UPTM REUNITE

NURSYASHA AMIRA BINTI SAIFUL
AM2311015156

UNIVERSITI POLY-TECH MALAYSIA

UPTM REUNITE
CATEGORY A

NURSYASHA AMIRA BINTI SAIFUL

THIS FINAL YEAR PROJECT REPORT IS PREPARED TO FULFILL THE REQUIREMENT OF
DIPLOMA IN COMPUTER SCIENCE

FACULTY OF COMPUTING & MULTIMEDIA
UNIVERSITI POLY-TECH MALAYSIA

NOVEMBER 2025

Declaration of Originality

This project is all my own work and has not been copied in part or in whole from any other source except where duly acknowledged. As such, all use of previously published work (from books, journals, magazines, internet, etc.) has been acknowledged within the main report to an item in the References or Bibliography lists.

I also agree that an electronic copy of this project may be stored and used for the purposes of plagiarism prevention and detection.

Copyright Acknowledgement

Author's Signature:
Date:18/11/2025

Coordinator / Office Stamp

Abstract

UPTM ReUnite is a mobile app created to digitalize and simplify the lost&found activity at Universiti Poly-Tech Malaysia (UPTM). It is a solution to the inefficiency in the current system, which is manual and includes centralized WhatsApp broadcasts and physical check ins; it will provide a centralized system that functions in real time where students can physically report and search for lost items instead.

The current system is too slow, disorganized and results in students getting low recovery rates, which infuriates and burdens students with financial damage to MPP through administrative work. UPTM ReUnite is notable as it encourages a proactive, community based methodology of lost and found and supports increased honesty, cooperation, trust and campus community. It promotes access that is fair for all students no matter what device they're using or how much money they have in their pocket.

The project followed the Agile method chaining methodology, implementing iterations over two weeks of operation. The app was developed using flutter for frontend and firebase for backend services(Authentication, Cloud Firestore and Cloud Storage). Data collected from student questionnaires and an interview with the MPP committee informed development. Deterministic testing (unit, integration, system and UAT) Most challenging was the exhaustive validation of the solution? s behavior.

The result is a complete, well coded and easy to use mobile app. UAT results were overwhelmingly positive with 88.5% of students rating the app as “Very Easy” to use and 77% reporting that it “Greatly Simplified” lost-and-found. The MPP manager also vouched for it about saving time and reducing administrative burden. UPTM ReUnite is already a successful example of how an innovation-focused, student-oriented technology product can be utilized for solving real-world campus issues.

Table of Contents

List of Figures

List of Tables

Acknowledgements

First and foremost, all praises to Allah S.W.T., the Most Gracious and the Most Merciful for bestowing me strength, patience and capability to complete this project.

I would also like to extend my heartfelt thanks and appreciation to my project supervisor, Madam Nor Hafiza binti Abd Samad for her support, guidance and constructive comments on developing UPTM ReUnite. Altogether too much of the solo journey often reminded me of her; but there is a real inspiration to be gathered from her influence.

Special thanks to the Project Coordinator for her guidance, and for providing a semblance of an organizational structure to this project, Madam Noraliza Azizan . I also wish to extend my gratitude to the MPP (Majlis Perwakilan Pelajar) committee, Sir Muhammad Fareez Imran Bin Rosmen for his time and availability during the user interview, ultimately giving me important administrative perspective that determined the interface of the application.

My friends and colleagues at Universiti Poly-Tech Malaysia (UPTM), thank you for being a great moral support, an ear to sound ideas off, and an arm twisting beta-tester. The feedback you provided was invaluable in improving the user experience.

Finally, I am grateful for the love and prayers of my sweet parents and family. Their love and faith in me is what has kept me going.

Thank you to everyone who helped out, we could not have completed it with out each and every one of you. Thank you.

CHAPTER 1

INTRODUCTION

1.1 Introduction

The University Poly-Tech Malaysia (UPTM), known as the College of Poly-Tech University MARA or KUPTM. A school based in Malaysia it is a private institution that offers industry focused programmes in IT and business as well as professional study institutions. The UPTM focuses on the development of multiple aspect for student experience and operation efficiencies in its facilities through technology (UPTM, 2023). This commitment includes finding solutions to the simple problems in academic life for example, that never-ending source of frustration over where you have put something that wasn't where you left it.

In every campus-wide endeavor, the university's central stakeholders are the students and board. For UPTM, the MPP, like much other students' representative councils in other countries and at school campuses is an important channel for monitoring student welfare and student life. The target audience for this campaign consists of two main groups; the system managers and users (MPP Office) responsible managing and operating lost items and all students at large who are to benefit from the service as well as contribute to its success. One practical solution could serve the MPP's administrative requirements, yet also be user-friendly and appealing to students.

Lost and Found services in schools are typically manual, fragmented, and inefficient. To solve this problem, an innovative procedure system should return any lost item to the original owner as soon as possible. The conventional system involves visiting Loser Sites at predictable times to achieve a reunion, but rather the finding and laying of what users have found. This mode of operation has a low rate of success, there are hordes of unclaimed items, inevitably resulting in something akin to an administrative blockade (Ali, 2020). As a result, both pupils curse their 'bloody bad luck and staff have an enormous administrative burden foisted on them. Students can face financial losses, stressful situations and academic upheaval, including having to show some kind of ID to use library offices. Or, more devastatingly, losing files that contain sensitive information.

On the other hand, a successful found event, whilst massively positive as a whole, can create its own logistics issues. For instance, the one who actually found an item needs more time than that to turn it into “found property.” And yet all such things are lost in its vast merits and importance. A successful one promotes good behavior and morals among students fosters a strong community spirit of trust and collaboration, in general, it benefits student health as such.

The goal of UPTM ReUnite ultimately is to construct and digitize a lost and found mechanism at UPTM where such solitude and arc-of-pain sentiment doesn’t belong. A single, real-time platform for students to report items lost in location-based photos descriptions that includes the most recent location on a map. People who find items can post them to a database which will be searchable by search engines. Finally, features will incorporate push notifications about system-recommended matches as well as secure chat to validate and coordinate returns, and a dashboard for MPP administrators to oversee activities in real time and expedite the process of making or processing claims. UPTM ReUnite wants to take advantage of the shared nature of smartphones and provide a system that is faster, more efficient and respectful of users.

This theme can be summarized by " lost found." It’s a relatively little thing, but it makes a big difference to the lives of UPTM students and the efficiency of administration. The old-school manual system simply can’t keep up in this day and age of digitization. We propose the design and implementation of UPTM ReUnite, a mobile app that addresses some of these well-known challenges (Sharma & Gupta, 2019: Aloudat et al, 2022). This easy to use, all in one place site that can provide support for students to help themselves and each other takes some of the burden off administration AND builds its culture around being honest and giving a hand up. In order to address a real challenge (the lost and found in this case) with the soul of UPTM’s creativity, this project is an exercise in innovation.

1.2 Problem Statements

Optimizing the lost and found process, the existing lost and found infrastructure at UPTM is heavily dependent on a centralized manual method through a Whatsapp broadcast channel administered by MPP. The framework reveals two important issues relevant to and connected with its validity and acceptability.

1.2.1 Slow and Restricting Sharing Hub

The existing model is a major impediment to the efficient distribution of information. The essential feature of the system is that there must exist a MPP administrator, who acts as the only intermediary for all lost and found information reports. The problem with such a process is its centralisation: when an item is lost or found, the student typically has to report to the administration by informing them face to face and wait until the details of the item will be announced and share it out to this wider channel. This complex process leads to extensive waits, often for hours. Long response time for finding valuables items such as wallets, or phones, reduces the chance of recovery success especially when searching in a so called "wasted time" kind of situation. The methodology the system uses is too slow to react so support is not felt in a timely manner - students are left frustrated with lack of faith in the process.

1.2.2 Lack an intuitive and organized interface

When a messaging platform like WhatsApp is used as the generalist lost and found notification, there will be noise and low signal regularization. In the UPTM WhatsApp rooms, other non-relevant posts (academic announcements, event advertisements or administrative notifications) quickly drown those about lost and found items. WhatsApp does have a basic search feature, but given that there is no hierarchical categorised structure of the messages and we cannot dive inline on long threads effectively, it's hard to get exactly what we are looking for. For instance, a notice regarding a lost laptop can easily scroll down the list of messages and become less visible to the intended user. Because these platforms are vanishing and unorganized, students may be unable to watch for crucial lost and found information announcements, therefore such communications are ineffective and their return rate of items is reduced.

1.3 Project Objectives

1.3.1 To provide a centralized mobile platform for managing lost and found items efficiently.

The ultimate goal is to avoid administrative bottleneck and provide a direct communication channel between students. It also allows users to post listing of lost/found items on their own without action from the other party in real time. Friendly UI to enable swift reporting including field descriptions, category), photo/camera based submission of reports with geo-tagged location information and associated time/date stamp. This automated system relieves administrators of any responsibility in the reporting process, and allows information to be published immediately. This feature makes it possible to report the lost and found more quickly with their owners, thereby increasing substantially the reunion success ratio.

