	Feature	Details
User Management	User Registration	• Users provide email, password, and full name. • Student ID verification ensures UNIMAS student status. • Email confirmation link for account activation.
	User Login	• Users log in with email and password. • Captcha for login security.
	Profile Management	• Users can edit their profile. • Users can deactivate or reactivate their accounts.
	Password Recovery	• Users can request a password reset via their registered email. • Temporary reset links expire after 30 minutes.
Item Management	Post Item	• Users can upload item details: item name, description, (e.g., electronics, books, clothing), condition, and price. • Multiple images (up to 5) can be uploaded for an item. • Submission triggers admin approval.
	Edit Item	• Users can update the title, description, category, price, or images. • Edited items re-enter the admin approval process.
	Delete Item	Users can delete items from their listings.
	Admin Item Control	• Admins review and approve or reject new and edited listings. • Admins can remove items violating policies and provide reasons for the user.
Browsing and Searching Items	Search Feature	Users can search by keywords of item title
	Browsing Categories	Items are displayed in categories (e.g., electronics, books).
Communication Features	Contact Seller	Users can send messages to sellers via WhatsApp by clicking the link under interested items.

Admin Functions	User Management	Admins can suspend or ban users for violations.
	Monitoring Listings	• Approve/reject listings with comments. • Monitor reported items for rule violations.
Security and Privacy	User Data Protection	All sensitive data (passwords, contact information) is encrypted.
	One-Time Password (OTP)	OTP enhances login security using SMS or email verification.
	User Reports	• Users can report inappropriate listings. • Reports trigger admin review.

3.2.2 Phase 2: User Design

The user design phase implemented Rapid Application Development (RAD) through three structured iterations to achieve client satisfaction. The first iteration involved basic wireframes and initial system diagrams, validated by potential users to refine the platform's core navigation structure. Feedback highlighted the need for a more streamlined user experience, leading to enhancements such as a simplified listing process.

The second iteration featured high-fidelity Figma prototypes, showcasing detailed UI components such as login, item listing, user profile, and transaction pages. These prototypes were shared with potential users, who mostly recommended improvements in category filtering in explore page to enhance accessibility of PreLove UNIMAS.

The final iteration focused on validating the refined design with potential users, including selected UNIMAS students. Their feedback emphasized the importance of a secure user verification process, optimized item categorization, and seamless WhatsApp integration for communication. Based on these recommendations, adjustments were made to improve the platform's responsiveness and ensure smooth user interactions. By incorporating multiple iterations, the user design phase ensured that the final system layout was functional and user-friendly. These refinements ensured a well-structured design, reducing redesign risks and providing a clear roadmap for development.

3.2.2.1 Flowchart

Figure 3.17 presents the system flowchart, which maps out the logical flow of processes within the system. It provides a step-by-step representation of the sequence of actions, decision points, and outcomes for both user and admin. This diagram is essential for understanding how inputs are processed and converted into outputs, highlighting the logical operations of the system and all the functional actions that are implemented.

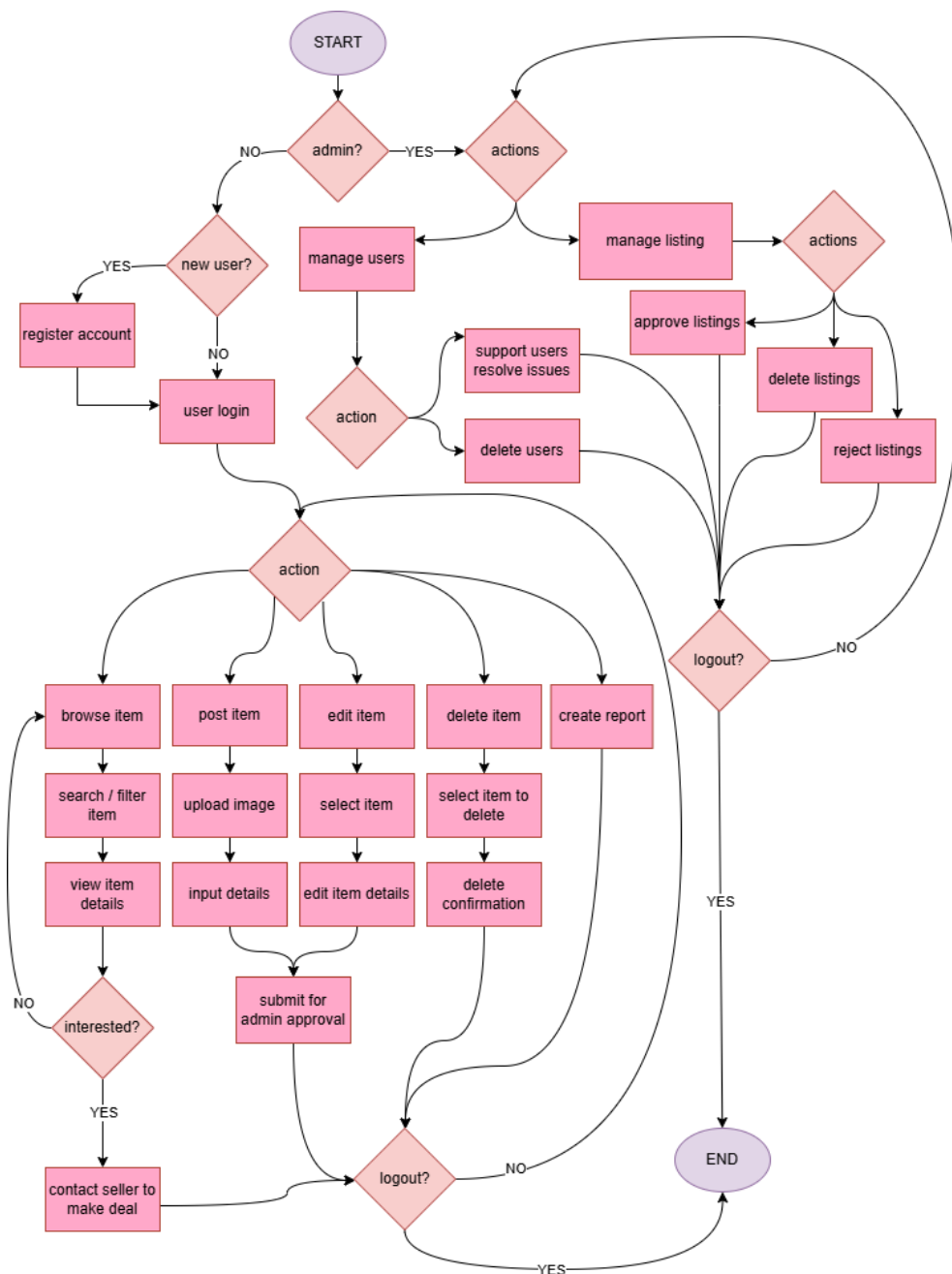


Figure 3.17: Flowchart of PreLove UNIMAS

3.2.2.2 Use Cases

Use Case Diagram

The use case diagram identifies the system's core functionalities and the roles of users interacting with it. The diagram shows the relationships between the primary actors (users and admin) and the use cases (functions), offering a clear visual representation of the scope and purpose of the system. This ensures that the requirements align with user needs. Figure 3.18 shows the use case diagram of PreLove UNIMAS.

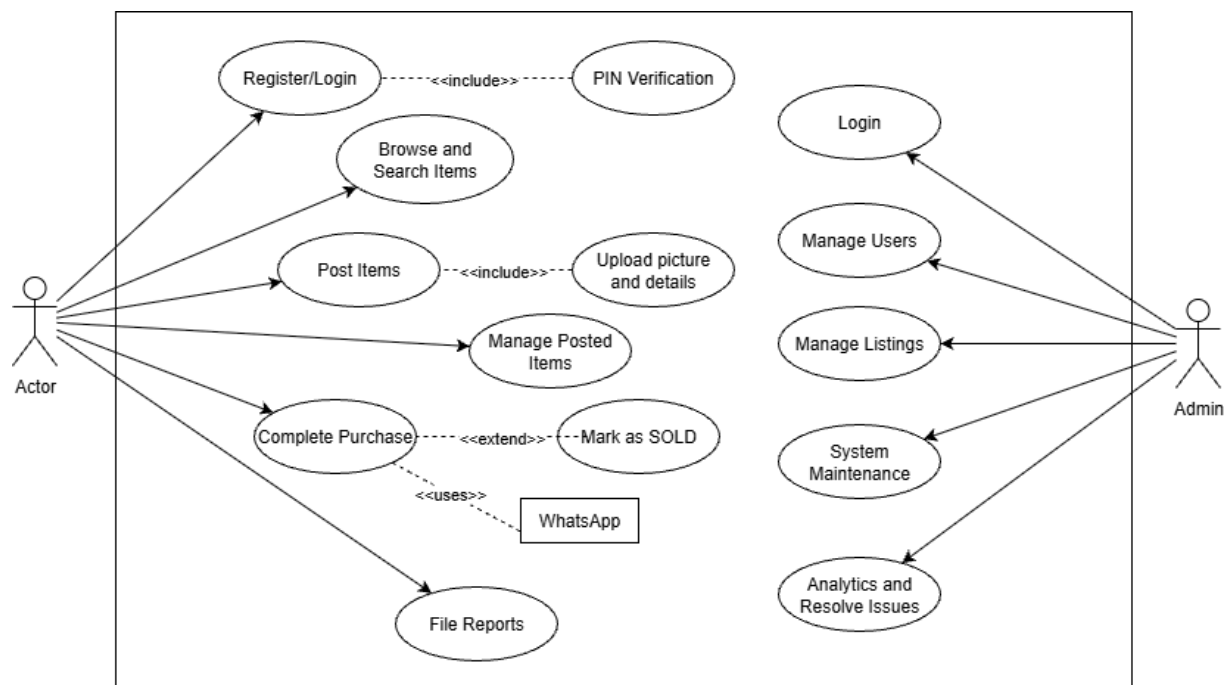


Figure 3.18: Use Case Diagram of PreLove UNIMAS

Use Case Description

Table 3.3: Use Case Description for Register/Login

Use Case Name	Register / Login
Actors	User & Admin
Description	Users get to register to the platform by providing necessary details and creating a login credential and went through PIN verification. Existing users and admin log in with their credentials to access the system.
Preconditions	Users and admin must have internet access and valid credentials for logging in or valid details for registration.
Postconditions	Users and admin gain access to the platform.
Main Flow	1. User or admin opens the platform. 2. Existing users or admin enter credentials and log in. 3. New users fill in registration details, submit and get verified. 4. System verifies credentials and grants access.
Alternative Flow	1. If credentials are invalid, the system shows an error message. 2. Users can choose to reset their password or retry.

Table 3.4: Use Case Description for Browse and Search Items

Use Case Name	Browse and Search Items
Actors	User
Description	Users explore available items or use the search bar to find specific listings. They can also apply filters and sort items.
Preconditions	User must be logged in.
Postconditions	User views the search results or item details.
Main Flow	1. Users enter keywords or use filters. 2. The system displays search results. 3. Users select an item for more details.
Alternative Flow	No results found; the system displays a "no items found" message.

Table 3.5: Use Case Description for Post Items

Use Case Name	Post Items
Actors	User
Description	Users upload item details and images to list them for sale.
Preconditions	Users must be logged in and have valid item details to post.
Postconditions	The item is listed on the platform for others to view and purchase.
Main Flow	1. User navigates to the "Post Items" page. 2. User fills in item details and uploads images. 3. The system saves the listing and displays it publicly.
Alternative Flow	If the user fails to upload details, the listing process is not completed.

Table 3.6: Use Case Description for Complete Purchase

Use Case Name	Complete Purchase
Actors	User
Description	The user communicates with another user via WhatsApp to finalize the transaction since the platform lacks built-in chat and payment integration. Once the transaction is completed, the seller updates the item's status as sold.
Preconditions	The user must have selected an item and received the seller's WhatsApp contact information.
Postconditions	The item is marked as sold after the transaction is completed.
Main Flow	1. The user selects an item and contacts the seller via WhatsApp. 2. Buyer and seller agree on transaction details. 3. The seller updates the item's status to "Sold."
Alternative Flow	If the transaction is not finalized, the listing remains unchanged.
Exceptions	Failure to update the item's status may cause confusion.

Table 3.7: Use Case Description for Manage Listings

Use Case Name	Manage Listings
Actors	User
Description	Users edit, update, or delete their posted items to ensure accurate listings.
Preconditions	The user must have at least one posted item.
Postconditions	The item listing is updated, or it is removed if deleted.
Main Flow	1. Users navigate to Profile Page. 2. The user selects "Manage Listings." 3. Edits or deletions are applied to specific listings. 4. The system saves changes or removes the item.
Alternative Flow	If no changes are made, the listing remains unchanged.

Table 3.8: Use Case Description for File Reports

Use Case Name	File Reports
Actors	User
Description	Users report inappropriate or fraudulent listings to administrators for review.
Preconditions	The user must identify a listing to report.
Postconditions	The report is submitted to administrators for further action.
Main Flow	1. The user selects an item or user to report. 2. The user clicks "Report Item" or "Report User" and provides reasons for the report. 3. The system submits the report to administrators.
Alternative Flow	If the user cancels, no report is submitted.

Table 3.9: Use Case Description for Admin Monitoring

Use Case Name	Admin Monitoring
Actors	Admin
Description	Admin oversees user activity, manage reports, and ensure system maintenance.
Preconditions	The administrator must have access to the admin panel.
Postconditions	System integrity is maintained, and reports are resolved.
Main Flow	1. The administrator logs in to the admin panel. 2. Reports are reviewed and resolved. 3. User activity is monitored for any issues.
Alternative Flow	No action is needed if no issues are found.

Table 3.10: Use Case Description for System Maintenance

Use Case Name	System Maintenance
Actors	Admin
Description	Admin ensures the platform operates smoothly by performing regular updates, backups, and troubleshooting technical issues.
Preconditions	The administrator must have access to the admin panel and system tools.
Postconditions	The system remains functional, secure, and up to date.
Main Flow	1. The admin logs in to the admin panel. 2. Scheduled maintenance tasks, such as backups or updates, are executed. 3. Any technical issues are identified and resolved.
Alternative Flow	If no immediate issues are detected, routine checks are completed.

Table 3.11: Use Case Description for Analytics and Resolve Issues

Use Case Name	Analytics and Resolve Issues
Actors	Admin
Description	Admin analyzes system data and reports to identify and resolve recurring issues or optimize the platform.
Preconditions	The administrator must have access to analytics tools and submitted reports.
Postconditions	System performance has improved, and unresolved issues are addressed.
Main Flow	1. The administrator reviews analytics data and user reports. 2. Patterns or trends are identified. 3. Necessary updates or fixes are implemented to resolve issues.
Alternative Flow	If no critical issues are found, the administrator monitors analytics for potential improvements.

3.2.2.3 Sequences Diagram

Figure 3.19 illustrates the sequence diagram for the register, login and logout process in the PreLove UNIMAS platform. It highlights the interaction flow between the user and the system, showcasing how authentication is performed when a user logs in and how the session is terminated during logout.

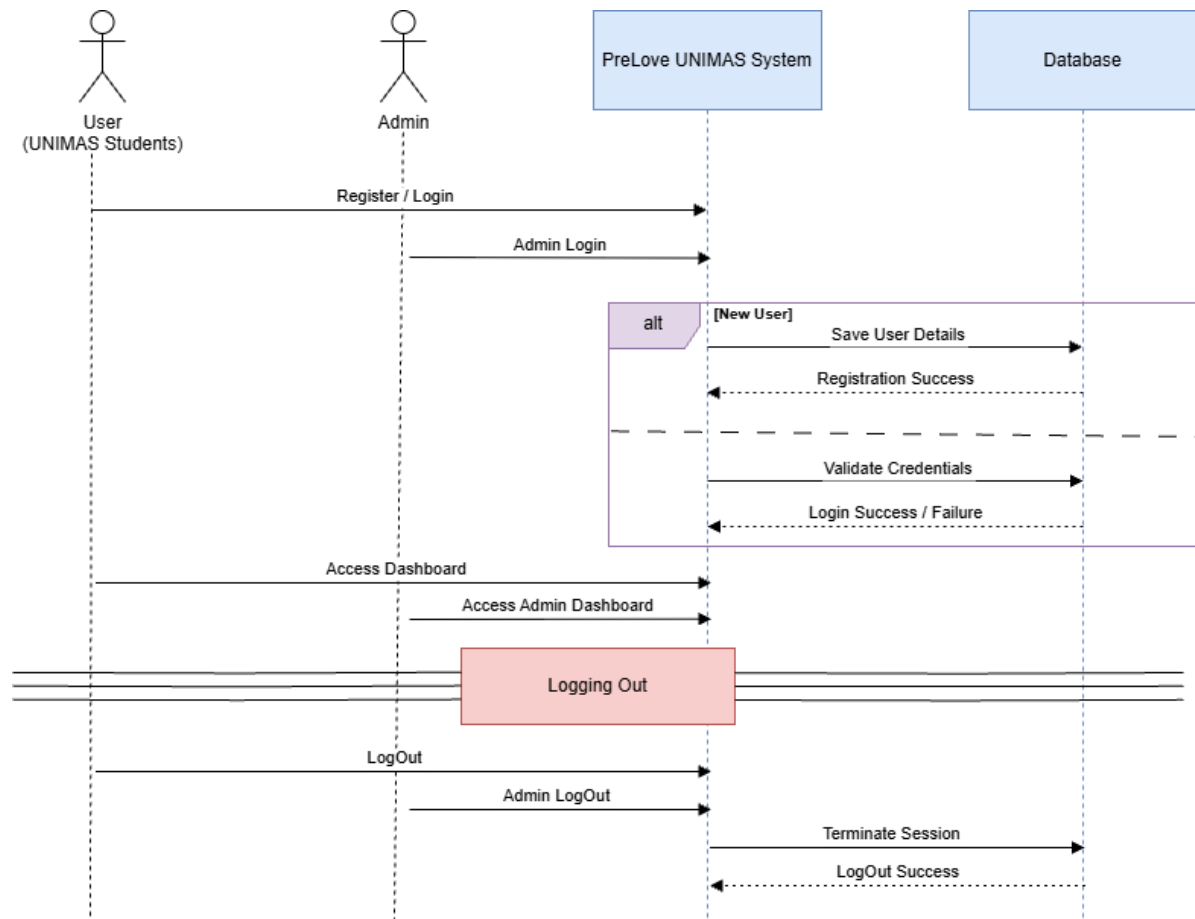


Figure 3.19: Sequence Diagram for Register/Login and Logout

Figure 3.20 displays the item management sequence diagram, outlining the complete workflow between users and administrators. Users as sellers can create, update and delete listings, while users as buyers browse available items. Simultaneously, administrators monitor listings, approve submissions and handle reports. The diagram demonstrates the system's secure validation processes and real-time database interactions that maintain platform integrity throughout these operations.