1.3.2 To design a user-friendly interface with categorized and location-based search features.

Under this objective, we plan to make the UPTM ReUnite mobile application as an organized platform by which chaotic and unproductive WhatsApp channels can be managed. The application will also include an organised database for categorising lost and found items (example: Electronics, Documents, Clothes), using the facility of location and status based filters (Lost/Found) to streamline the search process. Core features such as push notifications, a confidential app-only messaging system and multi-criteria search options (keyword, category, location, condition) will enhance the discoverability of items and encourage return. An Admin Moderation Dashboard allows MPP administrators to review and police listings, approve or deny removal requests for returning criteria violations, to keep an organized clean place.

1.4 Scope and Target User

1.4.1 Project Scope

The project is estimated to start with needs assessment through student surveys and market research, continuing onto iterative design and development based on Agile methodology. This ranges from Wireframing and prototyping for user-testing, Developing the app on Android Studio (frontend) and Firebase(Backend). We will deliver pilot version for a limited number of users before the final product is released, with ongoing bug fixing and feature adding supported for user feedback. The range is only limited to UPTM campus community digital services, which does not include hardware-linked services, off-campus disaster recovery services and money transactions. The project will result in working software, technical documentation and user training material, all delivered according to the academic deadline.

1.4.2 Product Scope

UPTM ReUnite is a mobile application targeting UPTM students and Admin(MPP UPTM), designed to report and track misplaced items on the campus grounds. The app will be integrated with a secure university login, so users can report detailed lost/found forms containing the descriptions, time and location of loss/gain, and attach pictures. A searchable database with filters by category, location or status will help to match lost items with the reports of what's been found where they've gone missing as it is reported, and real-time alerts will keep users updated on potential matches. There will be a post moderation and dispute management functionality through which UPTM's admin will be able to manage posts, resolve disputes etc. Their first release will target essential features for mobile (iOS and Android) apps, basic needs before more advanced stuff like reward systems or IoT tracking.

1.4.3 Target User

1.4.3.1 MPP Admin

The MPP Admin is a system super-user, not just an obstacle to getting things done. They are tasked with overseeing the UPTM ReUnite platform and the content submitted by students to ensure its authenticity and appropriateness. This user would require back-end tools for moderating listings, working on ownership disputes and managing system categories, shifting from a high-labour manual work to effective ecosystem management.

1.4.3.2 Students

Students are the primary end-of chain-user whether code finding or code loss happens. Immediate posting of items for sale and searching is needed, a direct to the public system without intervention. Their basic needs are that it's fast, clean and efficient to use with tools for example real-time-notifications and one-on-one messaging secured in the app allowing quick and safe reunions!

1.5 Project Requirement

1.5.1 Hardware Requirement

Acer Nitro 5 (AN515-58)	
Operating System	Windows 11 Home
Processor	12th Gen Intel(R) Core(™) i5-12450 (2.50 GHz)
RAM	8 GB
Storage	512 GB SSD
Display	15.6" FHD LED IPS 144Hz
System Type	64-bit operating system, x64-based processor

1.5.2 Software Requirement

1.5.2.1 Figma: The Basics of Design and Prototyping

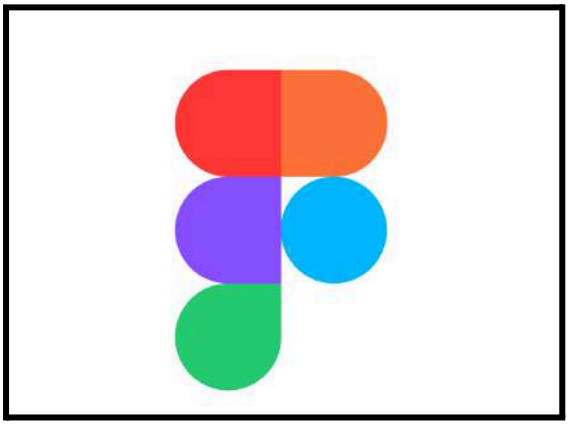


Figure 1.1 : Figma Logo (seeklogo, 2025)

Figma UI Mock up Figma has been in the eyes for creating and editing graphic designs since 2016 in web-based tool used for interface design, this is a design that offers the possibility of co-operation at the same time. The web-based feature makes it very easy for everyone to work on it together in real-time, especially perfect for group projects.

Function & How it Works with UPTM ReUnite: Figma was the software that the entire UX/UI of the UPTM ReUnite app was designed on before any code was written. We built every screen with it from the login screen and lost item report form, to the feed of listings you can search through, to the secure chat screen. We linked them together to create an interactive prototype, And that is so important. This clickable model also allowed us to simulate the app's flow, test how intuitive its design is with potential users and discover and fix usability issues early on. It was vital part of the progress for reaching the project target to have a simple and accessible tool, verifying that everyone could access system without depending on intermediate administrators.

1.5.2.2 Android Studio: The Ultimate Tool for Development

Figure 1.2 : Android Studio Logo (Roboqta, 2024)

Background: Android Studio, developed by Google, is the official Integrated Development Environment (IDE) for building Android apps. It comes with everything developers need to build, test, and debug apps for the Android platform.

The UPTM ReUnite app was designed predominantly on Android Studio as the workstation. We used it to write our entire codebase in the Kotlin programing language with the SQLite framework. The built-in assets were invaluable; the code editor was crucial in producing fast-loading lines of code for fancy features like camera integration (to upload product photos), the emulator helped test how well the app worked with different-sized screens on made-up devices, and most importantly debugging tools helped trace issues within complex functions such as the search algorithm and real-time chat. Android Studio was the battleground where every abstract idea from Figma and other spaces were shaped into a real, live native Android app.

1.5.2.3 Firebase: The Core and Backend

Figure 1.3 : Firebase Logo (Firebase, 2019)

An open-source data tracker that have been used to track this CRM system and provide the functionality as explained by Kim and Ko1 about builders of software application to be able to improve performance of their product.

Firebase is a BaaS (Backend-as-a-Service) owned by Google. Developers that want a toolbox to tackle most common backend needs, but do not want the hassle of running servers.

Function and Relationship to UPTM ReUnite: The UPTM ReUnite application is powered by Firebase. It takes care of all the crucial backend processes:

Firebase Authentication: Enables safe user authentication via UPTM student email, ensuring that only validated members of the campus can enter the application.

Firebase Cloud Storage: Securely stores any photographs uploaded by users with regards to their lost or found items.

We built the transcription hub at scale, reliable and secure with Firebase, where automatic updates between worlds is possible in real-time and keep everybody in sync; which mitigates the “slow restrictive sharing hub” matter.

1.5.2.4 GitHub: A Platform for Teamwork and Security in Coding

Figure 1.4 : GitHub Logo (logos-world, 2024)

GitHub is version control and collaboration system Git based. It is useful to monitor code changes and enable people work together in software development.

Function and Relation to UPTM ReUnite: GitHub was the primary secure location for all of the project source code. When a new feature was developed whether the notification system or administrative dashboard the code would be “committed” by staff members and then “pushed” to GitHub. That meant that there was a complete record of every change, which acted as a nice safety net. If a new feature had broken the program, we could simply revert to a previous stable version. Also, its work with other collaboration tools helped make it easy for teams to collaborate, ensuring that code written for a particular part of the program would not have conflict with similar projects. It was so crucial to keep the code base clean and practice Agile since the beginning of a project's life.

1.5.2.5 Canva: The Tool for Promotion and Graphics

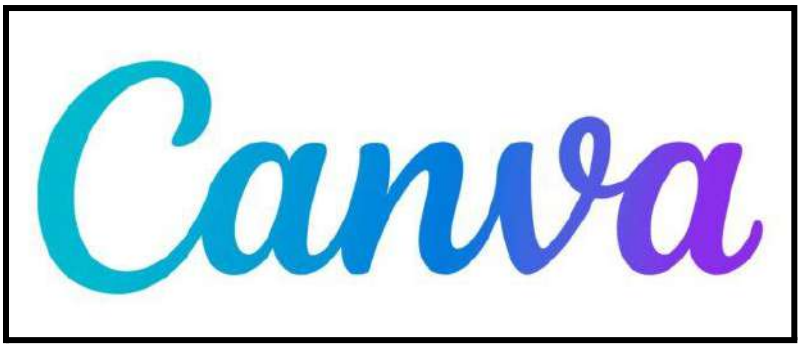


Figure 1.5 : Canva Logo (logo-marque, 2021)

Background: Canva is a simple to use mobile application and web based graphic design tool that allows anyone to make professional looking visuals without needing advanced design skills.