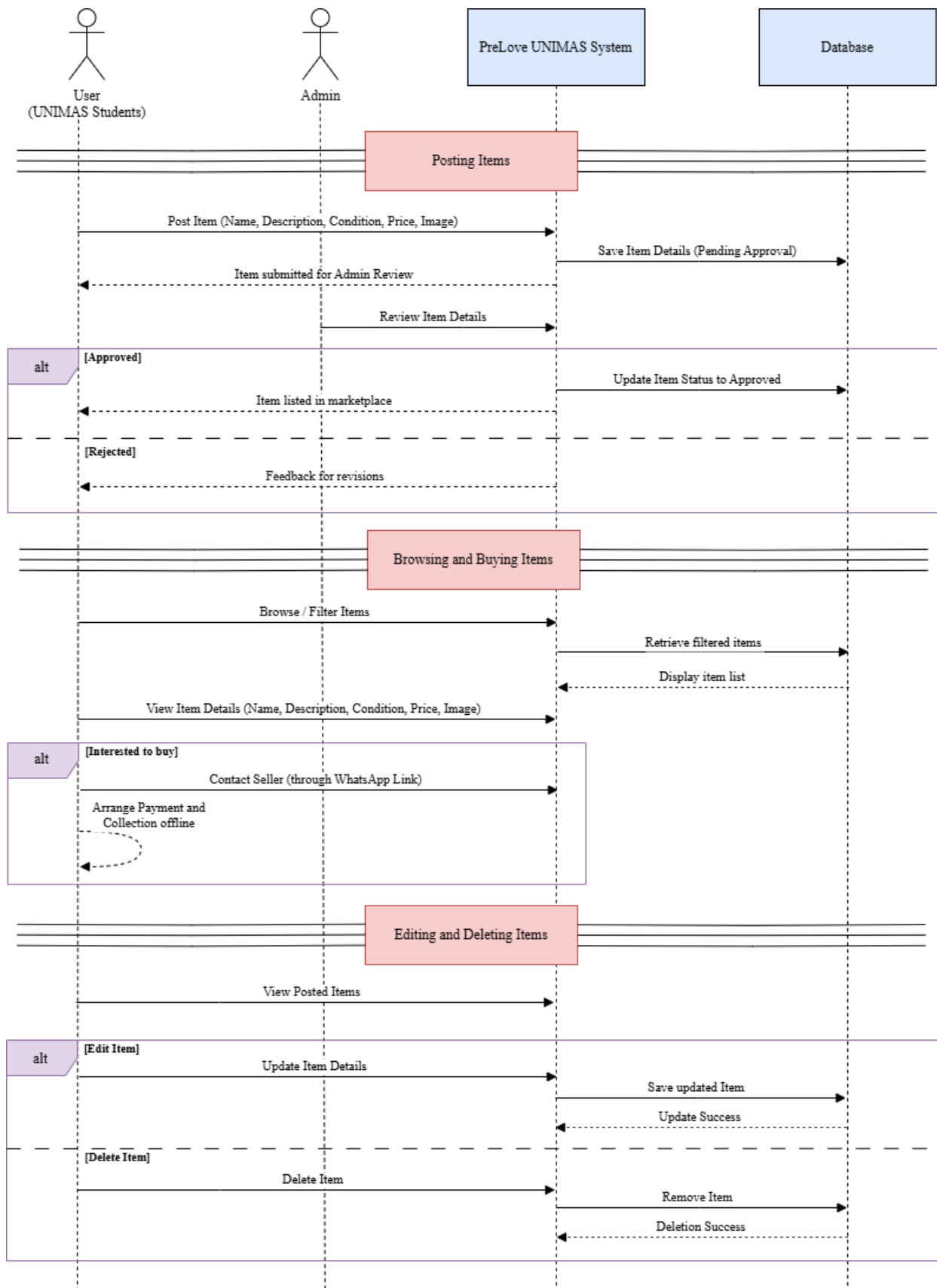


Figure 3.20: Sequence Diagram for Managing Items

The figure 3.21 presents the sequence diagram for admin monitoring on the PreLove UNIMAS platform. It outlines the interactions between the admin and the system for tasks such as viewing user activities, monitoring listings, and managing reports, ensuring platform compliance and proper functionality.

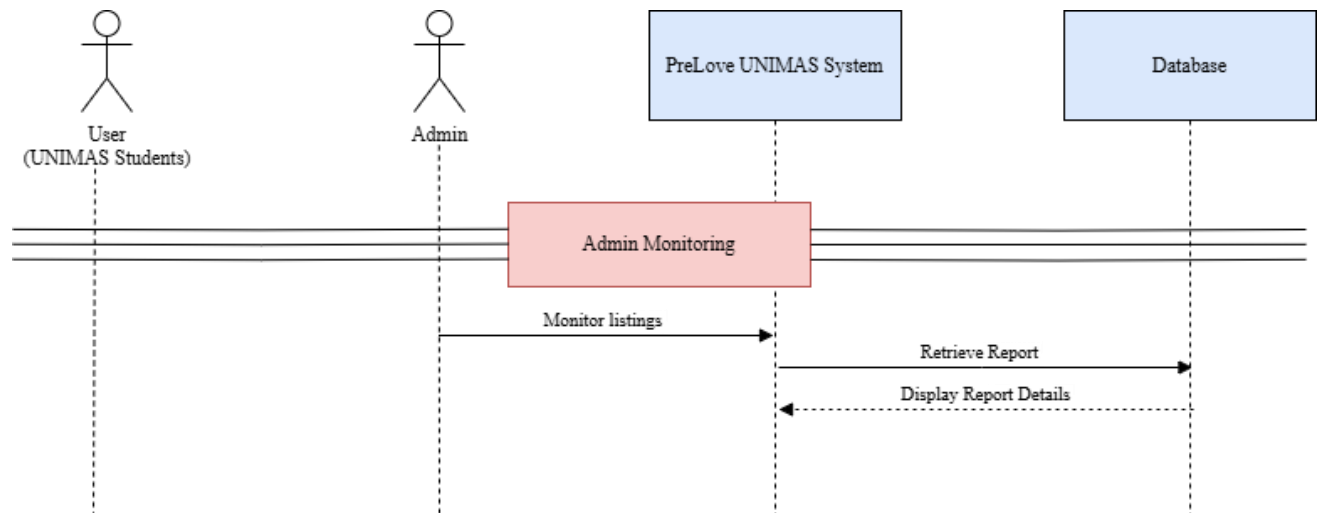


Figure 3.21: Sequence Diagram for Admin Monitoring

3.2.2.4 Class Diagram

A class diagram outlines the structure of the system by defining its classes, attributes, methods, and relationships. This diagram acts as a blueprint for both database design and software implementation, helping developers understand the system's logical organization and ensuring seamless integration of its components. The class diagram for this proposed system is shown in Figure 3.22.



Figure 3.22: Class Diagram of PreLove UNIMAS

3.2.2.5 System Architecture

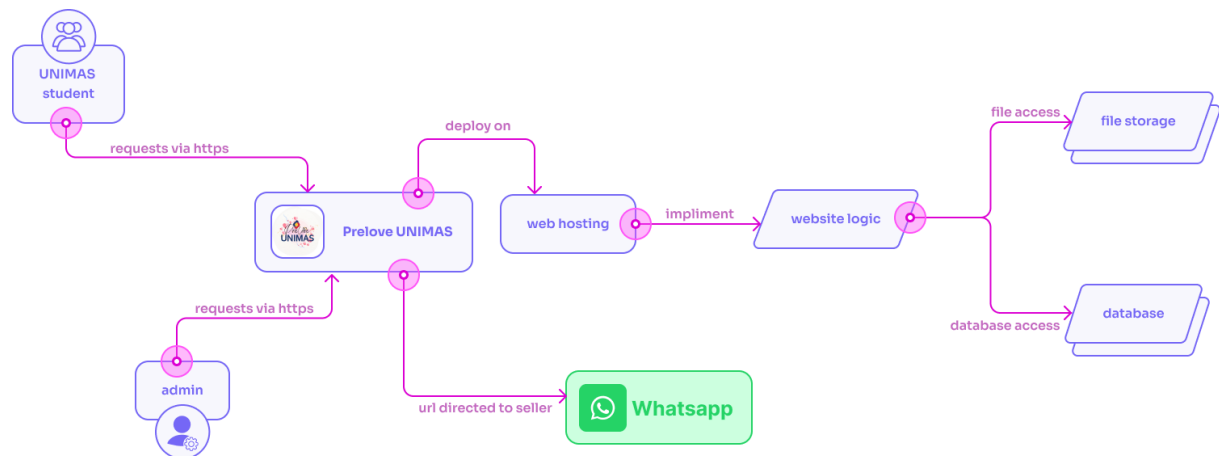


Figure 3.23: System Architecture of PreLove UNIMAS

Figure 3.23 illustrates the system architecture diagram, which offers a high-level representation of overall system structure, highlighting various software, hardware, databases, and external services are interconnected to create a functional solution. Software architecture provides a high-level representation of a system, illustrating how various components work together to perform specific tasks (Gillani et al., 2022). This diagram is crucial for visualizing the system's infrastructure, ensuring scalability, maintainability, and performance optimization.

3.2.2.6 User Interface (UI)

User interfaces play a crucial role in shaping the interaction between users and developed systems, a well-designed UI ensures intuitive navigation, visual consistency, and clear content categorization, all of which contribute to a seamless and enjoyable user experience (UX). For some applications, UI is not just about aesthetics, but it directly impacts usability, user satisfaction, and overall engagement. By integrating feedback from users, some pages of the system have been prototyped using Figma to visualize the interface and ensure the design aligns with user expectations. Below are the prototyped pages, which will serve as a reference for the next development phase.



Figure 3.24: Login and Registration Page

Figure 3.24 shows both login and registration page. The login page allows users to securely access their accounts by entering their email and password. The page includes clear input fields with labels for easy identification. Additional features include a "Forgot Password" link to help users recover their accounts and a register option for new users to create an account.

The registration page enables new users to create an account by providing essential details such as name, email, password, and student ID for verification. The form fields are organized logically, and the "Register" button is designed to stand out.

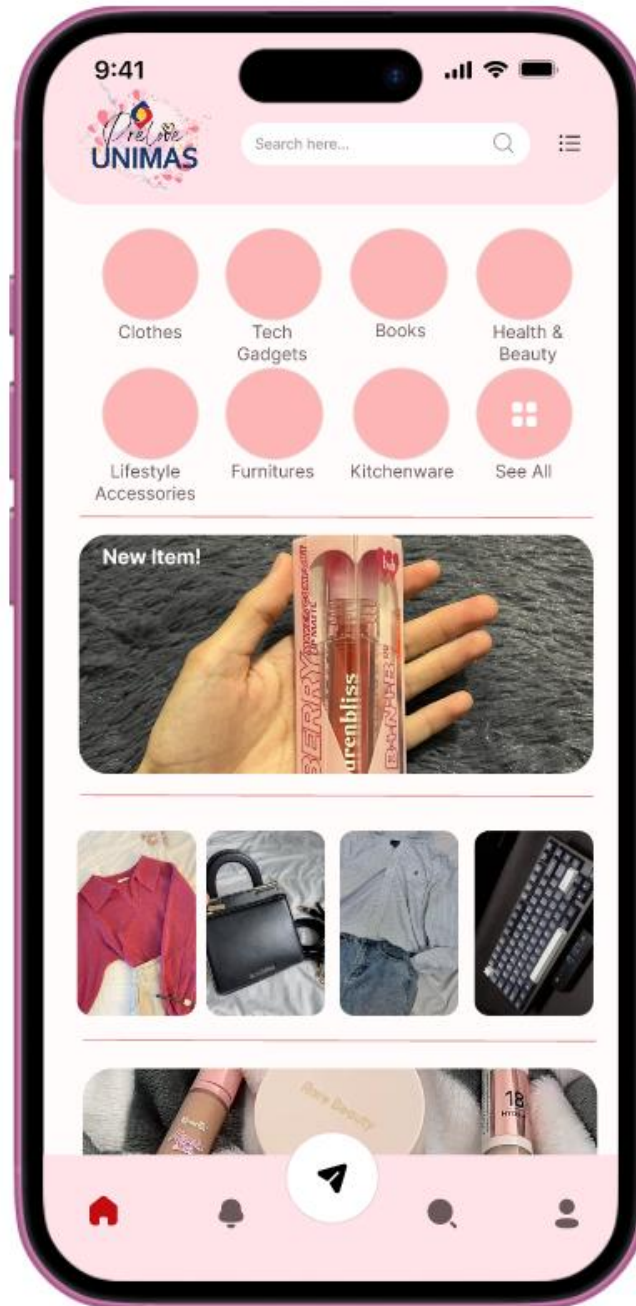


Figure 3.25: Homepage

The homepage as shown in Figure 3.25 serves as the main page for users after logging in. It features intuitive navigation, showcasing key sections such as categories and items for sale. It highlights newly posted items and most viewed or popular items. The page maintains visual consistency with the overall design, making it user-friendly and engaging.

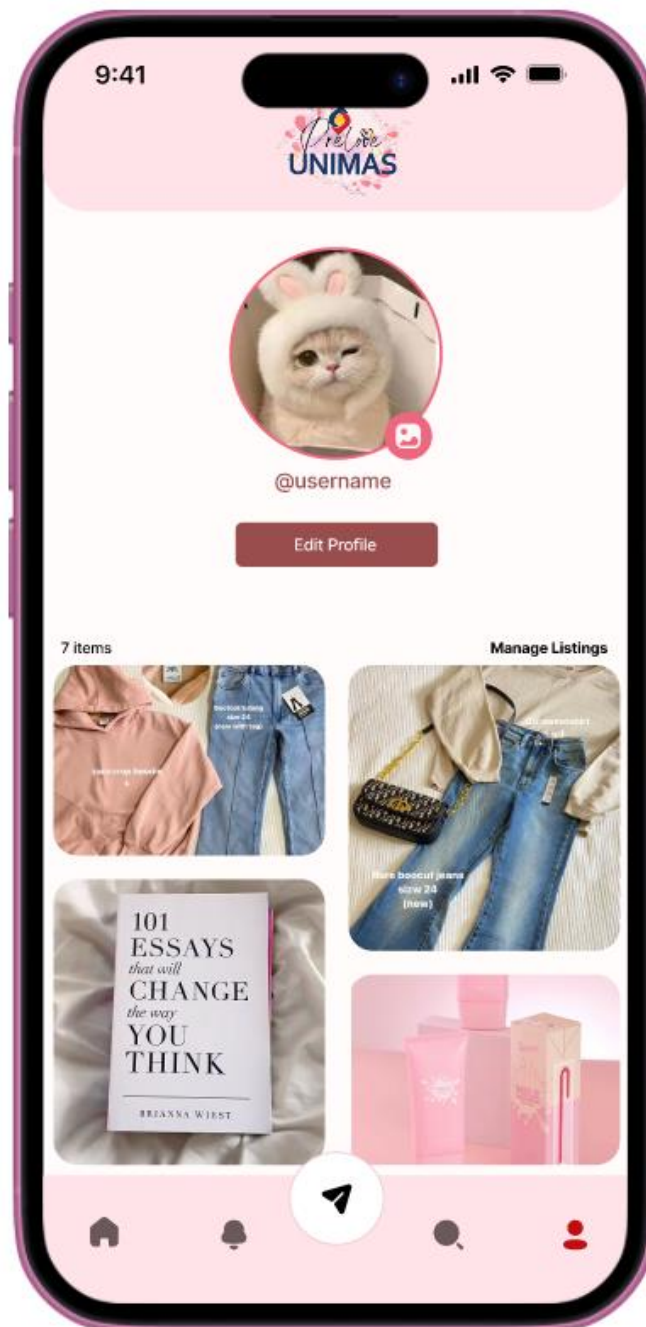


Figure 3.26: User Profile Page

The user profile page which shown in Figure 3.26 provides a centralized area to manage their personal listings and account settings. Users can update details like their name, email, password, or profile picture. The page also includes options to log out. The design ensures simplicity and clarity, making it easy for users to navigate.

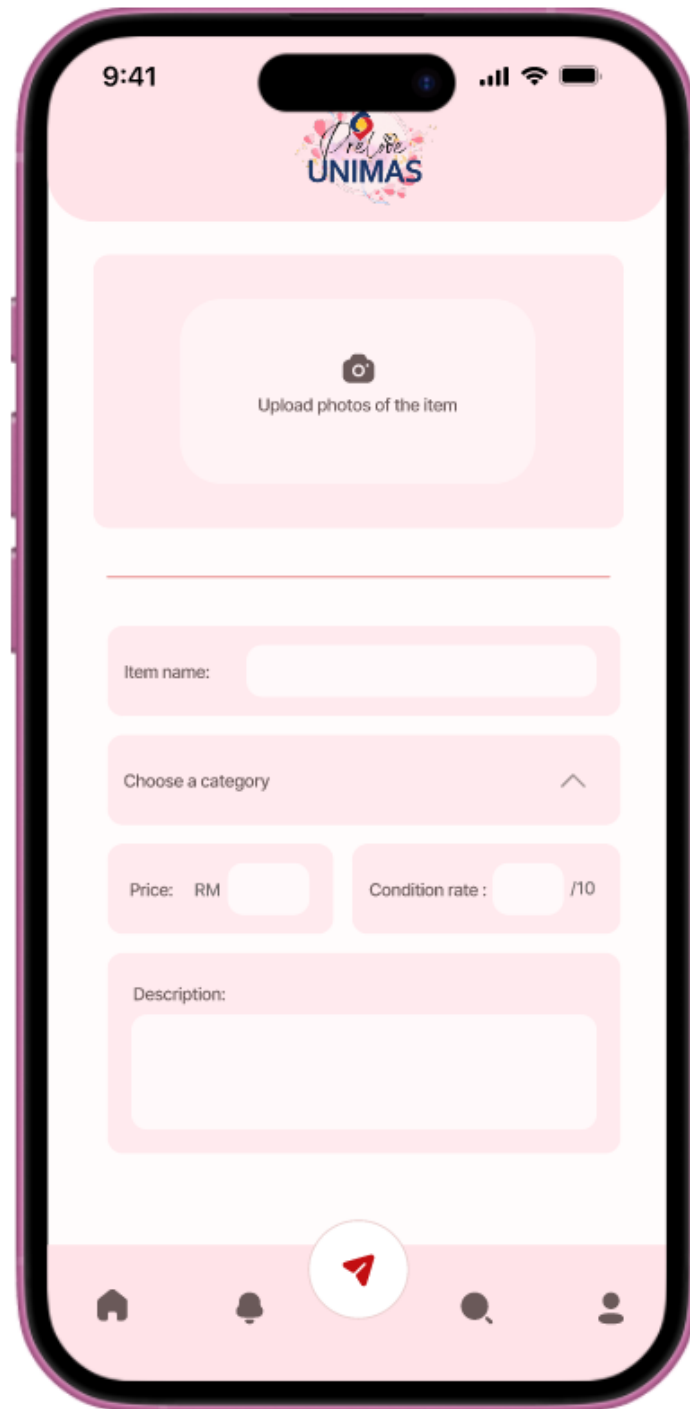


Figure 3.27: Post Item Page

The post item page, shown as Figure 3.27, allows users to upload items for sale by filling in details like item name, description, price, and category, along with uploading images. The page ensures an intuitive design, guiding users step-by-step to complete their listings quickly and easily.