Role and relation to UPTM ReUnite We used Canva for all the project documentation and communication, while focusing on creating the app interface tools. Using it, we made graphics to gather user's needs for the Google Form survey. Posters for project documentations and presentation slides. This ensured that all project related materials had a cohesive and professional aesthetic, something critical for successful marketing and user adoption post-release.

1.6 Conclusion

UPTM ReUnite, aims to address an issue have personally encountered and witnessed my friends face. Every step of this process from the kernel of an idea to the final lines of code and this report has been a personal journey, driven by our belief that nobody on our campus should have so inefficient a way to help one another. This app is my attempt to do make it honest a little bit of create a space because, while half-assing something is never a good idea, I can see where there maybe a use for this little pipe dream and the let ourselves feel safe even when we think our university only cares about staff members & not us.

Even though it was super tough to tackle this project solo, I found the Agile method really maintained my focus and kept me plugging away. Each solo sprint became a fun, challenging puzzle, each line of code taught me something about how to solve problems and every frustrated hour was overcome by the prospect of a student finding something they'd long thought lost. This has been more than creating an app, it's been a massive learning on my part of discipline, tenacity and going after what I think is a worthwhile pursuit. This project shows how one dedicated, passionate individual can produce something profoundly useful for their community.

And the real test for how well UPTM ReUnite works will be not just on how effective it is when built, but on what percent of people even bother to use it. I pray that all of us in this student body will take this seriously, but place a high value on it like there are other things we do collectively, for example, honesty and helping one another. I just really hope it turns into something that is a quiet, important part of campus life. Its aim is unadorned and sincere, even if it would eventually become about AI or campus integration: to get us to treat each other well.

This is my work, my sleepless nights and my dreams come true. I pray UPTM ReUnite demonstrates that when students lead, innovation doesn't require a committee, it only requires true compassion. I'm sending it to my university with hope hoping that it can be an infinitesimal cut of support, as part of a campus where no one has to deal with loss alone.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In ~~my~~ OUR opinion, mobile technology has revolutionized how people deal with every day problems, like locating missing or lost personal items. Conventional lost-and-found systems such as physical storing space and manual logbook are common fall victim of inefficiency, difficult accessibility, low recovery rates as well (Abdul-Jalil Salman & Athab, 2022). The old systems also make more work for staff, who have to manually keep track of what is turned in, and it can be difficult for students to verify whether or not their belongings had been found. The rapid development of mobile technologies and cloud-enabled services has created new opportunities for IT-based solutions, with more effective, real-time and scalable techniques to recover misplaced objects (Zhou et al., 2024).

Big tech companies like Apple and Google have spent the past decade building digital tracking mechanisms to solve the problems of older systems, as have creative companies including Tile. The varied approach to location tracking taken by Apple's Find My network, Google's Find My Device service, and the Life 360 represent three distinctive architectural concepts. Each one relies on location tracking, community reporting, and cloud connectivity but they offer different levels of availability, expense, personal privacy, and ecosystem dependency (support signals). apple. com, 2025; support. google. com, 2019; intl. life360. com, 2025). These solutions have set the ground for digital lost-and-found systems and provide valuable lessons when designing customised applications for specific communities.

As for Universiti Poly-Tech Malaysia (UPTM), developing the new UPTM ReUnite mobile application also requires careful consideration towards these models. Unlike worldwide solutions, which are designed for millions of users in public consumer markets, UPTM ReUnite has to meet the needs of a company world community isolated by location. This literature review examines and appraises, in the context of this paper, operating strategies Apple, Google and Life 360 to identify what can be adopted as best practice and what can be eschewed. By crafting our system design on the basis of this significant assessment, we are ensuring that UPTM ReUnite is not only feasible but also relevant to students and staff in the campus community (Castro et al., 2022).

2.2 Investigation

2.2.1 Cost-Effective Accessibility

A significant limitation of such commercial item retrieval systems is that they are based on expensive hardware or proprietary ecosystems. Apple's Find My network is integrated very neatly into iOS and macOS devices, making it hard for non-Apple users to benefit from its features (support. apple. com, 2025). Similar to all of those, Life 360 relies on users subscribes or upgrade plan package (intl. life360. com, 2025). Here at UPTM lots of students are on a budget, and these dependents might limit their participation!

ReUnite: UPTM Product Vision The present limitation will be addressed by ReUnite, which adopts an affordable model and zero dependence on expensive device ecosystems or external hardware. Leaving the device to perform only as a software with existing hardware available already in smartphones (Veeru et al., 2024). This ensures that all students, regardless of which phone they have or how much money they make, are able to access the platform equally. UPTM ReUnite removes the barriers to entry so more people can be included and contribute, and in turn creates a warm atmosphere for our entire campus community.

Also, the application will be designed to operate on multiple platforms. And unlike Apple's limited one only some Android users won't be able to use, UPTM ReUnite is intended for both Android and iOS, being the more all-encompassing solution (supports. google. com, 2019). The ability to work across different devices is really important in Malaysian universities, where students have varying devices some of which they could afford and others they like. "It just really does make it easier, and therefore more people participate," Madam Hafiza said, "and that makes lost-and-found recovery more successful."

Focusing on serving affordability really aligns with UPTM's mission of providing all students the ability to succeed. Cutting it Some slack Besides, the university shows that it has some kind of care for its students by cutting any overhead cost on the platform and subtly pushing a sense of community ownership to the platform. Inexpensive access to UPTM ReUnite is not only a technical game-playing, but human values pervaded and mirrored in justice, inclusivity and collective responsibility that cuts deeply across all members of the community (Abdul-Jalil Salman & Athab, 2022).

2.2.2 Campus-Centric Design

The global lost-and-found sector, based on my sample of one, is a drag because it's sprawling. All three companies like Apple, Google and Life 360 operate in a global market, but none of them intends for their systems to be tailored in the same ways as for college campuses. For instance, Apple's "Find My" requires a large-scale global device network (Jiang et al., 2019) for triangulation and does not work well in an enclosed environment such as libraries or lecture rooms. Similarly, Tile also relies on the presence of other Tile users nearby something that is likely few and far between in small local communities. These limitations indicate the necessity of campus-optimized solutions.

This problem is dealt with by addressing UPTM ReUnite in a campus-centric way. The system is suitable for UPTM's spatial limits, social circles and administrative constraints (Castro et al., 2022). The app might integrate with an institution's current Wi-Fi infrastructure to enhance indoor tracking accuracy, a secondary add-on for most worldwide systems. They could also use it to embed some campus aspect; eg drop off locations for certain parts of our uni, sanctioned reporting forms by the university, systems tying this with student ID number into place. These are the elements that make for a smooth and strong recovery, that matches our college's rhythms and structure.

With a narrower focus on the campus, UPTM ReUnite could then put into practice what it did best: efficiency instead of scale. ReUnite isn't the same as global networks that have to steward millions of devices in many states of undress. It markets itself to the UPTM community in particular, so response times should be even quicker and less complicated. Such focused development enables users to believe that the system was built for them, not simply a localised variant of a generic model (DEREK, 2023).

Placing an emphasis on the ReUnite campus also such facilities to be more closely managed "from the top-down." School staff could act as moderators who check the veracity of claims, resolve disputes and make sure the system was used done/used correctly. Megastructures and mimetic structures tend to not have governance mechanisms. UPTM ReUnite is part of an improved, more responsive and credible approach that connects technical efficiency with institutional accountability (Ballard et al., 2025).

2.2.3 Privacy-Conscious Community Reporting

Privacy is a big issue for international tracking systems, and the solutions we have don't strike the right balance between secure and user-friendly. Apple's Find My is end-to-end encrypted and so harder to participate in community instances (support. apple. com, 2025). Tile is similarly open and yet more vulnerable to your data because it piggybacks off third-party devices (intl. life360. com, 2025). Neither of those approaches works very well in a college situation where trust and security are super important.

Possibly UPTM ReUnite tries to solve this problem with privacy based community reporting in the design. The essence of ReUnite is the combination of tech and human based, unlike global players that works slavery on automation (Shivaramakrishnaan & Logesh, 2025). For example, if someone says they have lost an item, the app could give that person a way to provide details of the lost object, such as a description and its most recent location (as much information as possible can be given without the user having to reveal sensitive personal information). Sounds users' reports on the other side can't be reported and they are encouraged to participate in a peer pressure free reporting environment.

ReUnite also will utilize local data storage and restrict campus access. Information would only be accessed in the UPTM community, which reduces the likelihood of outside attacks or unauthorized use. Such campus-oriented design enables user's confidence in how their personal information is well-protected and responsibly managed, much more critical for students who are skeptical about using digital systems (Zhou et al., 2024).

Transparency is a really big part of it. The platform will be built on a foundation of clear privacy-preserving rules, and methods for giving consent as well as "mechanisms by which people can manage what data they choose to share, it said. This contrasts with commercial systems, which typically have long, confusing privacy policies that are often beyond the comprehension of most users. ReUnite prioritises being explicit and gaining consent, thereby positioning itself as a robust framework for balancing efficiency with the ethical responsibility of processing sensitive data (Abdul-Jalil Salman & Athab, 2022).

2.2.4 Notifications

Although the current manual process involving recovery of property placed in safekeeping at an MPP or HEPA office is also fatally restrictive because it fails entirely to provide proactive notification. Students are not currently able to easily find out if their lost belongings have been found, and have to physically visit the relevant offices in order to query this which is time-consuming and inefficient. UPTM ReUnite seeks to fill this gap through the application of a real-time push notification system, which transitions the nature of a recovery from being manual rather than electronic.

The app is designed to provide you with notifications that are not just up-to-the-minute, but also customized accordingly. When there is a close match between the description on another user's "found" report and the same registered users "lost" item, this results in an immediate digital match for which a push alerts are instantly sent to the other mobile device. Second, each new message in the in-app chat triggers an instant alert so the finder and owner can liaise quickly to confirm their contact details and arrange a handover at any of the official collection sites. That way, timely information is received directly by users and not buried among other modes of communication.

That's a one-way trip from proactive, maybe googling where places are that you don't even know about to passive awareness with instant alerts. It would avoid students having to make frequent trips to MPP or HEPA office just to get a lost item when they find them. As an outcome, a proactive method is used to minimize the recovery time, low overhead may be applied for administration (due to fewer unclaimed items) and a flexible lost-and-found system is sustained. Two Push Notification is an elemental assumption when creating the platform that adds efficiency and reliability (Wu, 2022).

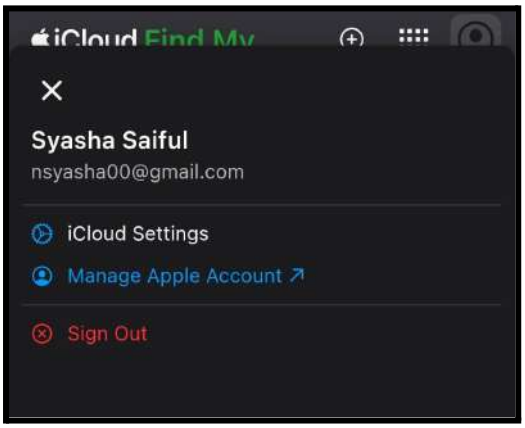
UPTM ReUnite mitigates this by integrating privacy-aware community reporting into its architecture. The speciality about ReUnite is it being a blend of tech and human led, unlike the multi nation organizations, that really work hard for automation (Shivaramakrishnaan & Logesh, 2025). For example, if an individual has lost something, the application would enable that person to share details about his or her lost object such as a description and its last known location without revealing personal information. In the meantime, other users may report on what they find without any identification of who they are or a nice, warm fuzzy family finding report. ReUnite will also utilize localized data storage, and restrict campus access.

2.3 Previous Case Study

A closer inspection of current digital tracking systems will go a long way to the development of an effective lost and found system for such a varied college campus. We analyze three popular case studies in this field: Google's Find My Device, Apple's Find My Device and the Tile Tracking System. In each case, there's a different approach that highlights its own strengths in terms of how well it works with ecosystems, currency and the physical objects themselves. Here we shall be paying close attention to their architectures, user experience designs and limitations in order to learn several useful lessons. To gain insight into what are best practices, and possible problems, and ultimately to facilitate the development of a core set of design principles that can be used as a resource in future development of UPTM ReUnite. The principles shall strive to achieve the appropriate balance of security, accessibility, cost-effectiveness and utility with regard to a college campus.

2.3.1 Case Study 1 : Apple's Find My

Apple's Find My system is much beloved as a digital tracking answer worldwide. Originally designed to find lost iPhones, it now also works with a range of Apple devices and even selects third-party products that use the Find My network. June 14th, 2020 Posted In: Uncategorized Apple's new API allows users to find tagged items leveraging GPS, Bluetooth and Apple's millions of devices all connected (support. apple. com, 2025). This global infrastructure ensures that even when a device is offline, nearby Apple devices can help it communicate with the owner using its network while maintaining privacy and anonymity for the owner. Everything in Apple's ecosystem works together so well that Find My ends up being an excellent model for digital tools to help when you lose something and want it found.



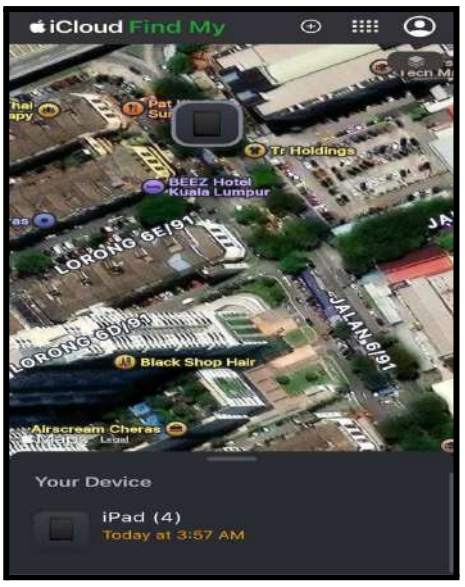


Figure 2.1 : Account overview (Find My Device, 2025) **Figure 2.2 :** Device Listing (Find My Device, 2025)

Figure 2.1 Illustrates the user's login in their iCloud account, the central portion of all Find My activities, is confirmed by the first interface. That account is associated with the email address nsyasha00@gmail.com. As mentioned in the background, this application is distinguished by its complete integration. The app is preloaded and deeply integrated with the Apple ecosystem, so no further configuration is necessary to enroll a device.

From Figure 2.2, we can see that the user is actually using a "iPad (4)," as featured prominently in the dashboard and to other devices they are interacting information with. Listing items such as the device's alias, its model generation and – perhaps most tellingly – the latest known place of residence with a timestamp like "BEEZ Hotel (KL) at Today at 3:57 AM." The focus of the system is to provide users with an easy-to-use experience, and this becomes apparent in the immediate information that it surfaces up front. This display also presents users with access to real-time information in a glance.

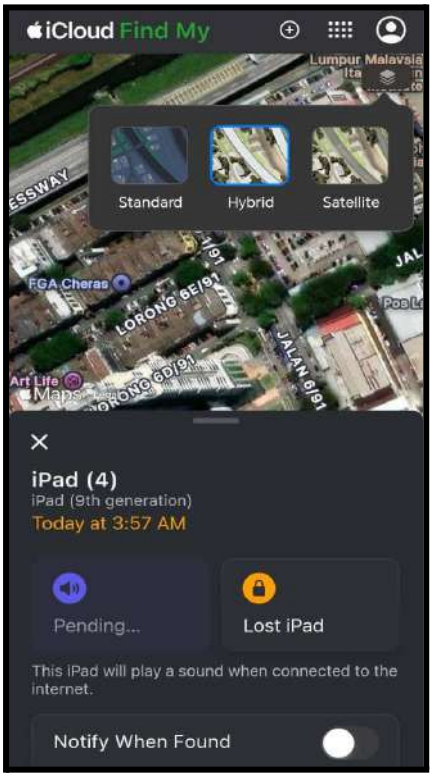


Figure 2.3 : Device Listing (Find My Device, 2025)

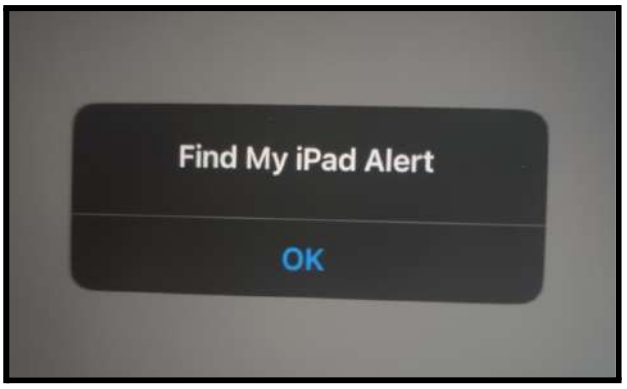
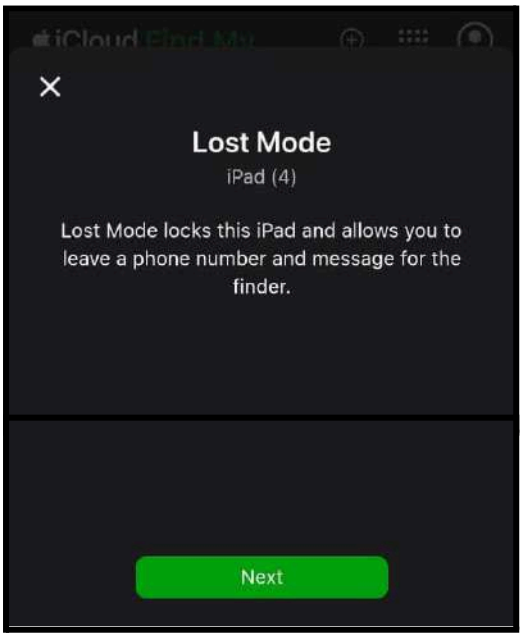


Figure 2.4 : Remote 'Play Sound' (Find My Device, 2025)

The user has detailed control over the map's appearance, as exemplified in Figure 2.3. The "Standard", "Hybrid" and "Satellite" views show different levels of geographical information, from a simple road map to photographs. This change is important in enhancing the users' experience to find around their device's occurrence like looking for a very specific building such as "BEEZ Hotel" within Kuala Lumpur. The simple user-interface of the system enables even these advanced remote tracking functions to be available with optimal ease-of-use.