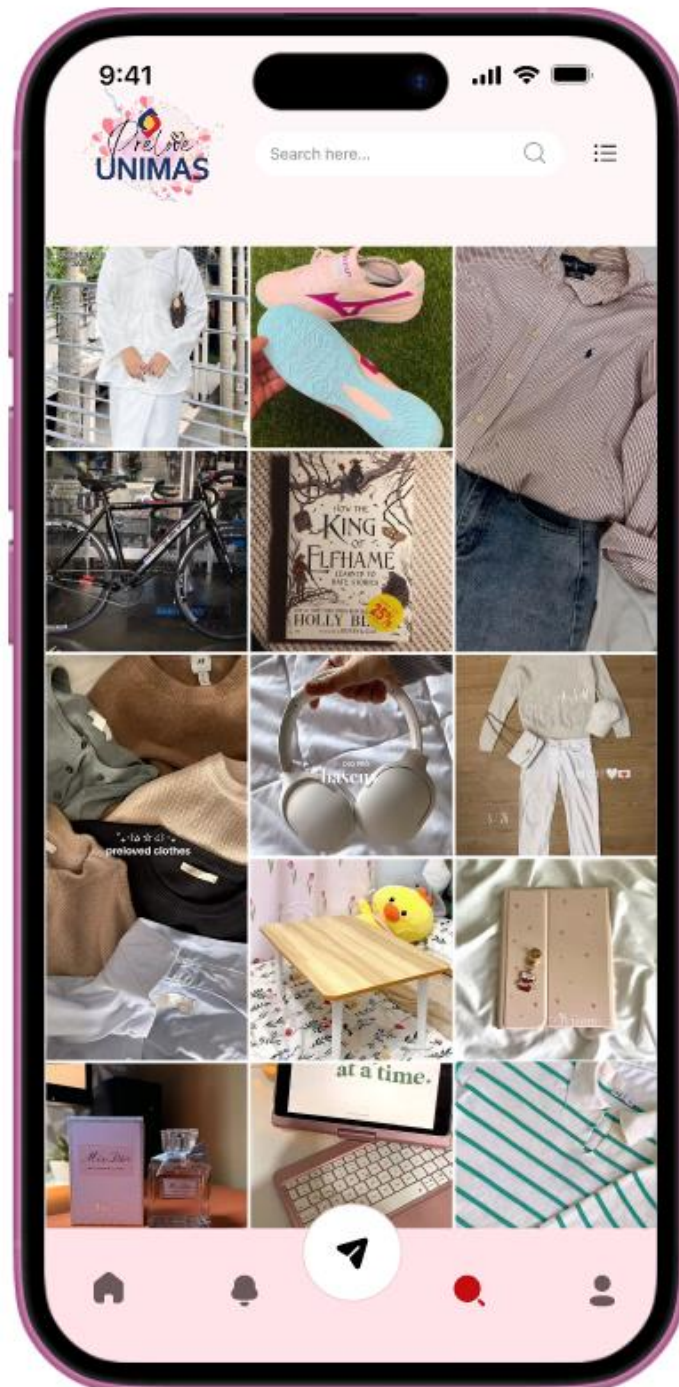


Figure 3.28: Explore Page

In Figure 3.23 shows the explore page which allows users to browse through a variety of items' pictures listed for sale. Users can view detailed item information, including descriptions and price by clicking into the photos. The design ensures a clean layout with filters and search functionality, making it easy to find specific items or categories.



Figure 3.29: View Item Details

Figure 3.29 shows the viewing item details page. When a buyer selects an item from the Explore Page, they will be directed to the View Item Details page, which displays the item's images, name, description, price, category, and seller details. A WhatsApp icon button allows direct communication via WhatsApp.

3.3 Chapter Summary

To conclude, the PreLove UNIMAS platform can be developed effectively using the Rapid Application Development (RAD) model, a methodology well-suited for this project due to its emphasis on iterative design and user feedback. During the requirements planning phase, key features and software requirements were meticulously outlined to ensure a seamless development process. A comprehensive questionnaire was distributed to UNIMAS students to gather insights and preferences, ensuring that the platform aligns with the needs of its target and potential users. In the user design phase, detailed flowcharts, use cases, and diagrams were created to provide a clear visualization of the system's structure and functionality. The platform's user interface was carefully designed to deliver a simple yet engaging user experience. This chapter also highlights the future steps, including testing, deployment, and user training, to guarantee a smooth and efficient launch of the PreLove UNIMAS platform, making it a reliable and user-friendly solution for buying and selling preloved items within the university community.

CHAPTER 4 : IMPLEMENTATION

4.1 Overview

The implementation phase of PreLove UNIMAS followed the ISO/IEC/IEEE 24748-3:2020 standard for software life cycle processes, particularly the Implementation and Testing Process. This phase represents the critical transition from design specifications to executable software components through systematic engineering practices (ISO/IEC/IEEE, 2020).

The project adopted the Rapid Application Development (RAD) methodology, emphasizing iterative prototyping, continuous user feedback, and modular implementation to ensure a functional, scalable, and user-friendly platform. This approach was selected based on findings that RAD improves time-to-market while maintaining quality standards (Koloosky, 2023). The implementation strictly adhered to IEEE 1012-2016 verification guidelines throughout the development lifecycle.

Key Implementation Activities:

- Software Development (Frontend, Backend, Database)
- UI/UX Design (Responsive & Accessible)
- System Architecture & Deployment
- Functional Module Implementation

The goal was to deliver a fully operational marketplace for buying and selling second-hand goods within Universiti Malaysia Sarawak (UNIMAS) while adhering to Software Engineering best practices and international standards.

4.2 Software Development

The system was developed using Rapid Application Development (RAD) methodology, emphasizing iterative prototyping and user feedback to accelerate delivery.

4.2.1 Technology Stack

The technology stack for PreLove UNIMAS was carefully selected to align with RAD methodology principles of rapid prototyping, modular development, and iterative refinement. Each component was chosen for its ability to accelerate development cycles while maintaining academic-grade reliability and security standards.

4.2.1.1 Frontend Layer

Table 4.1: Frontend Technology Stack

Technology	Version	Key Advantage
Bootstrap 5	5.2.3	Accelerated UI development with responsive, pre-styled components
JavaScript	ES6+	Enabled modern features (AJAX, DOM manipulation) for dynamic UX
Font Awesome	6.4.0	Ready-made icons vs. custom designs

4.2.1.2 Backend Layer

Table 4.2: Backend Technology Stack

Technology	Version	Key Advantage
PHP	8.1	Fast execution + native MySQL compatibility for RAD needs
MySQL	8.0	Scalable data storage for user transactions
Apache	2.4	.Reliable, modular server with .htaccess flexibility

4.2.1.3 System Development Tools

Table 4.3: Development Tools of the System

Tool	Purpose	Key Feature
XAMPP	Local environment	All-in-one Apache/MySQL/PHP stack for offline testing
VS Code	IDE	Live Server extension for instant browser reloads
phpMyAdmin	DB management	Visual interface for MySQL
Git & GitHub	Version Control	Track changes made in code
Hostinger	Web Hosting & Deployment	1-click PHP/MySQL hosting with scalable performance & built-in security



Figure 4.1: XAMPP Logo

1. XAMPP (Local Environment)

Installation:

- Download from Apache Friends
- Run installer (select: Apache, MySQL, PHP, phpMyAdmin)
- Complete installation (~5 minutes)

Setup:

- Launch XAMPP Control Panel
- Start Apache and MySQL services
- Test via <http://localhost> (should show XAMPP dashboard)



Figure 4.2: Visual Studio Code Logo

2. Visual Studio Code (IDE)

Installation:

- Download from code.visualstudio.com
- Run installer (default settings recommended)

Essential Extensions:

- PHP Intelephense (PHP support)
- Live Server (instant browser reload)
- Prettier (code formatting)



Figure 4.3: phpMyAdmin Logo

3. phpMyAdmin (DB Management)

Included with XAMPP:

- Access via <http://localhost/phpmyadmin>
- Default credentials:
 - Username: root
 - Password: (blank)



Figure 4.4: Git & GitHub Logo

4. Git & GitHub (Version Control)

- Install Git
 - Download from git-scm.com
 - Run installer (keep default options)

- Configure Your Account
 - Open Git GUI (Windows) or Terminal (Mac/Linux)
 - Enter your name and email when prompted
- Get the Project
 - Visit your repository page on GitHub
 - Click "Code" → "Download ZIP"
 - Extract files to your preferred folder
- Save Changes
 - Use GitHub Desktop app (visual interface)
 - OR use GitHub website to upload edited files
- Update Project
 - GitHub Desktop: Click "Commit to main" → "Push origin"
 - Website: Drag & drop files → "Commit changes"

5. Hostinger (Web Hosting & Deployment)



Figure 4.5: Hostinger Logo

- Sign Up
 - Go to Hostinger.com → Choose "Web Hosting"
- Upload Files
 - In hPanel → File Manager → Upload all project files to /public_html
- Create Database
 - Go to MySQL Databases → Create new DB
 - Import database (.sql) via phpMyAdmin

- Configure db.php

```
$host = 'localhost';  
  
$db = 'your_db_name';  
  
$user = 'your_db_user';  
  
$pass = 'your_db_password';
```

- Enable SSL
 - In hPanel → SSL → Activate Let's Encrypt
- Test Site
 - Visit <https://yourdomain.com>
 - Check login, uploads, and admin features

The selection of development tools for PreLove UNIMAS was strategically made to maximize efficiency and align with Rapid Application Development (RAD) principles. XAMPP was chosen as the local development environment because its preconfigured Apache-MySQL-PHP stack reduced setup time, accelerating the project's initial phase. VS Code served as the primary IDE due to its lightweight performance and integrated Live Server extension, which would cut testing cycles during debugging. phpMyAdmin streamlined database management by enabling real-time schema adjustments without restarting services. Git & GitHub provided essential version control capabilities, allowing tracking changes, revert problematic updates, and maintain code integrity throughout the development. Hostinger was selected as the web hosting provider for its reliable uptime, affordable pricing, and seamless integration with PHP and MySQL, ensuring smooth deployment and scalability for the PreLove UNIMAS platform. These tools created an optimized workflow that supported the project's need for fast iterations while maintaining stability.

4.3 Phase 3: Construction (Implementation)

4.3.1 File Structure

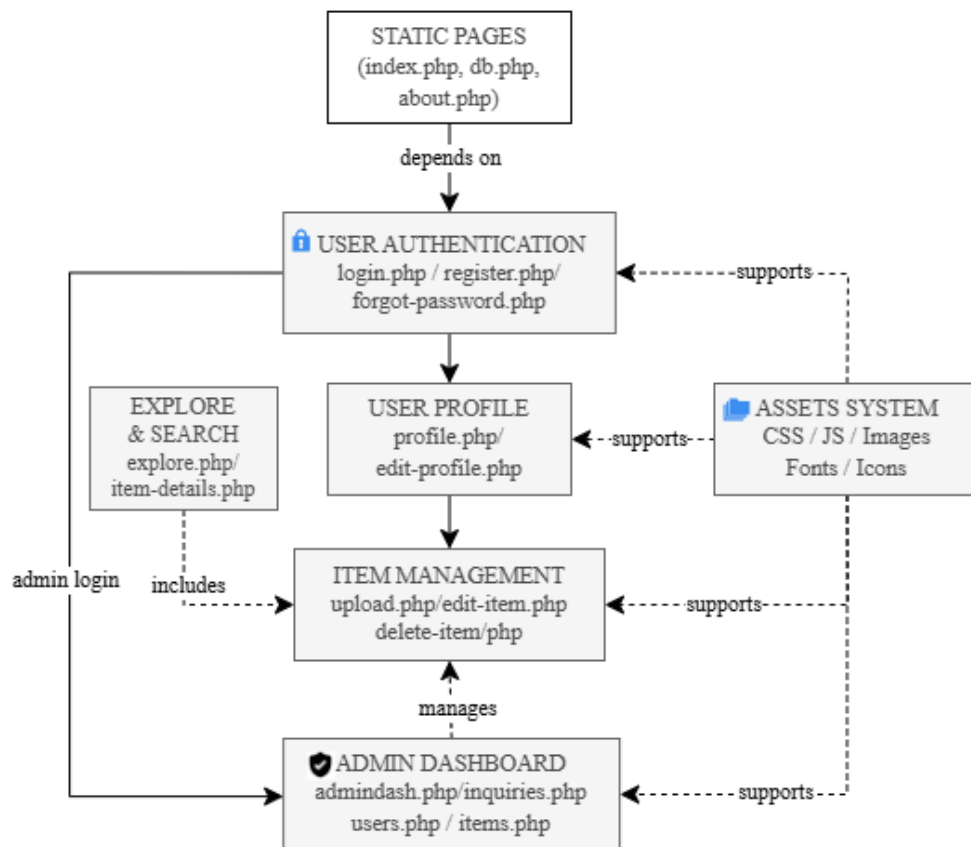


Figure 4.6: File Structure Hierarchy

Figure 4.6 illustrates the hierarchical file structure of the PreLove UNIMAS system, organized into logical modules including static pages, user authentication components, item management with explore and search, user profiles, and admin dashboard functions.

4.3.2 User Authentication Module

The authentication module forms the security backbone of the PreLove UNIMAS system, ensuring only verified users can access platform features. The module consists of four interconnected pages that work together to create a seamless yet secure access control process.

Registration Page

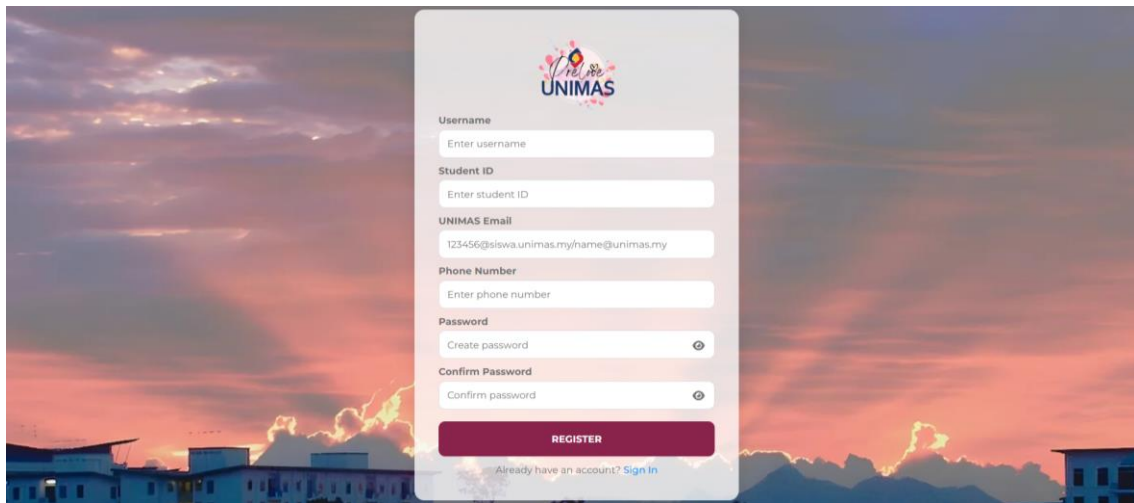
The registration page features a central white form overlay on a background image of a sunset over a lake with buildings. The form includes the UNIMAS logo at the top, followed by input fields for Username, Student ID, UNIMAS Email (with a pre-filled example), Phone Number, Password, and Confirm Password. Each field has a placeholder text. Below the fields is a red 'REGISTER' button and a link for users who already have an account.

Figure 4.7: Registration Page

The registration page as in Figure 4.7, serves as the entry point for new users, implementing strict validation rules to ensure only valid UNIMAS emails can create accounts. Upon successful registration, the system generates and emails a six-digit verification code using PHPMailer integration while temporarily storing the unverified account details in the database.

Verification Input Page

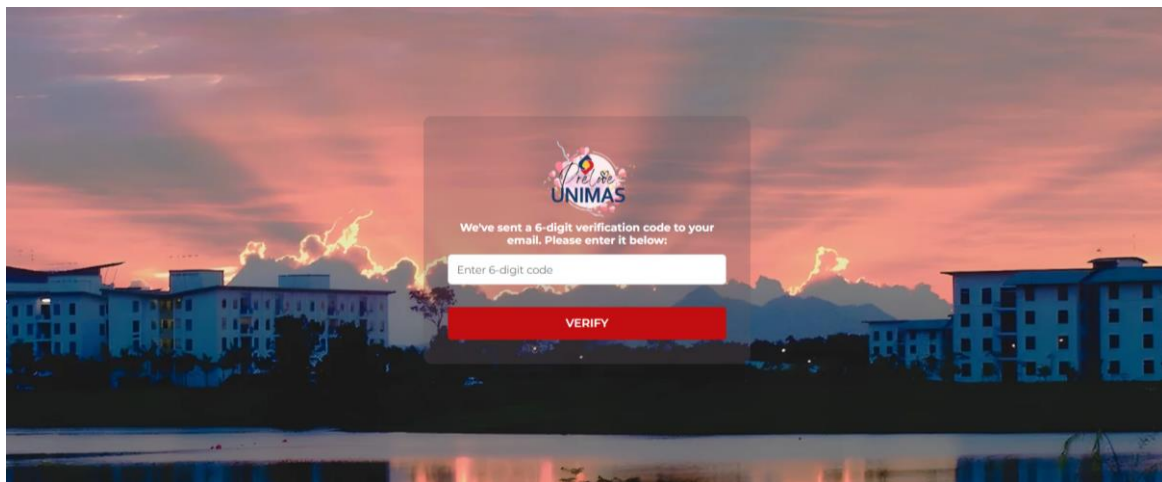
The verification input page shows a white form overlay on the same sunset background. It displays the UNIMAS logo and a message stating that a 6-digit verification code has been sent to the user's email. Below this is a single input field for the code and a red 'VERIFY' button.

Figure 4.8: Verification Input Page

Figure 4.8 shows the account verification page which handles the confirmation process where users input their received verification code. This page performs critical security checks, including code expiration validation and prevention of brute-force attempts, before updating the account status to verified in the database.