The procedure in Figure 2.4 starts from the user turns the "Play Sound" function on. This command prompts the iPad to make a loud, distinctive sound, which is useful if you have lost it somewhere close. The status system displays "Pending...waiting for device message, this menas the command is waiting to be run once there is an internet connection on the device. The following image is that of the alert displayed on your iPad under the app "Find My"! This is obvious evidence of the device having successfully received the “Play Sound” command and displayed it as an alert.



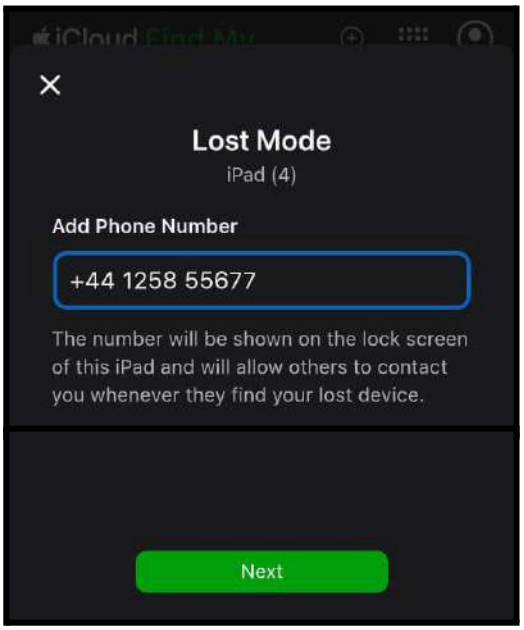
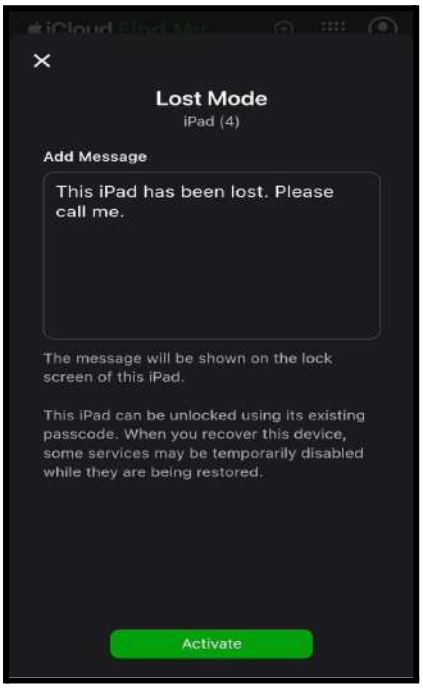


Figure 2.5 : Lost Mode Activation (Find My Device, 2025) **Figure 2.6 :** Contact Number Entry (Find My Device, 2025)

Figure 2.5 is an introduction screen showing what the "Lost Mode" does and its purpose before entering specifics. This feature “locks this iPad and lets you leave a phone number and message for the finder,” as the interface describes. This screen is needed to confirm that you are aware of what you are about to do. It briefly lists trench-safety and recovery benefits of the feature before referring the user to the next step, below:

Notice that when the user clicks on “Next” they begin configuring (see Figure 2.6). Adding Phone Number First step is that the owner has to "Add Phone Number". The UK Number (1258 55677) will also be prominently displayed on the iPad Lock screen. This step (which we noted in the background material), this process, creates not only a direct and secure means to communicate with anyone that finds the device, but also does so securely, increasing the likelihood of recovery. The system describes the significance of doing so as it will "enable others to reach you whenever they locate your lost device." This is an example of how user-centric the application is.



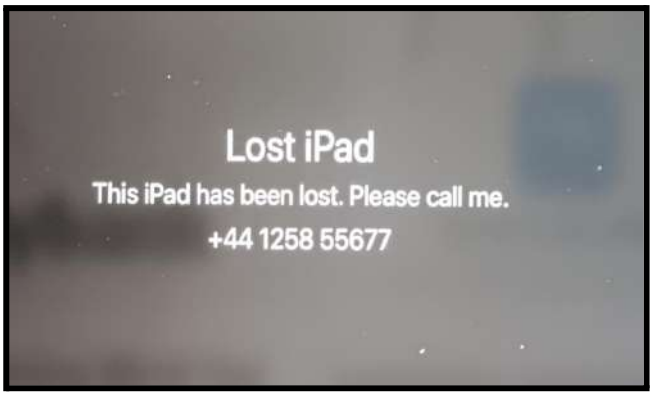


Figure 2.7 : Final Confirmation (Find My Device, 2025) **Figure 2.8 :** Lost Mode Active (Find My Device, 2025)

With the next step, as shown in Figure 2.7, you can "Add Message" to your lock screen. The user has sent the following message: "This iPad has been lost. Please, can you call me? The message and phone number provides some background of the person it's for, providing some comfort to the finder. The final screen is just a summary and the [Activate] button. Important details about the process are visible in the interface, such as being told a user can still unlock his device with his current passcode. This transparency makes an Apple user know what to expect and confirms the security measure (it will remotely lock out that iPad, displaying the contact information provided).

With Lost Mode enabled, the lost iPad's special lock screen is shown in Figure 2.8. At which point, the interface turns into a lost and found notice. Personalised message: "Lost iPad. 'Please ring me,' is a tacky advert followed by '+44 1258 55677'. This illustration confirms that the “Wipe Absolute” procedure was launched remotely and it locked your device in preparation for recovery. The ideal Lost Mode screen provides both security and an easy method for a finder to facilitate the device’s return.

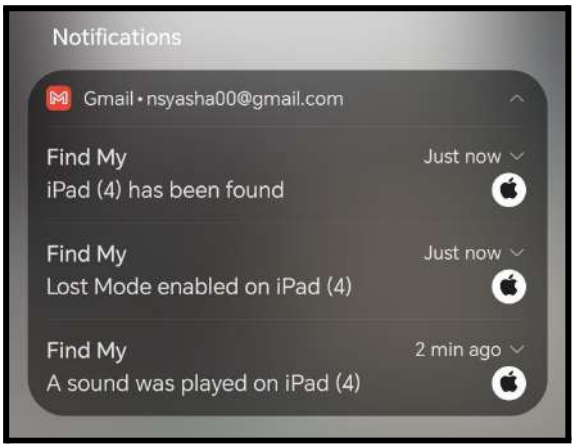


Figure 2.9 : Find My Notification History (Find My Device, 2025)

Finally, we have a log of all activities conducted remotely in the Find My app notice centre under Figure 2.9. It logs all command send order and success directly to the lost ipad which can be used as evidence.. The past reminds us: "A sound was played on iPad(4)", "Lost Mode enabled on iPad(4)", "Your iPad(4) has been found". The final alert “iPad (4) found” indicates the issue of no device is resolved. This ‘log of events in sequence’ demonstrates how trustworthy the system is and provides the user with a clear record of each and every step taken, right from starting the search down to successfully discovering the device.

A successful iPad rescue in this incident demonstrates how effective the Find My service is, when used for its intended purpose. Impeccable finish, and ease of use, as well as live remote functions make the device surveillance robust. This success also highlights the system’s primary failure-its exclusivity. Find My is only for Apple devices, and those who don’t have Apple are left out. University A such exclusivity is undesirable since, in a university environment users and faculty use several tools. Furthermore, the unique hardware benefits only a fortunate few in monetary terms (Abdul-Jalil Salman & Athab, 2022).

These limitations underline the need for consideration of inclusivity in community lost and found systems. Find My’s basic tutorials about tracking devices in real time, remotely locking them and communicating clearly will continue to be useful. The UPM University-wide solution [24] should promote the type of universal accessibility to all device families (Android, iOS, Web), protections and affordability for every campus member under a world wide open vs. Apple world wide closed infrastructure (Castro et al., 2022). So, Find My establishes a high bar for usability and security, but fails on the need for more open, inclusive and less platform-specific solutions in diverse communities.

2.3.2 Case Study 2 : Google's Find My Device

Find My Device by Google offers an interesting take on a digital version of lost and found. This is an app that helps people keep track of lost devices, specifically for Android. The system uses both GPS and network information to determine device locations, and it is available worldwide to Android users (support. google. com, 2019). Androids in general are cheaper, with a tremendously larger global user base than you will find for Apple's system.

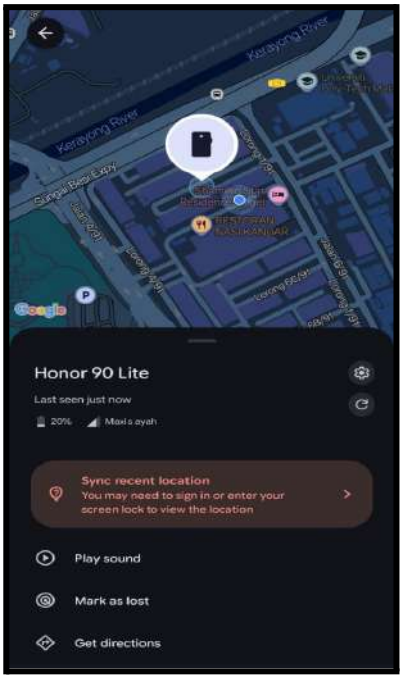
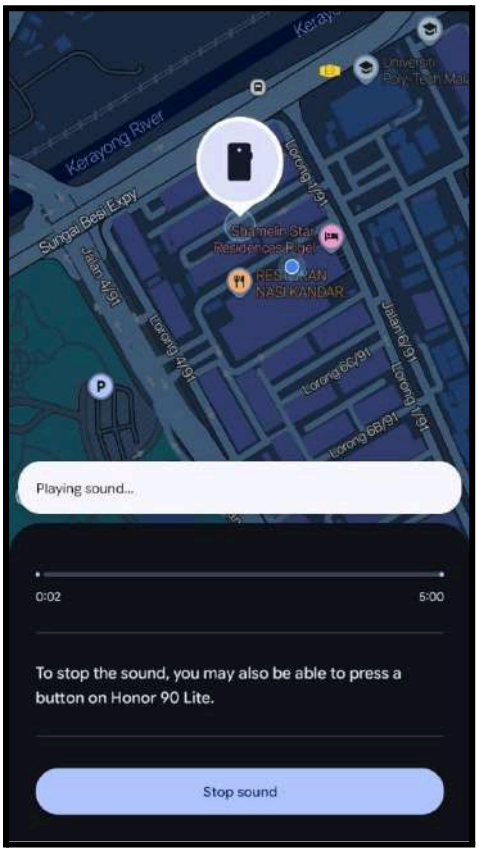


Figure 2.10 : Device Location Map (Find My Device, 2025) **Figure 2.11:** Device Control Menu (Find My Device, 2025)

The Google Find My Device service homepage for a smartphone named "Honor 90 Lite" where the two main UI interfaces are shown in Figure 2.10 and Figure 2.11 respectively. In the UI, you should see it on a map near "M Design Hotel @ Shamelin Perkasa," with a timestamp of "Last seen just now". It provides fast access to frequent remote operations, such as Play sound, Secure device and Get directions. Useful status information is presented (current battery level 29% and "Maxis ayah" network) and even the "Sync recent location" feature which requires authentication highlights that this system is all about real-time, secure positioning of particular handsets for recovery.



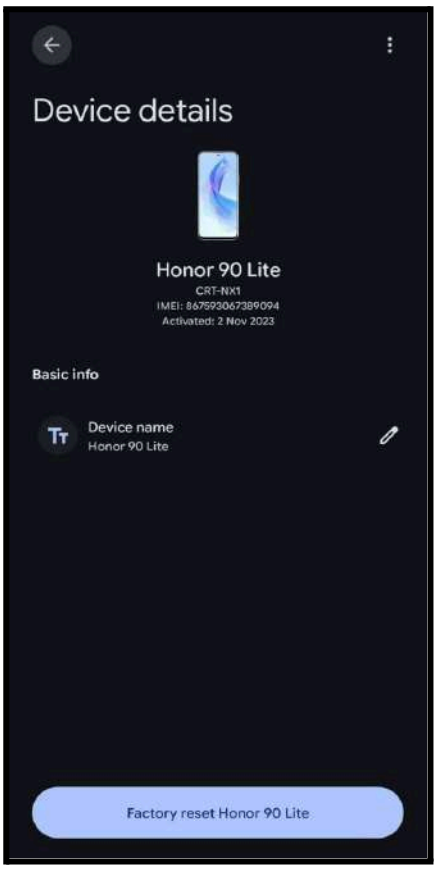
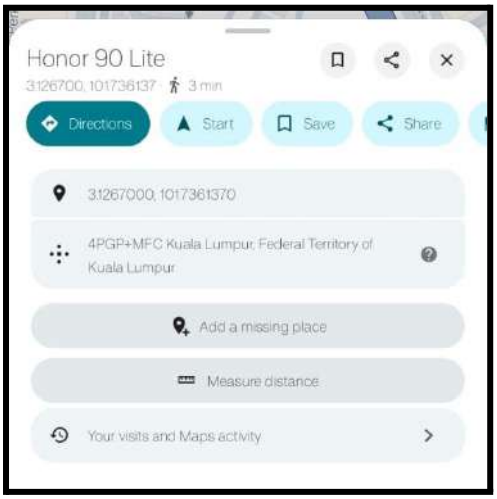


Figure 2.12 : Remote Action (Find My Device, 2025) **Figure 2.13:** Management Menu (Find My Device, 2025)

Figure 2.12 When the “Play sound” command is executed, the interface shows a connecting....." status. In case if there is any other device is connected with the same Google Account, then it can help in playing the sound on Honor 90 Lite. That suggests some kind of peer-to-peer or device-relay approach in Google’s world. User is able to "Stop sound" when needed - great job of having good power over the remote command.

If the user click into the device in figure 2.13, will appear a panel of devices when comes the complex management everything selected. This screen will show you critical like "Device details" which include : model, (CRT-NX1)as well as IMEI number, date of activation. It also offers crucial account management options, not least “Erasing” the device (the infamous remote "Factory reset"), which is among the last resorts to secure personal data when recovery seems hopeless.



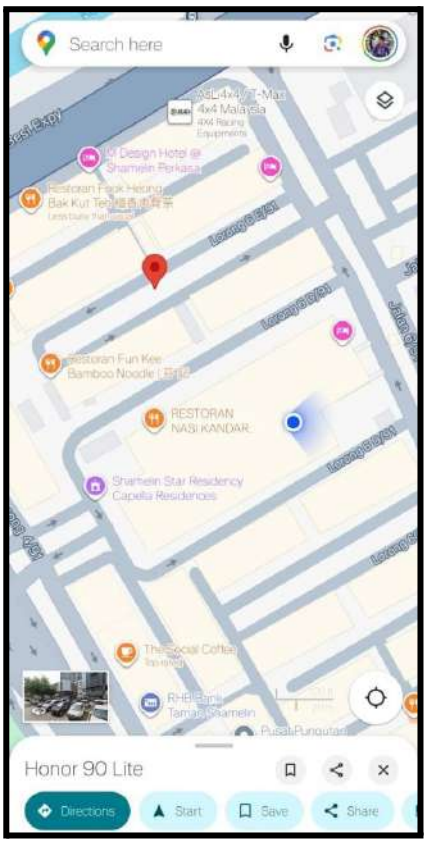


Figure 2.14: Navigation Options (Find My Device, 2025)

Figure 2.15: Location Sharing Options (Find My Device, 2025)

Additionally, we show the complete integration of the service with Google Maps to recover a device (see Figure 2.14). After selecting the device, the user can now press "Get directions" to go straight to the device's location. Recovery Featuring a user friendly interface with standard 'Start', 'Save' and 'Share' buttons this way back will be in co-operation, not isolation. Moreover, the exact geocoordinate (e.g., 4PGP+MFC Kuala Lumpur) is displayed that serves as point of reference to user.

Figure 2.15 shows that Google's Find My Device is a cheap and simple way of tracking on many Android phones. Its ability to find gadgets offline or in areas with a spotty internet connection is less powerful than Apple's, which uses its huge network of Apple devices to find lost items. Google's offering schools a lesson on accessibility. UPTM ReUnite, the campus lost and found system, should be easy to use and reachable from any phone. The technology might be different but we're looking to create a no-fuss, all-inclusive and totally effective lost item reunification device.

2.3.3 Case Study 3 : Life360

Here's an in-depth Life360 app review of one of the most popular family-oriented social locational sharing apps out there. This post investigates an alternative to Apple and Google's device-oriented approaches. Life360 uses Circles— closed groups that share your current location in real time to help you complement and cooperate. This paper leaps the user interface, from the Circle summary to location history and customizable alerts, to reveal: how dynamic user network management occur. The intention is to obtain design and functionality input on community engagement, user state management, as well as notification systems that will be used to develop a university-focused lost and found system.