Login Page

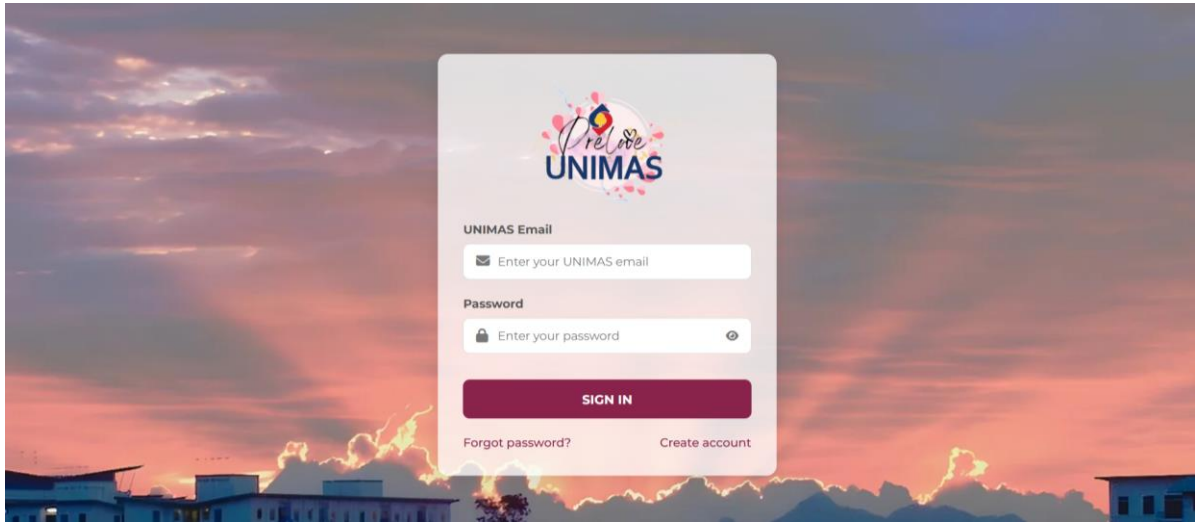


Figure 4.9: Login Page

The login page shown in Figure 4.9 serves as the primary authentication gateway. It distinguishes between regular student accounts and administrative user, with special handling for temporary passwords (for forgot password) that require immediate reset.

Forgot Password Page

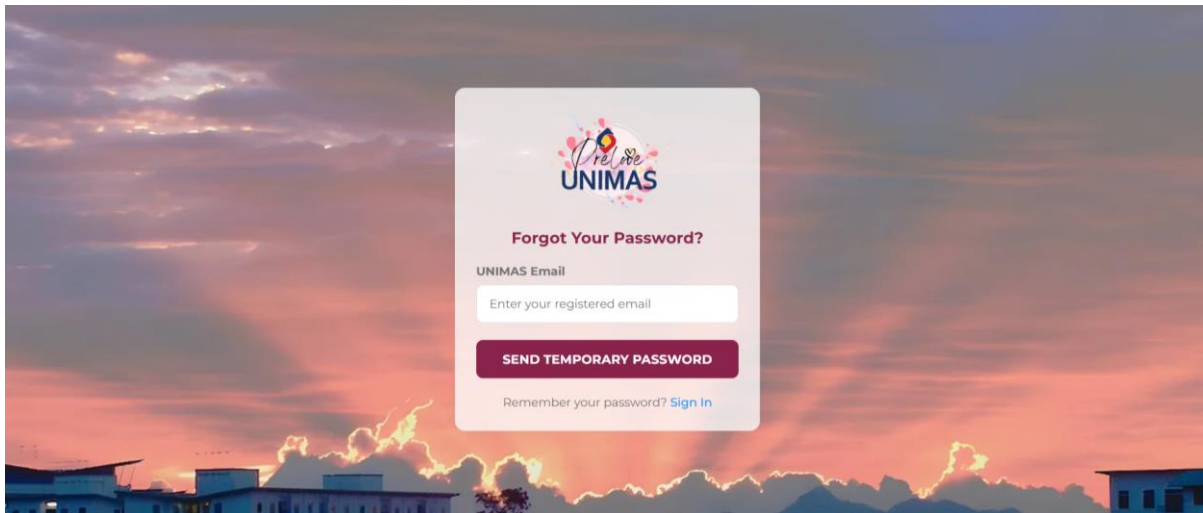


Figure 4.10: Forgot Password Page

Password recovery is managed through the forgot password page as shown in Figure 4.10, which initiates a secure reset workflow. This includes temporary password generation with forced expiration, email-based verification links, and automatic redirection to password update screens.

4.3.3 User Profile Module

The User Profile Module provides students with comprehensive control over their personal account settings and marketplace presence. The module consists of two interconnected pages that work in tandem to deliver a secure and intuitive user experience.

Profile Page

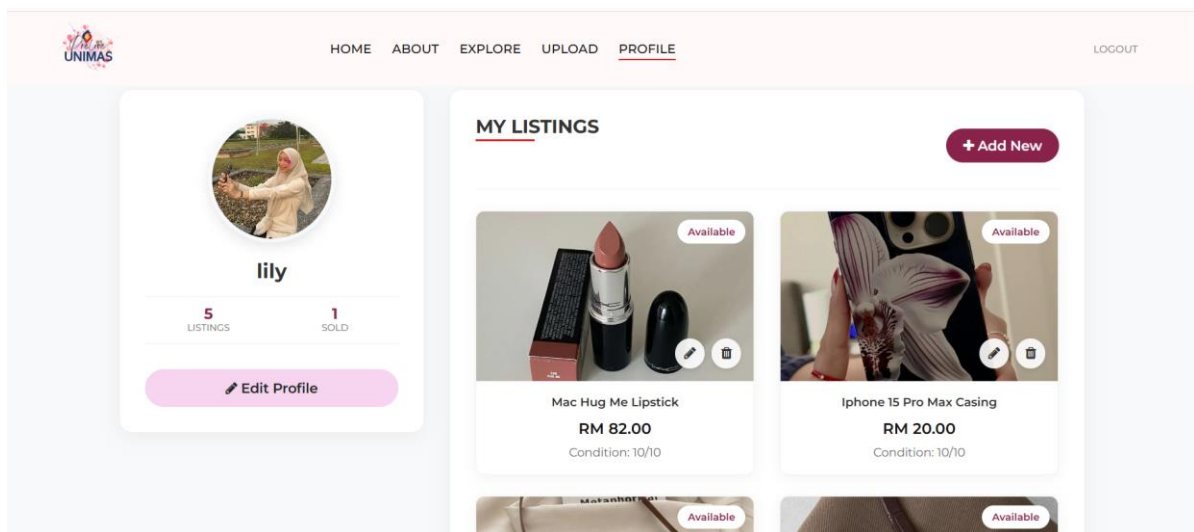


Figure 4.11: Profile Page

As shown in Figure 4.11, the Profile Page serves as the primary interface where users can review their account details, including their displayed name and status count. This page dynamically presents the user's marketplace activity through a gallery of their posted items and ongoing sales.

Edit Profile Page

Figure 4.12 shows the mobile displays of Edit Profile Page which is for account customization that offers a multi-functional interface that enables users to modify their personal information, update security credentials, and manage their visual identity. The profile picture upload system includes intelligent file processing that automatically optimizes image dimensions while enforcing strict file type and size restrictions to maintain system performance

Figure 4.12: Edit Profile Page

4.3.4 Item Management Module

The Item Management Module forms the core transactional component of PreLove UNIMAS, enabling students to implement Create, Read, Update, and Delete (CRUD) operations on second-hand items in the platform.

Upload Item Page

As shown in Figure 4.13, the Upload Item Page provides users with an intuitive form interface to add new products into the marketplace system. This page incorporates comprehensive field validation for item attributes including title, category selection, price, condition rating and detailed descriptions. The image upload functionality supports file selection, storing optimized versions in the /uploads/items/ directory while maintaining original image quality. Real-time previews allow users to verify their listings before submission, reducing error rates and improving data quality.

Edit Item Page

Item modification occurs through the Edit Item Page also shown in Figure 4.13, accessible via dedicated buttons on the user's Profile Page. This interface mirrors the upload form but pre-populates all existing item data, enabling seamless updates. A critical security layer ensures users can only edit their own listings through session-based ownership verification, preventing unauthorized access. The edit process maintains all existing item views while allowing price adjustments, category changes, or image updates.

Figure 4.13: Upload Item and Edit Item Pages

Delete Item Function

For item removal, the Delete Item function triggers a confirmation dialog when initiated from the Profile Page. Upon confirmation, the system executes a soft-delete process where items are marked as sold or inactive rather than being permanently erased, preserving transactional records while removing them from public view.

4.3.5 Explore & Search Module

The Explore & Search Module serves as the primary discovery interface of PreLove UNIMAS, enabling students to efficiently browse items through intuitive filtering and search mechanisms.

Explore Page

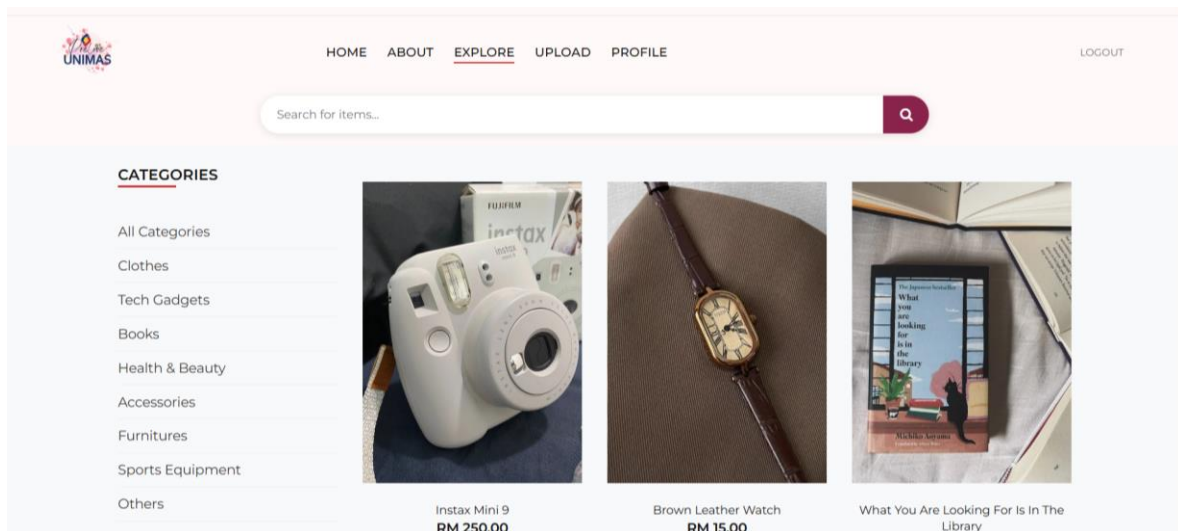


Figure 4.14: Explore Page

The Explore Page shown in Figure 4.14, forms the central browsing hub, presenting available items in a responsive grid layout optimized for both desktop and mobile viewing. The page implements a dual-layer filtering system combining category-based organization with dynamic search functionality. Both filtered and searched items display essential information in standardized cards featuring optimized thumbnails, price badges, and condition indicators.. Interactive hover states provide quick previews of key details with strategically placed "View Details" in expand buttons.

Item Details Page

The View Item Details Page in Figure 4.15 serves as the comprehensive display interface, accessible when users select items from the Explore Page. This page presents all relevant information in a clean, mobile-responsive layout including high-resolution image galleries, seller profiles with trust indicators, and detailed condition reports. Interactive WhatsApp linked button enable direct communication between buyers and sellers.

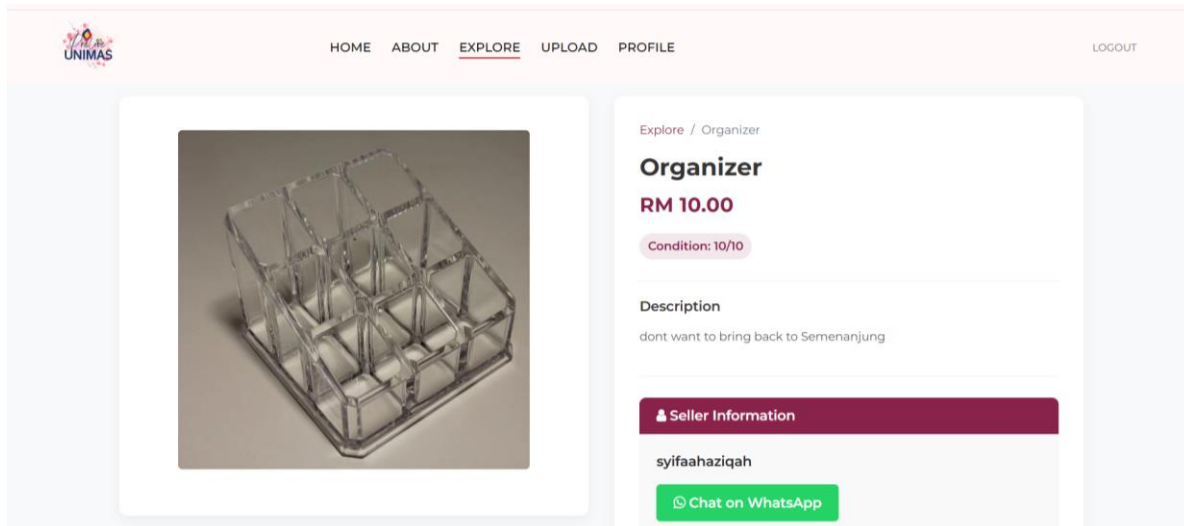


Figure 4.15: Item Details Page

4.3.6 Admin Dashboard Module

The Admin Dashboard Module serves as the centralized management hub for PreLove UNIMAS administrators, providing comprehensive oversight over system operations.

Manage Users Page

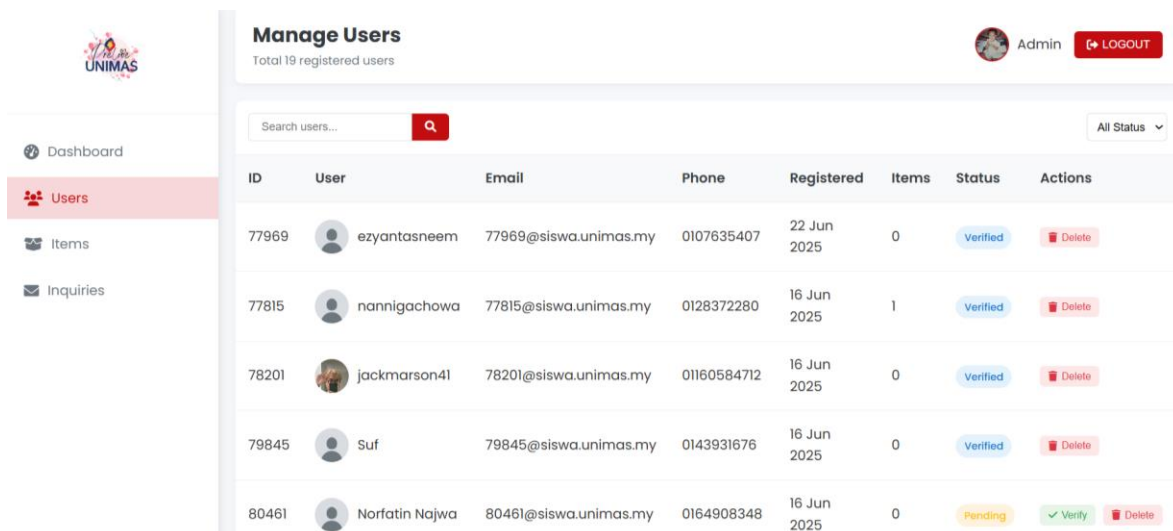
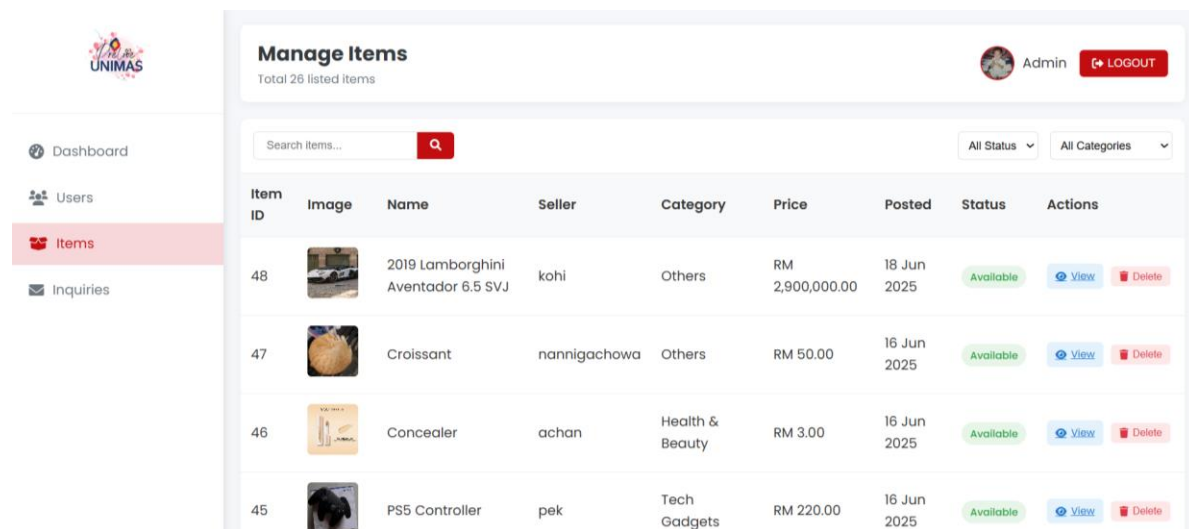


Figure 4.16: Admin Manage Users Page

User account oversight occurs through the Manage Users Page shown in Figure 4.16 which provides a searchable directory of all registered members. Detailed registered user profiles accessible from this page show complete activity histories including posted items. Administrators can verify user by clicking pending button.