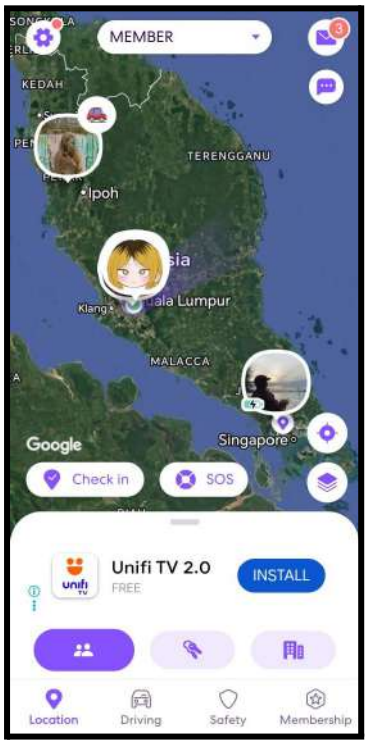


Figure 2.16 : Life360 Circle Overview (Life360, 2025)

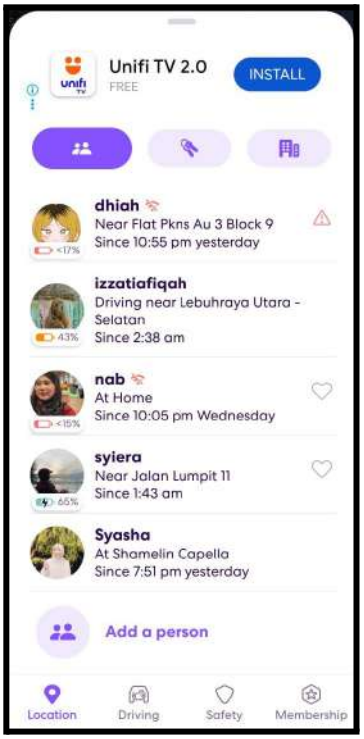


Figure 2.17 : Circle Members List and Status (Life360, 2025)

The default home screen of Life360 The user interface: private and public realm 39 Figure 2.16 Main dashboard in the Life360 app center around private groups, "Circles," and can be seen on gure 2.16. The interface will feature a map view in which the members of the circle display all participating states in Malaysian and their real-time locations, enabling them to see where everyone else is located. From here, the bottom navigation bar is your gateway to the key features of the app: The Location tab for tracking in real time, the Driving tab for monitoring trips and driving habits, Safety for emergency alerts and help pages and Membership to manage your subscription. This is kind of a command center, offering a fast visual overview of where everything is in the circle, and serving as the launchpad for sharing locations. It illustrates a user-focused design to help the user find a variety of complex spatial data easily.

You can stop viewing the map-based visualization view, but see a long list of all circle members in Figure 2.17. This screen gives you an at-a-glance view of how everyone is doing and it updates in real time, courtesy of the app. For instance, it can inform you that a member is at a specific venue (eg.“Syasha - At Shamelin Capella”) or on the move (i.e.”izzatiafiqah - Driving near Lebuhraya Utara – Selatan”). And it's crucial that each status also has a time on it ("Since 19:51 yesterday") because I want to know how long the member has been in that state. This list view is super useful to see at a glance where people stand without having to squint at map pins. It’s a great example of how flexible the app is in that it’s just repurposing the same basic data location in different, helpful ways to make life easier for people.

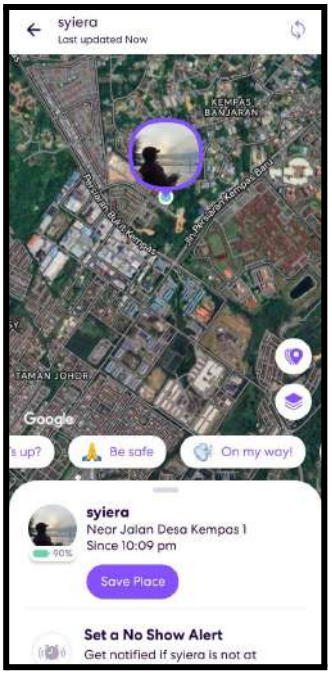


Figure 2.18 : Detailed Member Profile (Life360, 2025)

As seen in figure 2.18, when the user clicks on a member from the list they are presented with a detailed profile as for example in Figure 16 only registered users can access these function. This screen provide further details of the selected Member then it is showing a GPS location with modern functionality features. The features: Save a Place home, work, or any other location you visit regularly No Show Alert get an alert if the member has not arrived at their destination by a certain time Weekly Drive Report A weekly drive report that looks at your driving behaviors such as phone usage, speed and rapid acceleration, which continues to position Life360 as more than just tracking app but a full family safety offering. It’s that deeper layer of detail that makes the app useful, in interpreting location data to develop actionable information and safety alerts.

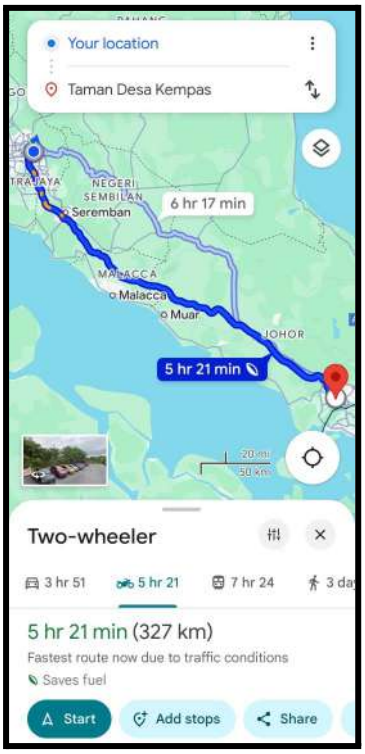


Figure 2.19 : Integrated Navigation and ETA (Life360, 2025) **Figure 2.20 :** Location History Timeline (Life360, 2025)

The relationship of the app to navigation services is illustrated in Figure 2.19. When configured in "Get Directions" mode, the application automatically navigates to a real-time location of your counsellor from your current location. It gives you an ETA, and road options based on traffic. This feature changes the app from a passive monitoring tool to an active coordination platform, one that is made more useful for real-world tasks like planning meetups or ensuring family members get home safely. Ensuring a reasonable user experience when combining tracking service and useful utilities is not easy.

Lastly, the location history feature of the app is indicated in Figure 2.20 . It monitors daily routine and where a subscriber is. This gives a retrospective view of their past activities that can be used to validate the location or to check daily rhythm. The app's ability to save and render data beyond real-time tracking is demonstrated by the "Daily History" feature. This is something I need to perform safety audits and for parents that want to monitor their teens driving habits (showing off all of the apps monitoring capabilities).

2.4 Comparison (in a table)

Feature / Case	Apple's Find My	Google's Find Hub	Life360
Primary Target	Apple devices (iPhone, AirPods, Macbook, etc)	Android devices (phones, tablets, wearables)	Real-time people tracking for family safety and coordination.
Technology Used	GPS, Wi-Fi, Bluetooth, iCloud	GPS, Wi-Fi, Google account sync	GPS, Wi-Fi, Cellular data, dedicated app network.
Accessibility	Limited (costly and exclusive to Apple ecosystem)	High (most students own Android devices)	High. Cross-platform (iOS/Android); free core features.
Offline Tracking	Excellent (Leverages nearby Apple devices anonymously)	Limited (Only shows last online location)	Limited. Relies on the lost person's device having an internet connection.
Remote Actions	Play sound, Lost Mode (lock + message), Remote Erase	Play sound, Secure Device (lock + message), Remote Erase and Navigate to location	Location Sharing, Place Alerts (e.g., "No Show Alert"), Panic Button (SOS).
User Interface & UX	Pre-installed, seamless ecosystem integration, real-time maps	Pre-installed on most Android, simple activation (via Google account), intuitive maps & controls	Feature-rich, focused on member statuses, alerts, and timelines.
Cost & Accessibility	High barrier, requires expensive Apple hardware	Free; highly accessible on diverse, often affordable Android devices	Freemium. Core features are free; advanced features require a subscription.
Key Strength	Powerful offline finding via a vast, encrypted network	High accessibility, affordability, and deep integration with Google Maps for navigation	Strong community-driven model, detailed alerts, and status tracking
Key Limitation	Platform exclusivity creates accessibility gaps in diverse environments	Limited offline functionality, effectiveness reduced in areas with poor internet connectivity	Tracks people, not items; privacy concerns can be a barrier to adoption.
Community Support	Apple ecosystem sharing	Google account network	User-created "Circles" (private groups).
Suitability for UPTM	Low. Ecosystem exclusivity and cost prevent universal access for all students.	High. High Android market share and $0 cost make it highly accessible. Lacks offline tracking for non-connected items.	Moderate to High. Provides the ideal community model and UX principles for a participatory system, though its core function is different.