Manage Items Page

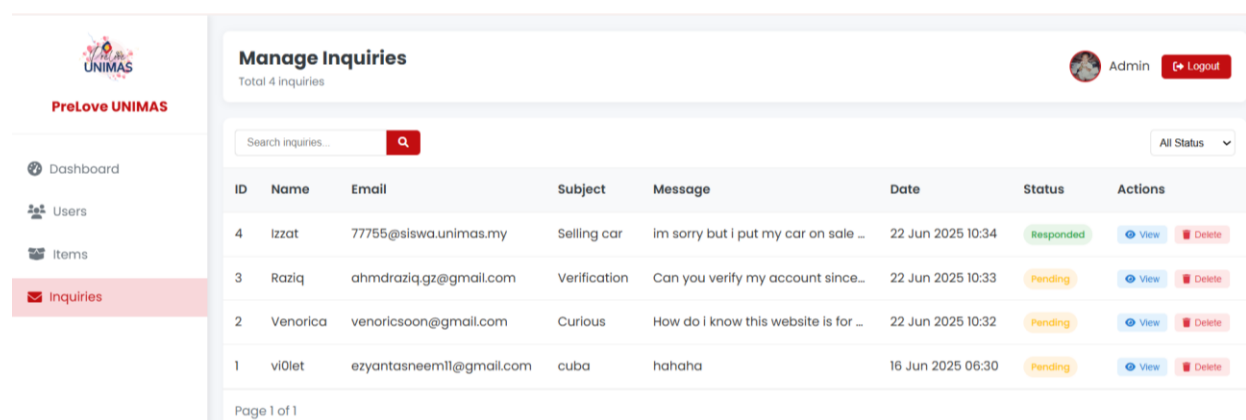


Item ID	Image	Name	Seller	Category	Price	Posted	Status	Actions
48		2019 Lamborghini Aventador 6.5 SVJ	kohi	Others	RM 2,900,000.00	18 Jun 2025	Available	View Delete
47		Croissant	nannigachowa	Others	RM 50.00	16 Jun 2025	Available	View Delete
46		Concealer	achan	Health & Beauty	RM 3.00	16 Jun 2025	Available	View Delete
45		PS5 Controller	pek	Tech Gadgets	RM 220.00	16 Jun 2025	Available	View Delete

Figure 4.17: Admin Manage Items Page

For inventory management, the Manage Items Page offers advanced moderation tools through a paginated data table interface. Administrators can filter listings by multiple parameters including category, posting date, price range, and reported status. Each item entry displays with contextual action buttons for immediate editing, temporary deactivation, or permanent removal. Bulk processing capabilities allow simultaneous moderation of multiple listings, significantly improving operational efficiency during peak activity periods.

Manage Inquiries Page



ID	Name	Email	Subject	Message	Date	Status	Actions
4	Izzat	77755@siswa.unimas.my	Selling car	im sorry but i put my car on sale ...	22 Jun 2025 10:34	Responded	View Delete
3	Raziq	ahmdraziq.gz@gmail.com	Verification	Can you verify my account since...	22 Jun 2025 10:33	Pending	View Delete
2	Venorica	venoricsoon@gmail.com	Curious	How do i know this website is for ...	22 Jun 2025 10:32	Pending	View Delete
1	violet	ezyantasneem1@gmail.com	cuba	hahaha	16 Jun 2025 08:30	Pending	View Delete

Figure 4.18: Admin Manage Inquiries Page

The Manage Inquiries page is an admin interface for managing customer inquiries, featuring a paginated table display with search and status filtering capabilities. Administrators can view detailed inquiry information in a modal, send email responses directly using PHPMailer integration by clicking view button, and mark inquiries as responded or delete them, with all actions logged for tracking.

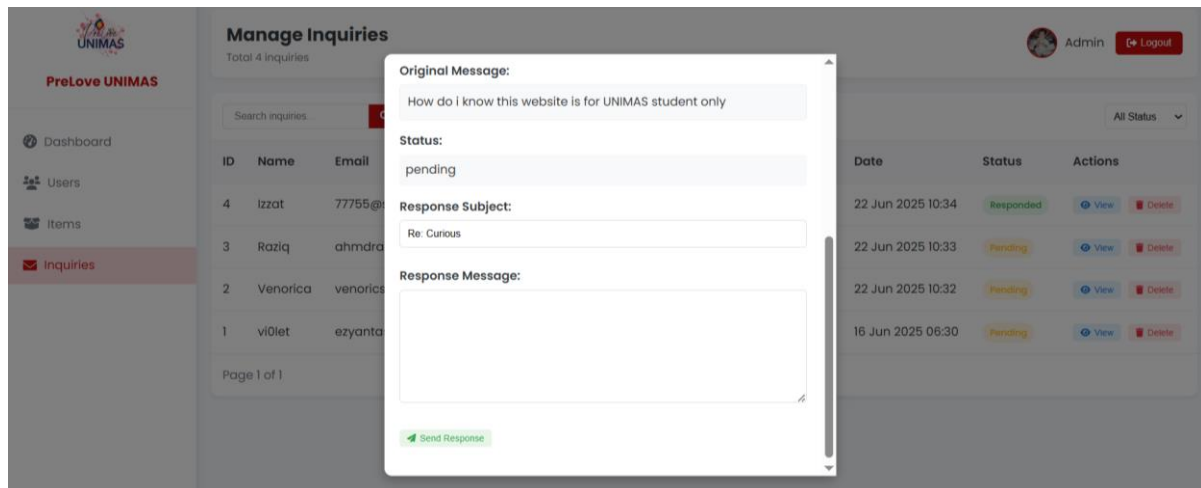


Figure 4.19: Viewing Inquiry

4.3.7 Static Pages Module

The static pages module consists of publicly accessible pages Homepage and About Us Page that display general information about PreLove UNIMAS, along with db.php for database connectivity. The homepage serves as the main landing page, introducing the platform and its features, while the About Us page provides details on the project's mission, team, and purpose. Besides, About Us page also includes a public inquiry form for any users to ask out any curiosity and report any inappropriate content. The database connection centralizes MySQL configurations for overall PreLove UNIMAS platform, ensuring secure and reusable database access across the application. These pages use consistent styling, basic security measures, and are optimized for responsiveness across devices.

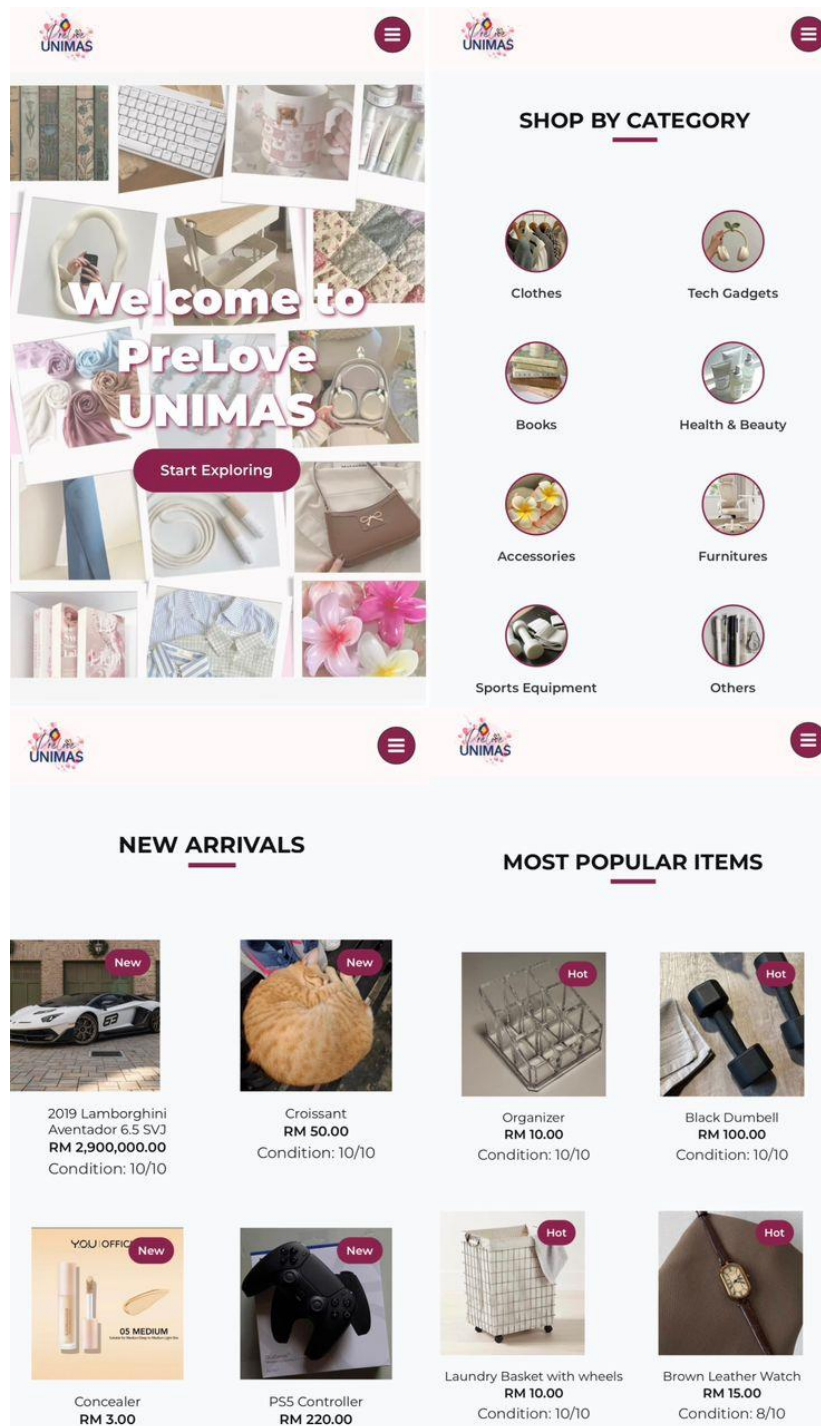


Figure 4.20: Homepage

Homepage featuring a welcoming message, product categories for easy browsing, a "New Arrivals" section highlighting recently added items, and a "Most Viewed" section showcasing popular products. Designed for user engagement, the page dynamically pulls content from the database and maintains a responsive, clean layout for seamless navigation across devices.

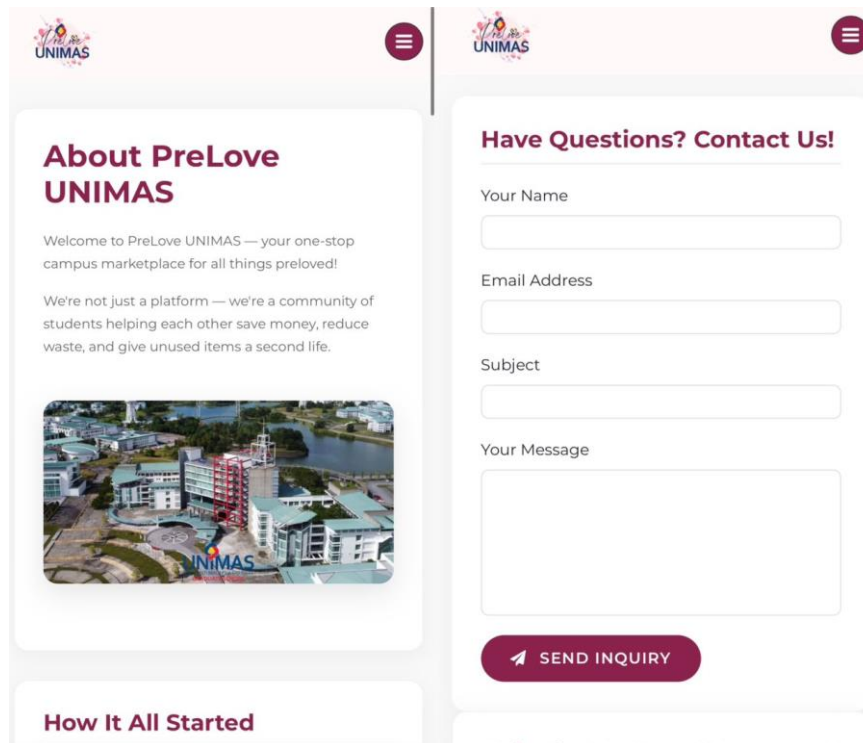


Figure 4.21: About Us Page

The page presents PreLove UNIMAS's history, mission, and core beliefs, introducing the platform's purposes. It includes a public inquiry form where users can submit questions or feedback, submissions are stored in the database and managed by admins via the dashboard.

4.4 Chapter Summary

In summary, the implementation phase involved the complete development of the PreLove UNIMAS platform based on the requirements defined in earlier phases. The use of Rapid Application Development (RAD) allowed the system to evolve quickly. All core features - including user authentication, profile management, item CRUD operations, search functionality, and admin tools were successfully implemented alongside static informational pages, resulting in a fully responsive and functional platform. Built with a secure tech stack and development tools like XAMPP and VS Code, the system incorporates robust security measures and adheres to IEEE 1012-2016 verification standards. Now complete and deployed on Hostinger, the platform is ready for the formal testing and evaluation phase that will be detailed in the next chapter.

CHAPTER 5 : TESTING AND EVALUATION

5.1 Introduction

Testing is a critical phase in the software development lifecycle that ensures the PreLove UNIMAS platform meets all functional requirements, performs optimally, and delivers a seamless user experience. Software testing standards provide systematic guidelines to ensure software quality, compliance, and reliability (Jain, 2024). The objective is to validate the system's reliability, security, and usability while identifying and resolving potential defects before deployment.

The testing phase comprises two key components:

1. **Functional Testing:** Verifies that the system operates according to specified requirements.
2. **User Acceptance Testing (UAT):** Ensures the system aligns with end-user expectations and real-world scenarios.

The testing also was conducted following ISO/IEC 9126 standards, ensuring the system meets key quality characteristics:

- **Functionality:** Does the system perform as intended?
- **Reliability:** Can it handle errors and maintain performance?
- **Usability:** Is the interface intuitive for UNIMAS students?
- **Efficiency:** Does it operate smoothly under expected loads?

This chapter details test cases, methodologies, and results for each module, aligned with ISO/IEC 9126 standards.

5.2 Phase 4: Cutover (Functional Testing)

Functional testing validates all features of the PreLove UNIMAS platform by verifying the intended behaviours for each user role: Unregistered User, Registered User, and Admin. The

testing focuses on core functionalities, access controls, and system responses to ensure alignment with requirements.

Test Scenarios by User Role

1. Unregistered User

Homepage Navigation

- The homepage must display available item categories.
- Newly posted items and popular items should be visible in designated sections.

About Us Page

- The page must display PreLove UNIMAS history, mission, and beliefs.
- An inquiry form should be accessible and render correctly.

Explore Page

- All posted items should be visible.
- Users must be able to filter items by categories.

Access Restrictions

- Attempting to view item details, profiles, or upload items must redirect unregistered users to the login/registration page.

Registration Process

- Users must provide valid details (name, UNIMAS email, student ID) to register.
- The system must send a 6-digit PIN via email for verification.
- Account verification should only occur after successful PIN entry.

2. Registered User

Login & Password Recovery

- Users must log in using valid credentials; invalid attempts would display appropriate errors.

- Forgot password functionality must send a temporary password to the registered email, allowing the user to log in and reset their password.

Profile Page

- The profile page must display the user's total listings and sold items count.
- All posted items should be listed, with a notification if no items are available.
- Users must be able to edit, delete, or mark items as sold.
- An "Edit Profile" button should redirect to the profile editing page.

Edit Profile Page

- Users must be able to update their profile picture.
- Basic details (username, student ID, phone number) should be editable.
- Password changes.

Upload Item Page

- Users must be able to upload item images.
- Item details (price, condition, description) must be submitted correctly.
- Newly uploaded items should appear in the user's profile page.

Logout

- Upon logout, the session must terminate and redirected to the homepage.

3. Admin

Login & Dashboard

- Admins must log in using valid credentials.
- The dashboard should display relevant analytics (user counts, active listings).

User Management

- Admins must be able to view the full list of registered users.
- Functionality to ban or remove suspicious accounts must work as intended.

Item Moderation

- Admins must be able to view and remove inappropriate listings.

Inquiry/Report Handling

- Admins must be able to respond to user inquiries after viewing.
- Inquiry statuses ("Pending," "Responded") should be updatable.

Logout

- Admin sessions must terminate securely upon logout.

5.2.1 Testing Methodology

Methodology of the testing is by structuring the key features to be tested by modules:

Table 5.1: Modules for Functional Testing

Module	Key Features to Test
User Authentication	User Registration, Login Validation, Password Recovery
User Profile	Profile Viewing & Editing, Change Password
Item Management	Item Upload/Edit/Delete, Mark Items as Sold
Explore & Search	Category Browsing, Keyword Search Functionality, Viewing Item Details
Admin Dashboard	User & Inquiries Management, Item Moderation
Static Pages	Homepage, About Us Page Content, Inquiry Form Functionality

5.2.2 Testing Instructions

1. Accessing the Website

- Open a web browser.
- Enter: <https://www.preloveunimas.com> to load a homepage

2. Test Accounts

- Credentials for Registered User testing:
 - Email: 77755@siswa.unimas.my
 - Password: Abc123456
- Credential for Admin Account:
 - Email: admin@prelove.my
 - Password: EzyanTasneem0206

5.3 Test Cases of PreLove UNIMAS

Test cases are structured by module to systematically validate each core functionality of PreLove UNIMAS

5.3.1 Authentication Module

Table 5.2: Test Case of User Registration

Module	User Authentication Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: User Registration (FR01)					
Test Case Description: Testing the processes in FR01					
Testing Objective: To validate the User Registration functionality of the PreLove UNIMAS platform					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
AUTH-01	Successful registration with valid UNIMAS email	1. Fill all fields with valid data 2. Use email: 77755@siswa.unimas.my 3. Submit form	1. System sends verification code 2. Redirects to verify.php	As expected	Pass
AUTH-02	Password mismatch validation	1. Fill all fields 2. Enter different passwords 3. Submit form	System shows error: "Passwords do not match"	As expected	Pass
AUTH-03	Short password validation	1. Fill all fields 2. Enter 7-character password 3. Submit form	System shows error: "Password must be at least 8 characters"	As expected	Pass
AUTH-04	Non-UNIMAS email rejection	1. Fill all fields 2. Use email: test@gmail.com 3. Submit form	System shows error: "Email must be in format: [matric number]@siswa.unimas.my or [name]@unimas.my"	As expected	Pass
AUTH-05	Empty field validation during registration	1. Leave one or more required fields blank. 2. Submit the form.	1. System displays error: "Please fill in all fields". 2. Form submission is blocked.	As expected	Pass
AUTH-06	Duplicate email registration attempt	1. Fill all fields with valid data. 2. Use an email already registered in the system. 3. Submit the form.	1. System displays error: "Email already registered". 2. Form submission is rejected.	As expected	Pass

Table 5.3: Test Case of Login Validation

Module	User Authentication Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: Login Validation (FR02)					
Test Description: Testing the processes in FR02					
Testing Objectives: To test both student and admin login flows					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
AUTH-05	Successful student login with correct password	1. Enter 77755@siswa.unimas.my 2. Enter Abc123456 as password 3. Click "SIGN IN"	1. Session created with student data 2. Redirect to profile.php	As expected	Pass
AUTH-06	Successful student login with temporary password	1. Enter valid UNIMAS email 2. Enter temporary password 3. Click "SIGN IN"	Session created with using_temp_password flag	As expected	Pass
AUTH-07	Admin login with correct credentials	1. Enter admin@prelove.my 2. Enter EzyanTasneem0206 3. Click "SIGN IN"	1. Admin session created 2. Redirect to admindash.php	As expected	Pass
AUTH-08	Failed login with invalid credentials	1. Enter invalid email/password 2. Click "SIGN IN"	Shows error: "Invalid email or password"	As expected	Pass

Table 5.4: Test Case of Password Recovery

Module	User Authentication Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: Password Recovery (FR03)					
Test Description: Testing the processes in FR03					
Testing Objectives: To test the end-to-end flow of the forgot password process					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
AUTH-09	Successful password reset request	1. Enter registered UNIMAS email 2. Click "Send Temporary Password"	1. Temporary password generated 2. Email sent with temporary password 3. Success message displayed	As expected	Pass
AUTH-10	Password reset for non-existent email	1. Enter unregistered email 2. Click "Send Temporary Password"	Shows error: "No account found with that email address"	As expected	Pass
AUTH-11	Empty email submission	1. Leave email field blank 2. Click "Send Temporary Password"	Error: "Please fill out this field "	As expected	Pass

5.3.2 User Profile Module

Table 5.5: Test Case of Profile Viewing & Editing

Module	User Profile Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: Profile Viewing & Editing (FR04)					
Test Description: Testing the processes in FR04					
Testing Objectives: To check the integrability of CRUD operations of user profile.					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
PROF-01	View profile page	1. Log in as registered user 2. Navigate to profile page	1. Profile info displayed correctly 2. Listings shown with images 3. Stats (total/sold) accurate	As expected	Pass
PROF-02	Update basic profile information	1. Log in as a registered user. 2. Navigate to the Edit Profile page. 3. Modify the Username, Student ID, and Phone Number fields. 4.Click Update Profile.	1. Profile information updates successfully. 2. Success message ("Profile updated successfully!") appears. 3. Changes reflect immediately in the database and profile page.	As expected	Pass
PROF-03	Upload and validate profile picture	1. Log in and navigate to Edit Profile. 2. Click Choose New Photo and: - Upload a valid image (JPG/PNG, ≤5MB). - Upload an invalid file (PDF or >5MB). 3. Submit the form.	1. Valid image: Preview updates; file saves; old image (if not default) is deleted. 2. Invalid file: Error message displays (e.g., "Only JPG, JPEG, PNG & GIF files are allowed").	As expected	Pass
PROF-04	Change password with valid inputs	1. Log in and navigate to Edit Profile. 2. Enter a new password with matching confirmation (≥8 characters). 3. Click Change Password.	1. Password updates in the database. 2. Success message ("Password updated successfully!") appears.	As expected	Pass
PROF-05	Validate password change errors	1. Log in and navigate to Edit Profile. 2. Test: - Leave fields blank. - Enter mismatched passwords. - Use password <8 characters. 3. Attempt submission.	1. Blank fields: "Please fill in all password fields". 2. Mismatch: "New passwords do not match". 3. Too short: "Password must be at least 8 characters". 4. Form rejects submission.	As expected	Pass

5.3.3 Item Management Module

Table 5.6: Test Cases of Item Upload/Edit/Delete

Module	Item Management Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: Item Upload/Edit/Delete (FR05)					
Test Description: Testing the processes in FR05					
Testing Objectives: To check the integrability of CRUD operations of items.					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
ITEM-01	Upload new item with valid data	1. Log in to the system 2. Navigate to the Upload page 3. Fill in all required fields. 4. Upload a valid image file (JPG/PNG under 15MB) 5. Click "Upload Item" button	1. Item is saved to database 2. Image is uploaded to server 3. Success message is displayed 4. Item appears in user's profile and explore page	As expected	Pass
ITEM-02	Uploading item with missing required fields	1. Log in to the system 2. Navigate to the Upload page 3. Leave one or more required fields blank 4. Click "Upload Item" button	1. Form is not submitted 2. Error message appears: "Please fill in all required fields."	As expected	Pass
ITEM-03	Unauthorized access prevention	Without logging in, attempt to access upload.php directly	1. User is redirected to login page 2. No access to upload form	As expected	Pass
ITEM-04	Edit item with valid data	1. Log in to the system 2. Navigate to an existing item in profile page 3. Click "Edit" button 4. Modify item details (name, category, price, condition, description) 5. Click "Update Item" button	1. Item details are updated in the database 2. Success message is displayed 3. User is redirected to profile page 4. Updated information appears in profile and explore pages	As expected	Pass
ITEM-05	Change item image	1. Log in to the system 2. Navigate to an existing item in profile page 3. Click "Edit" button	1. New image is uploaded and saved 2. Image path is updated in database	As expected	Pass

		4. Click on image area and select a new valid 5. Click "Update Item" button	3. New image appears in item listing		
ITEM-06	Mark item as sold	1. Click delete button on listing 2. Select "Yes, it was sold" 3. Confirm action	1. Item status changes to "sold" 2. Sold count increments 3. Listing remains visible	As expected	Pass
ITEM-07	Delete item permanently	1. Click delete button on listing 2. Select "No, just delete it" 3. Confirm deletion	1. Listing removed from profile 2. Total count decrements 3. No change to sold count	As expected	Pass

5.3.4 Explore & Search Module

Table 5.7: Test Cases of Category Browsing

Module	Explore & Search Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: Category Browsing (FR06)					
Test Description: Testing the processes in FR06					
Testing Objectives: To test the functionality of category filters					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
EXPL-01	Browse all categories	1. Navigate to the Explore page 2. Click "All Categories" or leave category filter unselected 3. View the displayed items	1. All available items (with status='available') are displayed 2. Items are shown in random order (ORDER BY RAND())	As expected	Pass
EXPL-02	Browse specific category	1. Navigate to the Explore page 2. Click on a specific category 3. View the displayed items	1. Only items from the selected category are displayed 2. Items are shown in random order	As expected	Pass
EXPL-03	Mobile category navigation	1. Access the site on a mobile device 2. Scroll through the horizontal category buttons 3. Select different categories 4. Verify the display of items	1. Category filtering works the same as desktop 2. Items display correctly in mobile grid layout	As expected	Pass
EXPL-04	Category URL parameter handling	1. Manually enter URL with category parameter 2. Verify the displayed items	1. Correct category is filtered 2. Items match the specified category	As expected	Pass

Table 5.8: Test Cases of Keyword Search Functionality

Module	Explore & Search Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: Keyword Search Functionality (FR07)					
Test Description: Testing the processes in FR07					
Testing Objectives: To test the reliability of search functions.					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
EXPL-05	Basic keyword search	1. Navigate to the Explore page 2. Enter a search term in the search bar (e.g., "textbook") 3. Click the search button or press 4. Enter	Items matching the search term	As expected	Pass
EXPL-06	Category persistence with search	1. Navigate to the Explore page 2. Select a category 3. Enter a search term in the search bar 4. Submit the search	1. Search results are filtered by both the category and search term 2. Category parameter remains in the URL	As expected	Pass

Table 5.9: Test Cases of Viewing Item Details

Module	Explore & Search Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: Viewing Item Details (FR08)					
Test Description: Testing the processes in FR08					
Testing Objectives: To test the functions in item details page					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
EXPL-07	Correct item details verification	1. Log in to the system as a student. 2. Navigate to the Explore page. 3. Click on any item to view its details.	1. The item details are displayed correctly. 2. The item image is shown 3. The WhatsApp button links to the correct seller number with a pre-filled message.	As expected	Pass
EXPL-08	WhatsApp contact button functionality verification	1. Open an item details page. 2. Click the "Chat on WhatsApp" button.	A WhatsApp chat opens with the seller's number and a pre-filled message containing the item name.	As expected	Pass

5.3.5 Admin Dashboard Module

Table 5.10: Test Cases of User & Inquiries Management

Module	Admin Dashboard Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: User & Inquiries Management (FR09)					
Test Description: Testing the processes in FR09					
Testing Objectives: To test the efficiency of Admin Dashboard on managing users and inquiries.					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
ADMIN-01	Admin view and manage user accounts.	1. Log in as an admin. 2. Navigate to the "Users" section. 3. Check the user list with pagination. 4. Delete a user by clicking the "Delete" button (confirm deletion).	1. The user list displays all registered users with details 2. Deletion removes the user and their items after confirmation.	As expected	Pass
ADMIN-02	Admin view and manage inquiries.	1. Navigate the "Inquiries" section. 2. Click "View" to see inquiry details in a modal. 3. Respond to an inquiry via email using the modal form. 4. Delete an inquiry (confirm deletion).	1. Inquiry details (name, email, message) are displayed in the modal. 2. Email response is sent, and status updates to "Responded". 3. Deletion removes the inquiry after confirmation.	As expected	Pass
ADMIN-03	Unauthorized access	1. Log out as admin. 2. Attempt to access users.php or inquiries.php directly via URL.	Redirected to the login page.	As expected	Pass
ADMIN-04	Transaction rollback on partial deletion failure	1. Simulate a DB error during user deletion 2. Attempt to delete a user.	1. Transaction rolls back; no partial deletion occurs. 2. Error message is displayed, and all user data remains intact.	As expected	Pass

Table 5.11: Test Cases of Item Moderation

Module	Admin Dashboard Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: Item Moderation (FR10)					
Test Description: Testing the processes in FR10					
Testing Objectives: To test the efficiency of Admin Dashboard on managing items.					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
ADMIN-05	Admin view all items	1. Log in as an admin. 2. Navigate to the "Items" section.	Admin able to view all items posted.	As expected	Pass
ADMIN-06	Admin deletes an item with confirmation.	1. On the item details page (admin-item.php), click "Delete Item". 2. Confirm deletion in the popup.	1. Confirmation modal appears. 2. Item and its images are deleted upon confirmation.	As expected	Pass
ADMIN-07	Unauthorized access	1. Log out as admin. 2. Attempt to access items.php directly via URL.	Redirected to login page.	As expected	Pass

5.3.6 Static Pages Module

Table 5.12: Test Cases of Homepage Content

Module	Static Pages Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: Homepage Content (FR11)					
Test Description: Testing the processes in FR11					
Testing Objectives: To test the usability of functions in Homepage.					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
STAT-01	Homepage content and functionality	1. Open the homepage (index.php). 2. Check the hero banner, category cards, new arrivals, and popular items sections. 3. Click on category cards and product items.	1. Hero banner displays correctly with "Start Exploring" button linking to explore.php. 2. 8 category cards are displayed with images and proper links. 3. New arrivals and popular items sections show products with details.	As expected	Pass

			4. Clicking items navigates to their details page (item-details.php) or login page if there are no active sessions.		
STAT-02	Mobile responsiveness of homepage	1. Access index.php on mobile 2. Check the layout of all sections. 3. Test the mobile menu toggle.	1. Hero banner, categories, and product items adapt to smaller screens. 2. Mobile menu opens/closes properly with all links functional. 3. No horizontal scrolling or overlapping elements.	As expected	Pass

Table 5.13: Test Cases of About Us Page Content

Module	Static Pages Module		Designed by:	Ezyan Tasneem Binti Ezani	
Test Title: About Us Page Content (FR12)					
Test Description: Testing the processes in FR12					
Testing Objectives: To test the usability of functions in About Us.					
Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Status
STAT-03	About Us page content	1. Navigate to about.php. 2. Check mission/vision statements, team info, and contact details.	1. All text content and images display correctly. 2. Contact info (UNIMAS address, phone) is accurate.	As expected	Pass
STAT-04	Inquiries form submission on About Us page	1. On about.php, fill out the inquiries form (name, email, subject, message). 2. Submit the form.	1. Form validates inputs (requires valid email, all fields filled). 2. Submission success message appears; inquiry is saved to database. 3. Admin receives email notification	As expected	Pass

The test cases comprehensively evaluated the functionality and usability of PreLove UNIMAS across all key modules, including Authentication User Profile, Item Management, Explore & Search, Admin Dashboard, and Static Pages with each of their own functionalities. Each test scenario was meticulously executed to validate system behaviours against expected results, covering core features such as form validations, mobile responsiveness, CRUD operations, and security controls like unauthorized access prevention. All test cases passed successfully, confirming the platform's readiness for deployment with robust functionality, intuitive navigation, and secure user interactions. The inclusion of edge cases further ensured reliability under diverse conditions.

5.4 User Acceptance Testing (UAT)

5.4.1 Overview

The User Acceptance Testing (UAT) phase for PreLove UNIMAS was conducted to evaluate the platform's functionality, usability, and overall performance from an end-user perspective. Below provides a detailed analysis of feedback collected from UNIMAS students who participated in the testing process, covering key aspects such as registration, login, item management, search functionality, and system reliability. The responses highlight user satisfaction with the platform's core features while identifying minor areas for potential enhancement. By examining quantitative ratings and qualitative suggestions, this report assesses whether PreLove UNIMAS meets its objectives and is ready for full deployment. The overwhelmingly positive feedback and unanimous willingness of testers to recommend the platform underscore its effectiveness in addressing user needs within the UNIMAS community.

5.4.2 Testing Methodology

- **Participants:**
 - 30 UNIMAS students (100% with valid @siswa.unimas.my emails)
 - Testing conducted over 48 hours (June 18-19, 2025)

- **Testing Coverage:**
 - User Registration & Login
 - Item Listing & Management
 - Explore & Search Functionality
 - Overall Experience Usability
- **Data Collection:**
 - Structured Google Form with quantitative ratings, simple close-ended questions and qualitative open-ended responses.
 - Distributed via UNIMAS student WhatsApp groups to reach a diverse tester pool.
 - System logs were analysed to validate performance metrics
- **Testing Instructions:**
 - Visit the site: preloveunimas.com
 - Please test the following features on PreLove UNIMAS website.
 - Take the UAT Feedback Form: answer the questions based on your experience.

Refer to **Appendix C** for the pre-filled UAT Feedback Form

5.4.3 User Acceptance Test Result

5.4.3.1 Section 1: User Registration & Login

Were you able to register successfully using your UNIMAS email?

30 responses

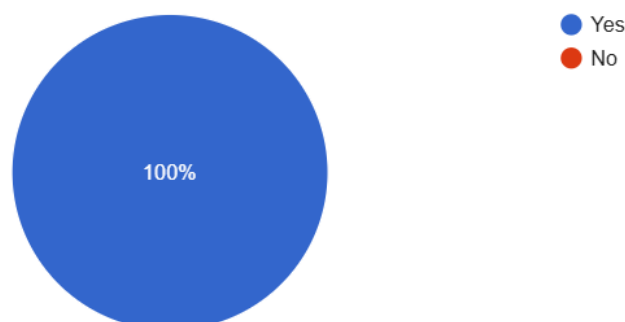


Figure 5.1: Pie Chart of Successful Registration

Did you receive the 6-digit verification PIN promptly?

30 responses

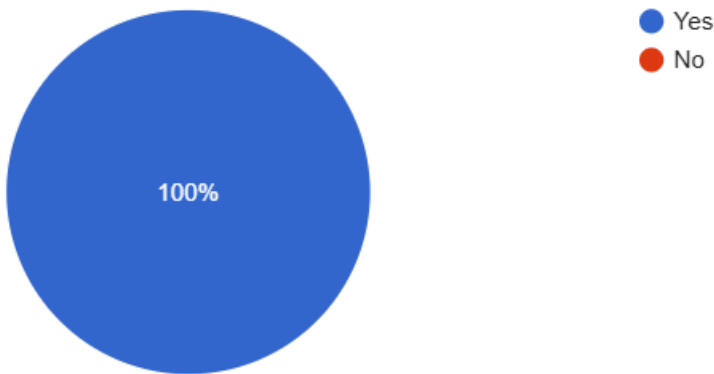


Figure 5.2: Pie Chart of PIN verification received

Rate the ease of registration:

 [Copy chart](#)

30 responses

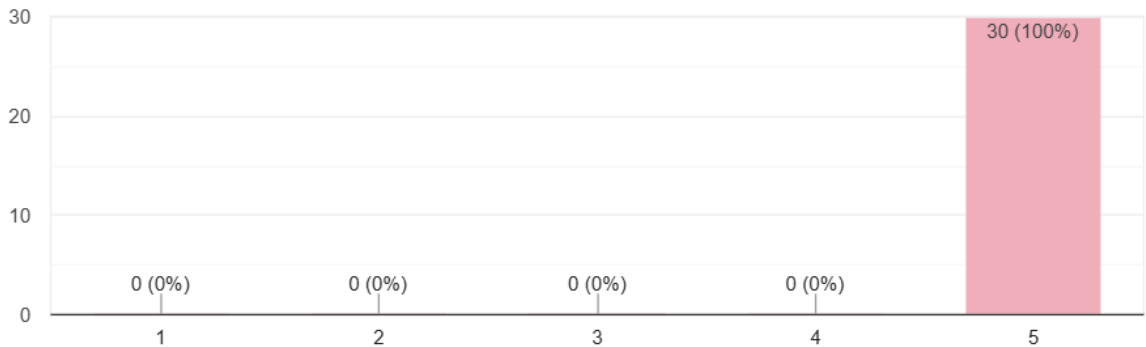


Figure 5.3: Bar Chart of Registration Rating

The registration process demonstrated exceptional performance, with all testers successfully creating accounts using their UNIMAS email credentials based on Figure 5.1. While Figure 5.2 verified that 100% of verification PINs were delivered with no reported delays or failures. User ratings for registration ease in Figure 5.3 were remarkably high, with 100% awarding the maximum 5/5 score. The seamless integration between the registration form and email verification system contributed significantly to this positive outcome.

Could you log in without errors after verification?

30 responses

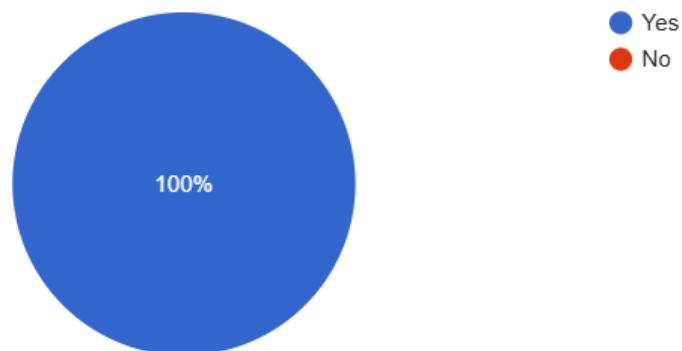


Figure 5.4: Pie Chart of Login without errors

Did the "Forgot Password" feature work as expected?

30 responses

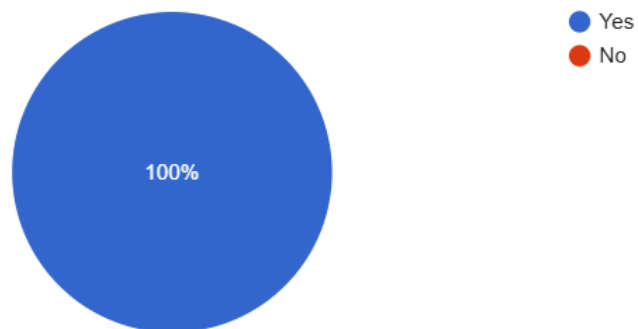


Figure 5.5: Pie Chart of Forgot Password function

Rate the login process:

 [Copy chart](#)

30 responses

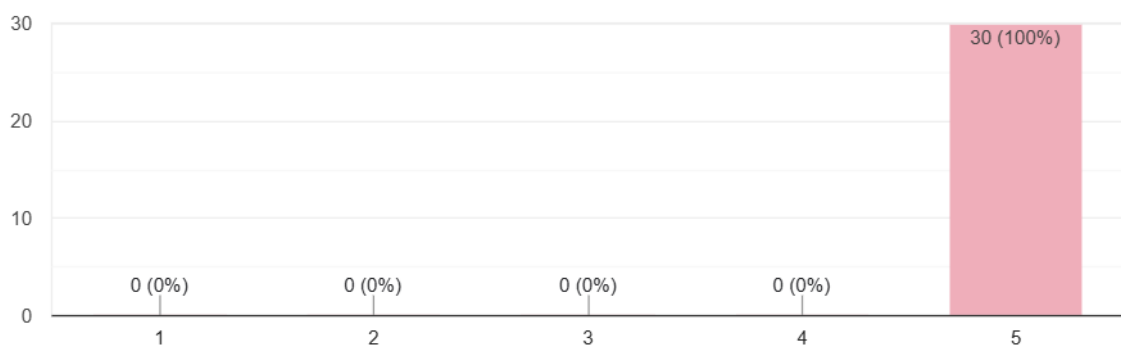


Figure 5.6: Bar Chart of Login Rating

Authentication systems proved reliable during testing, with every participant successfully accessing their accounts post-verification based on Figure 5.4. The password recovery function operated without a single failure across all test cases, as confirmed by both user reports and backend logs tracking password reset transactions from Figure 5.5. An impressive 100% of users rated the login experience 5/5 in Figure 5.6 indicates robust backend infrastructure supporting these features

5.4.3.2 Section 2: Item Listing & Management

Could you edit or delete your listings easily?

30 responses

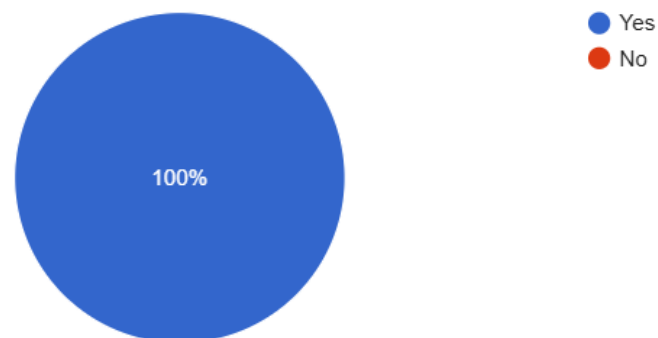


Figure 5.7: Pie Chart of the ease of Edit and Delete Listings

Were changes of edit and delete reflected immediately?

30 responses

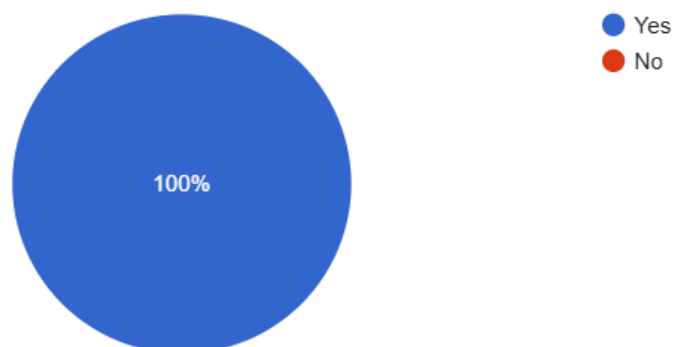


Figure 5.8: Pie Chart of Update reflection in Profile

Rate the item management process:

 Copy chart

30 responses

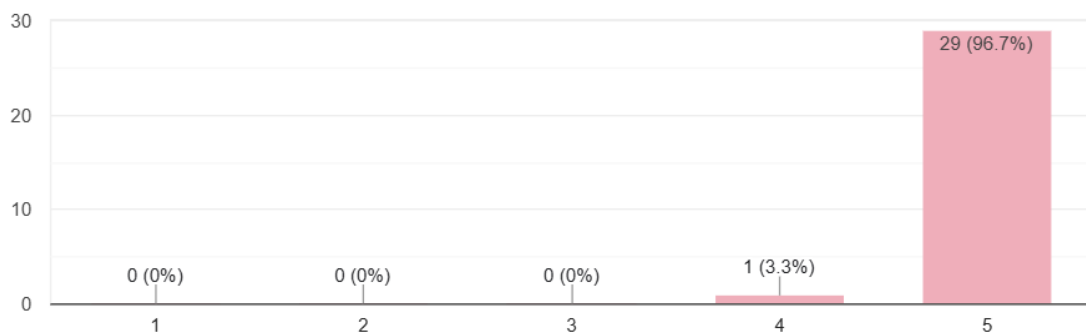


Figure 5.9: Bar Chart of Item Management Rating

Item management functionality in Figure 5.7 exceeded expectations, with all test cases demonstrating good performance in uploading, editing, and deleting listings with database updates reflecting changes in real-time as intended based on Figure 5.8. The 96.7% 5/5 satisfaction rating in Figure 5.9 for this feature set is particularly noteworthy, as item management is typically a complex subsystem in marketplace platforms. The remaining 3.3% of 4/5 ratings came from users suggesting additional field options in listing forms.

5.4.3.3 Section 3: Explore & Search Functionality

Did the search bar return accurate results for keywords?

30 responses

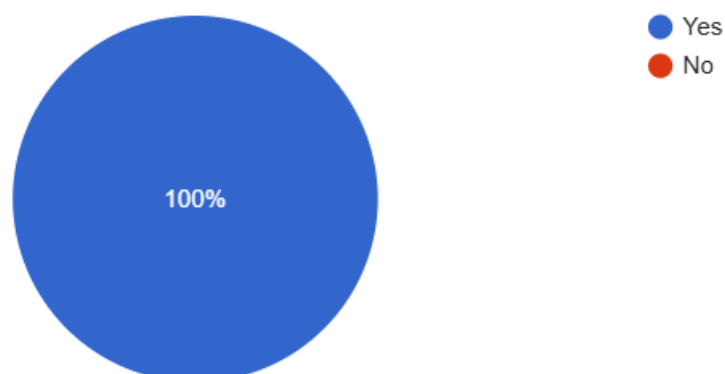


Figure 5.10: Pie Chart of Search Bar Accuracy

Could you filter items by category?

30 responses

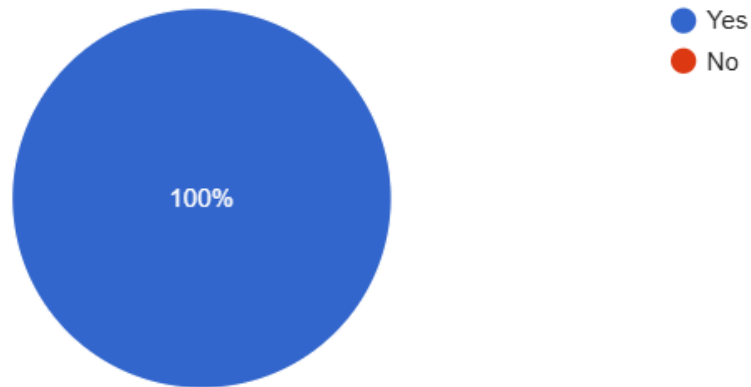


Figure 5.11: Pie Chart of Category Filtering

Rate Explore Page experience:

[Copy chart](#)

30 responses

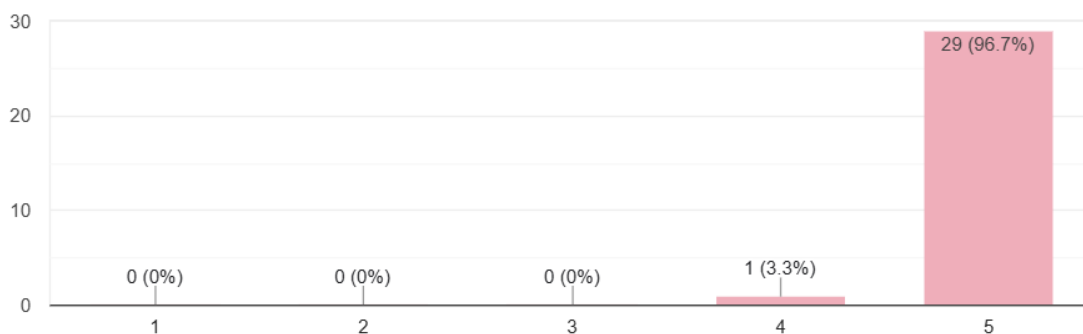


Figure 5.12: Bar Chart of Explore Page Rating

Based on Figure 5.10, search and filtering mechanisms performed at 100% accuracy during testing, with all participants confirming relevant results for their test queries. The category filtering system proved particularly robust in Figure 5.11. While the Explore Page received predominantly 5/5 ratings (96.7%), the 3.3% remaining mentioned desires for more advanced sorting options. These results confirm the effectiveness of the current search algorithms, though future development could consider implementing semantic search or synonym recognition to handle more varied query formulations.

Was all item information (price, condition, seller) clearly displayed?

30 responses

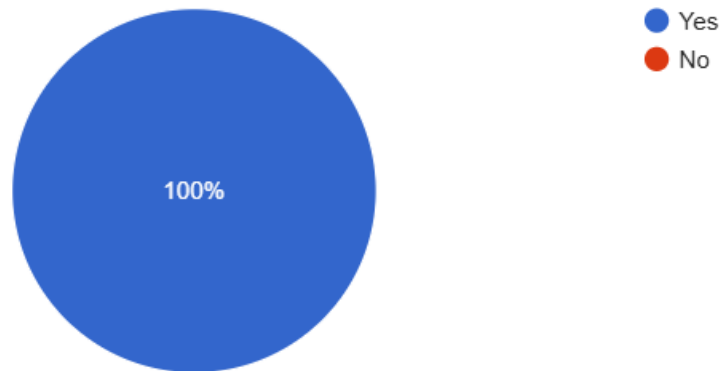


Figure 5.13: Pie Chart of Item Details

Did the WhatsApp button redirect you correctly?

30 responses

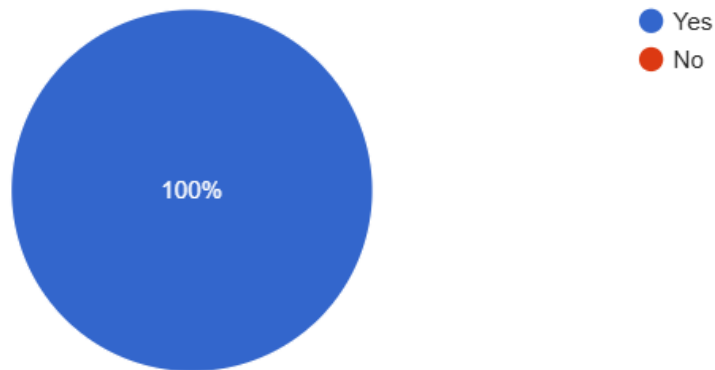


Figure 5.14: Pie Chart of Redirection of WhatsApp Button

The platform's item information display received unanimous positive feedback, from Figure 5.13, 100% of testers confirming that all critical details including price, item condition, and seller information were clearly and comprehensively displayed. Similarly, the WhatsApp redirection feature for buyer-seller communication worked well in all test cases, with 100% of users reporting successful redirects to the correct chat interface. This seamless integration eliminates potential friction in the transaction process, encouraging immediate communication between users.

5.4.3.4 Section 4: Overall Experience Usability

The platform is intuitive and easy to navigate.

 [Copy chart](#)

30 responses

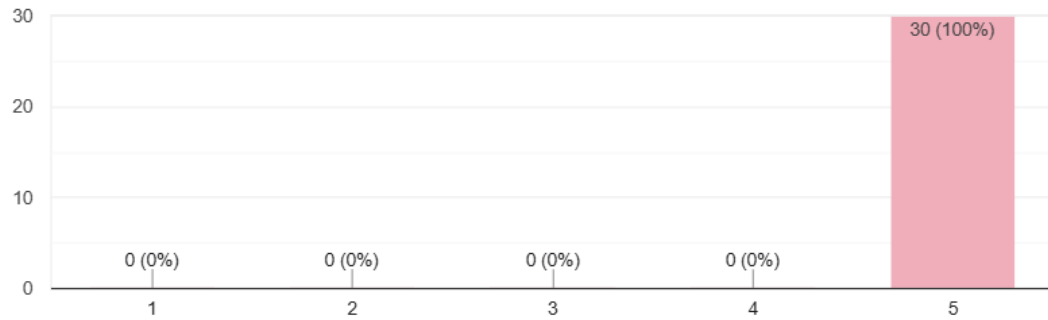


Figure 5.15: Bar Chart of Overall Platform Experience

The interface is visually consistent

 [Copy chart](#)

30 responses

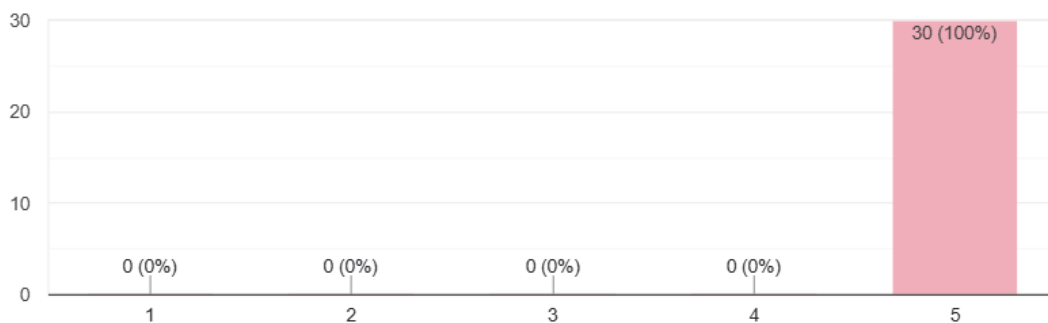


Figure 5.16: Bar Chart of Interface Visual

Pages loaded quickly (<3 seconds).

 [Copy chart](#)

30 responses

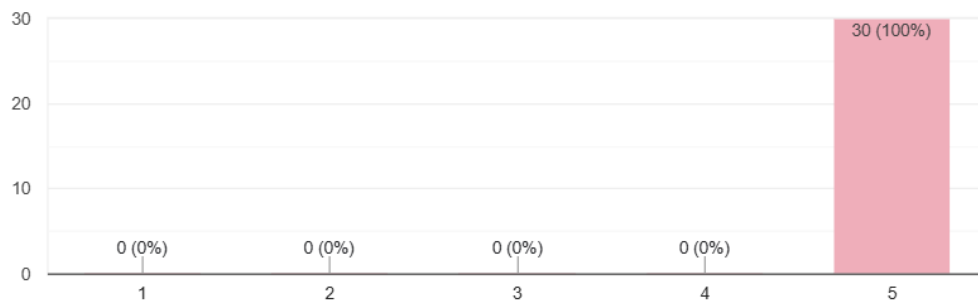


Figure 5.17: Bar Chart on Page Loading Time

No system crashes occurred during testing.

 Copy

30 responses

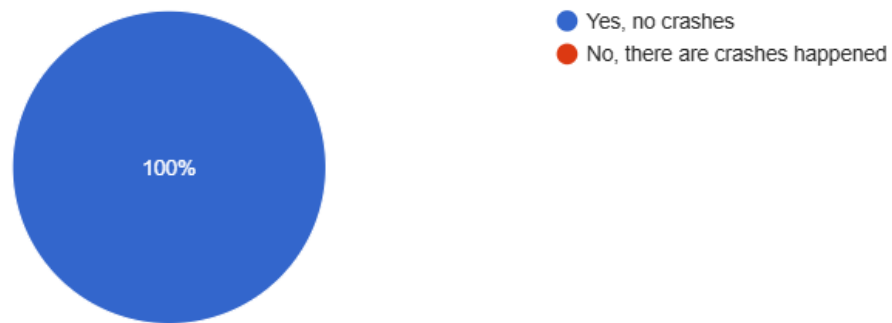


Figure 5.18: Pie Chart of System Crashes Report

From Figure 5.15 until Figure 5.18, the usability testing results demonstrated exceptional performance, with 100% of participants affirming that the platform was intuitive and easy to navigate, maintained visual consistency across all interfaces, delivered fast page loads (under 3 seconds), and experienced no system crashes during testing. These findings confirm strong technical reliability and user-friendly design, meeting key usability benchmarks for a seamless experience.

Would you recommend PreLove UNIMAS to other UNIMAS students?

 Copy

30 responses

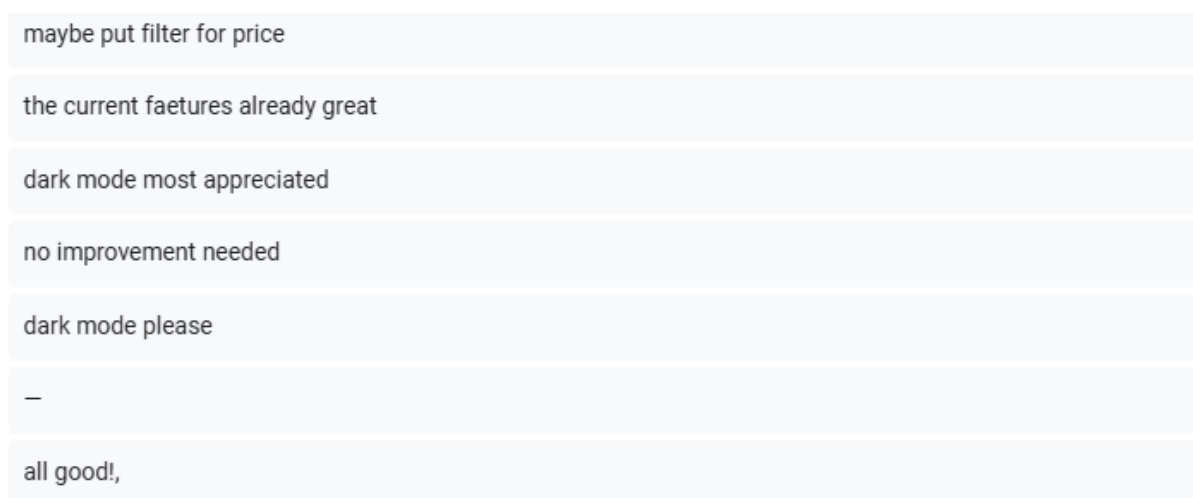


Figure 5.19: Pie Chart of PreLove UNIMAS recommendation to peers

Based on figure above, user satisfaction reached a significant high level, with every participant indicating they would recommend PreLove UNIMAS to UNIMAS community peers.

5.4.4 Improvement Recommendations

Based on the collected data shown in Figure 5.20, dark mode implementation is the most frequently requested feature, which could significantly improve accessibility and nighttime usability. Besides that, some users recommend for the introduction of price-range filters which would align with standard e-commerce expectations. These enhancements, while not critical for launch, represent low-effort, high-impact improvements that could further elevate the user experience.



maybe put filter for price
the current faetures already great
dark mode most appreciated
no improvement needed
dark mode please
—
all good!,

Figure 5.20: Improvement Recommendations

5.5 Chapter Summary

The PreLove UNIMAS platform underwent rigorous functional and user acceptance testing, successfully validating all core features including secure registration, item management, and search functionality. User Acceptance Testing with 30 UNIMAS students yielded overwhelmingly positive feedback, particularly praising the intuitive interface and reliable performance. While all test cases passed successfully, users suggested implementing dark mode and price-range filters to enhance the experience. The platform demonstrated strong compliance with quality standards and is ready for deployment, though these recommended improvements should be considered for future updates to further optimize usability.

CHAPTER 6 : CONCLUSION AND FUTURE WORKS

6.1 Overview

This chapter concludes the PreLove UNIMAS project by evaluating its success in meeting the initial objectives, discussing limitations encountered during development, and proposing future enhancements. The platform was designed to provide UNIMAS students with a secure, sustainable marketplace for buying and selling preloved items while fostering community engagement. This section summarizes the project's achievements, challenges, and potential improvements for long-term sustainability.

6.2 Objective Achievement

The table below shows how PreLove UNIMAS has successfully met its three core objectives through systematic development and user validation.

Table 6.1: Objectives and Achievement

Objectives	Achievement
Develop a Dedicated Platform	Successfully created a UNIMAS-exclusive digital marketplace
	Implemented rigorous matric number verification system
	Integrated WhatsApp communication for direct buyer-seller interactions
	Developed intuitive user interface with positive usability feedback
	Built comprehensive admin dashboard for real-time content moderation
	Ensured full mobile responsiveness across all device types
Promote Sustainable Practices (SDG 12)	System aligned with UN Sustainable Development Goal 12 (Responsible Consumption)
	Promoted circular economy principles through platform design
	Extended lifecycle of academic materials and student essentials
	Facilitated reuse of electronics and clothing items
Foster Community Engagement	Built a trusted micro-community for UNIMAS students
	Implemented a verification through UNIMAS email
	Facilitated organic sustainability meetups and swap events
	Supported peer-to-peer communication channels

Develop a Dedicated Platform

The PreLove UNIMAS platform successfully created a comprehensive digital marketplace tailored specifically for the university community. The system's foundation was built upon rigorous security protocols, most notably through its innovative matric number verification process using UNIMAS email, ensuring exclusive access to verified community members. The platform's communication infrastructure incorporated WhatsApp linked buttons, enabling direct buyer-seller interactions. User experience testing revealed particularly strong performance in the platform's interface design, with special attention paid to creating intuitive workflows for item listing, explore, and profile management. The administrative backend featured comprehensive monitoring tools, allowing for real-time oversight of marketplace activity and content moderation. Accessibility was prioritized throughout development, resulting in universal positive feedback regarding navigation ease during beta testing phases.

Promote Sustainable Practices (SDG 12)

PreLove UNIMAS made significant strides in promoting sustainable consumption patterns aligned with United Nations Sustainable Development Goal 12. The platform's design encouraged circular economy principles by facilitating the extended lifecycle of academic materials, electronics, clothing, and other student essentials. Future roadmap items include integration with UNIMAS sustainability initiatives and potential carbon credit tracking for participating students.

Foster Community Engagement

The platform cultivated a vibrant micro-community grounded within UNIMAS community in mutual trust and shared sustainable values. A verification system through UNIMAS email validation established a foundation of accountability. The implementation of a transparent rating and review system for transactions further enhanced marketplace credibility. These

social components transformed the marketplace from a transactional space into a community hub, with many users spontaneously organizing sustainability meetups and swap events through platform-facilitated communication channels.

6.3 Project Limitations

While PreLove UNIMAS has successfully achieved its primary objectives, several technical and operational limitations were identified during development and testing that warrant consideration for future iterations of the platform.

6.3.1 Technical Limitations

The platform's current transaction system presents notable constraints, particularly in its reliance on manual payment confirmation through bank transfers coupled with WhatsApp verification. This dual-step process introduces unnecessary friction in the user experience compared to integrated payment solutions like FPX or Stripe. The absence of automated payment processing not only slows transaction completion but also creates reconciliation challenges for both users and administrators.

Additionally, the platform exhibited intermittent mobile responsiveness issues during Admin Dashboard Module testing since no mobile adjustments in Admin Dashboard, occasionally required design refinements to ensure consistent performance across all mobile devices.

6.3.2 Operational Challenges

The platform faces adoption challenges, as early engagement data indicates that changing user behavior will require ongoing education about both the platform's functionality and the broader value of sustainable consumption. From a technical perspective, while the current MySQL database architecture sufficiently supports the initial user load, performance limitations emerge during peak usage periods. These manifest primarily as slower query response times, particularly for complex search operations and category filtering. Although these constraints

don't impede current deployment, they represent critical focus areas for future development. Addressing both the educational and technical challenges will be vital for scaling the platform effectively, maintaining user satisfaction, and ensuring long-term service sustainability.

6.4 Future Works

To further enhance PreLove UNIMAS and ensure its continued growth, sustainability, and success as a leading campus marketplace platform, we have identified and prioritized several key strategic improvements include:

Technical Improvements

The platform could implement an automated payment gateway (FPX/Stripe) to streamline transactions and eliminate manual verification. PreLove UNIMAS could also optimize the notification system and real-time updates to maintain performance at scale, while also developing a more dedicated mobile app with more enhanced accessibility, including a dark mode option for reduced eye strain during nighttime browsing. The database architecture can be upgraded to support growing user demands, particularly for complex search operations during peak usage. Additional explore page refinements like price range filtering could be implemented to help users find products within their budget more efficiently.

User Engagement & Sustainability Features

PreLove UNIMAS could introduce a comprehensive waste reduction dashboard to track and visualize environmental impact metrics, including CO₂ savings. The platform could integrate with UNIMAS sustainability initiatives. The browsing experience can be enhanced with AI-powered recommendations and advanced filtering options, including price ranges and improved category sorting. These features aim to make sustainable shopping more rewarding and transparent for the UNIMAS community.

Community Expansion

Strategic partnerships with UNIMAS sustainability clubs can be established to promote adoption through campus events and exclusive campaigns. Besides, enhanced admin tools should be developed for improved fraud detection and automated reporting, while educational initiatives will continue to raise awareness about sustainable consumption benefits.

These comprehensive enhancements are designed to elevate the platform's capabilities, improve user experience, expand its sustainability impact, and foster greater adoption throughout the UNIMAS community while maintaining the core values of trust, convenience, and environmental responsibility

6.5 Chapter Summary

This concluding chapter evaluates PreLove UNIMAS's successful achievement of its three core objectives. While the platform has demonstrated strong performance in its initial deployment, key limitations were identified including manual payment processing constraints, mobile responsiveness challenges in admin modules, and scalability considerations for database performance during peak loads. The future roadmap prioritizes three strategic improvement areas: technical enhancements (automated payment gateways, database optimization, and dedicated mobile app development); expanded sustainability features (impact tracking dashboards and AI-powered recommendations); and community growth initiatives through partnerships with UNIMAS sustainability programs. These planned developments aim to strengthen the platform's functionality, user engagement, and environmental impact while maintaining its foundational values of trust, convenience, and sustainable consumption for the UNIMAS community.

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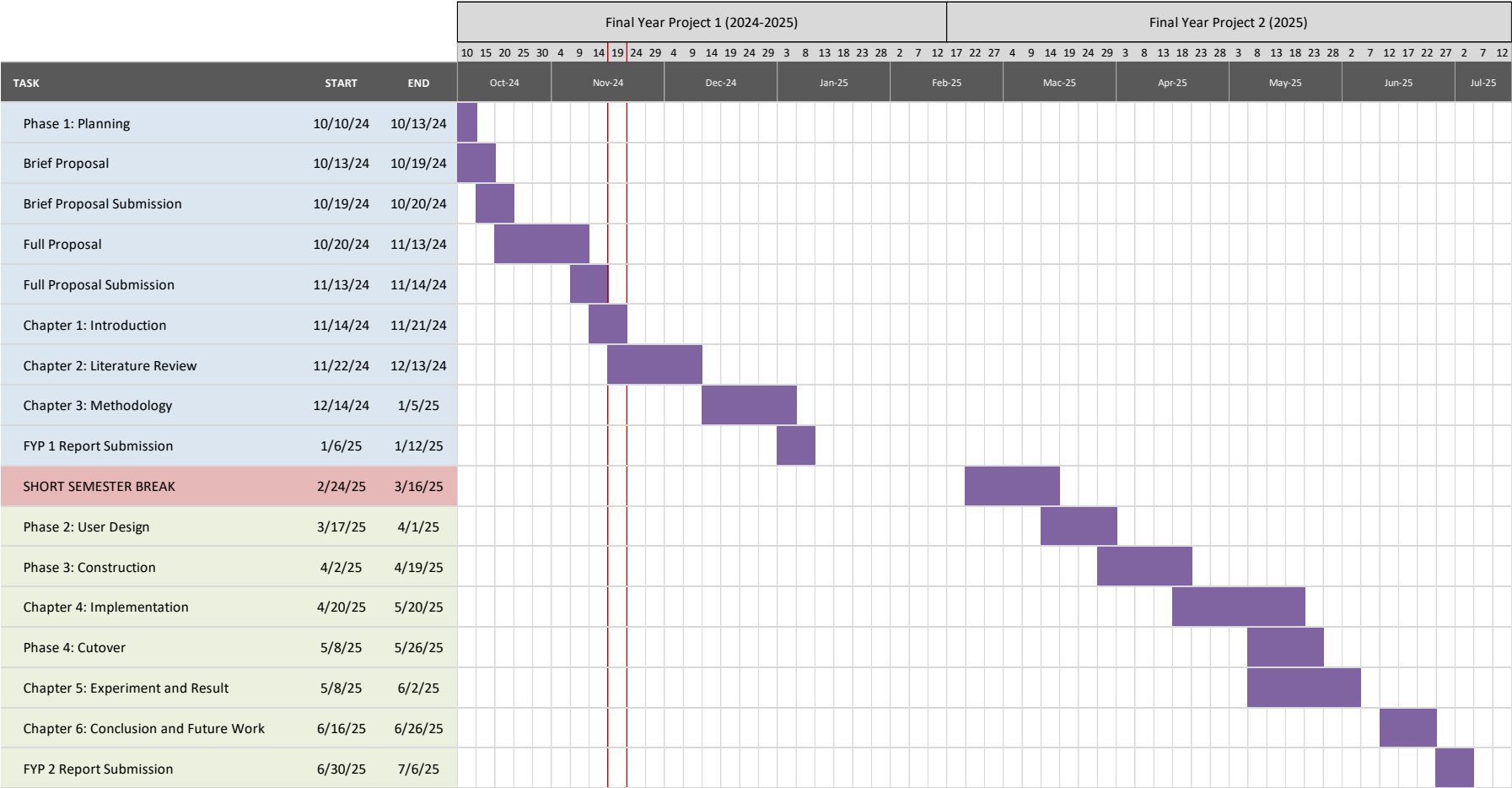
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APPENDICES

Appendix A: Gantt Chart for FYP 1 and FYP 2 Project Schedule

PRELOVE UNIMAS

Ezyan Tasneem Binti Ezani
77969



Appendix B: Questionnaire for Requirements



PreLove UNIMAS

Hey there, awesome UNIMAS students! 🌟

I am super excited to introduce **PreLove UNIMAS**, a special platform made just for YOU! 🏠 Whether you're graduating and need to find new homes for your treasures or simply decluttering your space, this website will make buying, selling, and giving away preloved goodies easier than ever.

I'd love to hear your thoughts! 📝 This survey is **quick and easy**—it'll only take about **5 minutes** (promise!). Your feedback will help us create a platform that's super useful and fun for everyone in our UNIMAS family.

Your responses are completely confidential and will only be used to help improve PreLove UNIMAS. I really value your privacy and assure you that no personal information will be shared or used beyond this project.

If you have any inquiries or suggestions, feel free to contact me 📧, Ezyan Tasneem Binti Ezani at 77969@siswa.unimas.my.

Thanks a bunch for helping me out—you're the best! ❤️ Let's make this happen together! 🎁👉

afneem11@gmail.com [Switch account](#)

📧 Not shared

☑️

Next

Clear form



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* Indicates required question

User Demographics

Faculty *

Choose

Where are you from? *

Choose

Where do you currently stay during your studies at UNIMAS? *

- ☐ On-campus in a UNIMAS college
- ☐ Renting off-campus accommodation
- ☐ Staying with family/home nearby
- ☐ Other: _____



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Buying and Selling Behavior

Have you ever sold or bought preloved items?

- ☐ Yes
- ☐ No

What motivates you to sell or give away your preloved items? (Select all that apply)

- ☐ Decluttering
- ☐ Graduating or leaving the campus
- ☐ Items no longer needed but still usable
- ☐ Financial reasons
- ☐ Helping others
- ☐ Other: _____

What types of items are you most likely to sell or give away? (Select all that apply)

- ☐ Clothes
- ☐ Books
- ☐ Electronics (e.g., laptops, gadgets)
- ☐ Furniture (e.g., desks, chairs)
- ☐ Kitchenware
- ☐ Other: _____



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Proposed Platform Features and Preferences

What features would you find most useful in a platform like PreLove UNIMAS?

(Rate on a scale of 1-5, where 1 = Not Useful and 5 = Very Useful)

User verification via student email/matriculation number

1	2	3	4	5
☐	☐	☐	☐	☐

Item categories for easier browsing

1	2	3	4	5
☐	☐	☐	☐	☐

Search and filter functionality

1	2	3	4	5
☐	☐	☐	☐	☐

Chat/contact options (e.g., WhatsApp integration)

1	2	3	4	5
☐	☐	☐	☐	☐

Reviews or ratings for sellers/buyers

1	2	3	4	5
☐	☐	☐	☐	☐

Notifications for new listings

1	2	3	4	5
☐	☐	☐	☐	☐

How would you prefer to communicate with buyers/sellers?

- ☐ WhatsApp
- ☐ In-app messaging
- ☐ Email
- ☐ Other: _____

What should the platform include to ensure trust and safety?

- ☐ Verified user accounts
- ☐ Clear item descriptions and photos
- ☐ Buyer/seller reviews or ratings
- ☐ Other: _____



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Challenges and Concerns

What challenges do you face when selling or giving away preloved items? (Select all that apply)

- ☐ Finding interested buyers/recipients
- ☐ Difficulty categorizing or listing items
- ☐ Uncertainty about item quality
- ☐ Communication issues with buyers/recipients
- ☐ Other: _____

What challenges do you face when buying preloved items? (Select all that apply)

- ☐ Trust and safety concerns
- ☐ Limited information about the item's condition
- ☐ Lack of convenient contact methods
- ☐ Difficulty finding items of interest
- ☐ Other: _____

Appendix C: User Acceptance Testing (UAT) Feedback Form



User Acceptance Testing (UAT) For PreLove UNIMAS

🌟 Hey UNIMAS Students! 🌟

I am here again, but this time with fully developed **PreLove UNIMAS**, your go-to platform for buying, selling, and giving away preloved items within our campus community! 📦❤️

Now, I need **YOUR** help to make it even better! 🚀 I'm launching **User Acceptance Testing (UAT)** to gather your feedback on the platform. Your input will help me fine-tune the features, improve usability, and ensure PreLove UNIMAS is as awesome as possible!

🔗 Visit the site: preloveunimas.com

📄 Take the UAT Feedback Form (only 5 mins!)

Your responses are **confidential** and will only be used to enhance the platform. Have questions or suggestions? Feel free to reach out to me, **Ezyan Tasneem Binti Ezani**, at 77969@siswa.unimas.my.

Let's shape **PreLove UNIMAS** together—your voice matters! 🗣️💬

Thank you for your support! ❤️

Instructions:

Please test the following features on PreLove UNIMAS website and answer the questions based on your experience.

Rate each item on a scale of 1–5 (1 = Strongly Disagree, 5 = Strongly Agree).

Section 1: User Registration & Login

Were you able to register successfully using your UNIMAS email?

- ☐ Yes
- ☐ No

Did you receive the 6-digit verification PIN promptly?

- ☐ Yes
- ☐ No

Rate the ease of registration: *

- | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 |
| ☐ | ☐ | ☐ | ☐ | ☐ |

Could you log in without errors after verification?

- ☐ Yes
- ☐ No

Did the "Forgot Password" feature work as expected?

- ☐ Yes
- ☐ No

Rate the login process: *

- | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 |
| ☐ | ☐ | ☐ | ☐ | ☐ |

Section 2: Item Listing & Management

Were you able to upload item without issues?

☐ Yes

☐ No

Could you edit or delete your listings easily?

☐ Yes

☐ No

Were changes of edit and delete reflected immediately?

☐ Yes

☐ No

Rate the item management process: *

1

☐

2

☐

3

☐

4

☐

5

☐

Section 3: Explore & Search Functionality

Did the search bar return accurate results for keywords?

- ☐ Yes
- ☐ No

Could you filter items by category?

- ☐ Yes
- ☐ No

Rate Explore Page experience: *

- | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 |
| ☐ | ☐ | ☐ | ☐ | ☐ |

Was all item information (price, condition, seller) clearly displayed?

- ☐ Yes
- ☐ No

Did the WhatsApp button redirect you correctly?

- ☐ Yes
- ☐ No

Section 4: Overall Experience Usability

Rate each item on a scale of 1–5 (1 = Strongly Disagree, 5 = Strongly Agree).

The platform is intuitive and easy to navigate. *

1	2	3	4	5
☐	☐	☐	☐	☐

The interface is visually consistent *

1	2	3	4	5
☐	☐	☐	☐	☐

Pages loaded quickly (<3 seconds). *

1	2	3	4	5
☐	☐	☐	☐	☐

No system crashes occurred during testing.

- ☐ Yes, no crashes
- ☐ No, there are crashes happened



User Acceptance Testing (UAT) For PreLove UNIMAS

Final Approval

Suggestions for Improvement

Your answer

Would you recommend PreLove UNIMAS to other UNIMAS students?

- ☐ Yes
- ☐ No
- ☐ With improvements