Table 2.4.1 : Comparison of three app

2.5 Discussion

Reading study's review of geo popular location-based services really helps in figuring out how to develop the best lost and found system for campus. They acknowledge that the main trade-off is between closed and highly integrated ecosystems on one hand and open but less developed platforms on the other. Find My in Apple is incredibly useful and impressive this way when it comes to offline tracking, but it only works with the walled garden, which makes it difficult for some people to make use of. By contrast, for Android users, Google's Find My Device is significantly more accessible and concentrates on being cheap and easy to use. But it lacks the sprawling offline network that Apple provides. Life360 introduces a central new model that features community-driven engagement. The real strength isn't in the tracking devices, however, but rather in enabling a network of individuals who can share their status within what's called a circle. And I'm not referring to brand loyalty (service. google. com, 2019; intl. life360. com, 2025). For a university, they signal that success won't come from best practices, which is fancy talk for keeping it in the family, rather, winning means opening doors.

The particular complexity of an academic campus demands consideration of diversity in devices and artifacts. Campus lost and found would be forced to handle everything from iPhones to textbooks to student IDs, so an Apple-specific hardware model doesn't make much sense. We believe in a device agnostic approach, particularly since everyone is not using the same things (iOS/Android/Web browsers). Thus, the fundamental reason for creating a service like UPTM ReUnite is that it should be inclusive: We really wanted the whole community to be able to participate in and have an impact on how Upland grows not just those who can afford new gadgets or with disposable income.

An additional advantage of a university environment is the potential ease of institutional support. Unlike consumer apps like Life360, which rely on organic growth through user downloads of their apps to build their network, UPTM ReUnite can be adopted within existing administrative infrastructure. University staff running libraries, security offices and student hubs can add their own level of verification and trust that crowdsourcing alone may not be capable of providing, he argues. This combination of using Life360's community reporting and the university's official oversight proves it works and reduces risk, he said, as it does not need to rely on a critical mass of students from day one.

At the end of the day, getting that balance right between user experience and security if very key. In the apps we examined, intuitive, mobile-first interfaces were key to attracting people to use them. For campus, this would entail that reporting and claiming should be as simple as it is to check your status on Life360. The system needs to deal with such user's data in a secure way and at the same time be able to return items back to their owners (eg by making use of university student authentication systems). The arbitration between making things too easy and secure systems is often fellas out for trust necessary in order for the system to become a well-used campus service (Veeru et al., 2024).

2.6 Conclusion

This comprehensive review of tracking systems will provide a strong foundation for UPTM ReUnite as a specific campus intervention. A study on Apple Find My, Google Find My Device, and Life360 shows all solutions have useful functionalities but none is tailored to the specific requirements of a college environment. Apple's implementation is a good integration with the ecosystem, but being hardware restricted. Google’s offering is more accessible but lacks the bespoke community services. Life360 also represents a great type of "circle" mechanism or networking that matches well with the power and connectivity of any campus community.

UPTM ReUnite will be designed as a hybrid combining the most beneficial characteristics of each and limiting their shortcomings. The program will focus on universal access with a cross-platform design that works equally well on iOS, Android smartphones, and need of special hardware. It will be the first to be introduced into several campus locations, and functionally, it will put in place Life360's crowd-sourced model of content which magically turns the entire college community into a proactive reporting engine so that students and employees can collectively help retrieve lost items. This entrepreneurial ecosystem, fueled by university institutional interest, will establish a strong foundation in the co-optimization between efficiency and human-centered design of technology specifically for the UPTM community.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The project followed the Agile project management methodology which prescribed the UPTM REUNITE project to be carried out iteratively and incrementally including developing of minimum viable product (MVP), agile planning, ongoing optimization. This methodology was chosen in terms of its flex, unlike waterfall which are more rigid and less flexible. What appealed to me is that it does this project little by little in sprints and check and massages it based on the input of stakeholders This provided flexibility for the finished product to be more adapted to what the UPTM community actually needed.

What motivated us most to try Agile was that it is customer-driven. As it was built in small cycles then every sprint added a working piece of software with them which provided the opportunity to receive feedback from the instructors and MPP admin. This virtuous cycle did wonders for us in validating design decisions not just, but also ensuring the new application's feature set was actually solving a handful of real world problems that users care about on day 1.

It also helped that agile's emphasis on individuals and interactions was a nice fit for the solo developer. It resulted in a structured process with few documentation, which led people to invest their energy into coding and design. The process broke it down to two-week sprints, and there was a ton of power in having something tangible to aim for at each stage of work. Fueled by a tech stack of SQLite and Firebase, this approach shielded me from paralysis and allowed me to keep up the momentum right past ideation towards a shippable product.

3.2 Agile Methodology

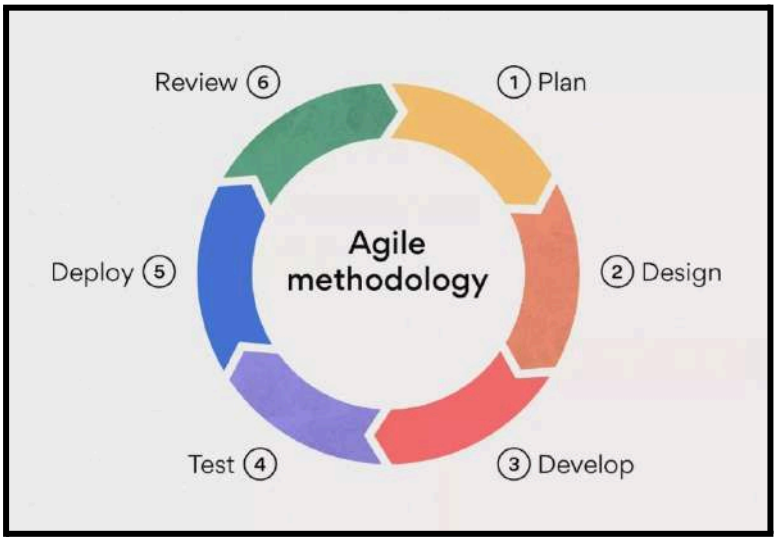


Figure 3.1 : Agile Methodology (Ashvin Patel, 2022)

The UPTM ReUnite application was designed using Agile development methodology covering the entire software lifecycle process. For this project Agile adoption, meant that we decided to construct our applications piece by piece with iterative development in a number of scheduled sprints. Each sprint was typically two weeks, and built to ship some targeted, functional piece of the application (example, user auth system or core lost posting feature). This had huge benefits when compared to a traditional linear approach as all the integration and testing happened in an ongoing manner, so any issues were identified early and the project was able to respond to learning or changing requirements more easily. The foundation was that the development version of the app worked at any time, which means you always felt that something is going on and we had something to show for feedback all the time.

As one-person show, the Agile methodology gave me a concrete frame in which to let my workflow move without the heaviness of a giant team. I was the product role and had my slice of Definition of Done in the backlog as features and priorities, and development team who took care of implementation. Initially at the beginning of each sprint I would lay out tasks for the next iteration in such a manner that I pick something of high priority from Product backlog, and will be done through remaining days. Individual daily stand-ups involved verifying progress against the sprint and re-focusing as necessary. At the end of each sprint there was a review of the work to be done, and setting up for retrospectives allowed for an examination on what went well and how I might improve my process for the next sprint. This process of planning, acting and reflecting was essential in overcoming inertia and embedding the project on course to its intent.

3.3 Phases in Agile Methodology

3.3.1 Phase : Plan

The planning stage set out the roadmap for the whole UPTM ReUnite project. This started with a detailed analysis of the problem statements and user requirements described in Chapter 1 which helped me to specify the basic features and functions the application should provide. I developed a prioritised product backlog by making us of digital Kanban board that captured all user stories and tasks listing them under must, should could have based on MoSCoW method. The Must-haves were basic functionality, such as user login, registering lost/found posts, database search capabilities and an admin dashboard because that's what I needed in the app to begin with.This backlog was used for the scope of all the project. I then created a higher level release plan, divided the time to development in 2-week sprints with crisp objectives (ex "Implement Firebase Authentication and User Profile Setup") This high level planning had to be in place in order for me not to get confused/deviated during my solo-development journey.

3.3.2 Phase : Design

The design phase comprised translating the proposed criteria into a visual and interactive model for use in the application. I kicked things off by doing some low-fidelity wireframe sketches on paper, in order to map the user flow for integral actions a user might take such as a student reporting something they've come across. These wireframes were implemented into high-fidelity, interactive prototypes that we built out in Figma. The Figma prototype is crucial as it makes me able of living the user experience from end to end wireframing, all the way from main screens, to navigation structure and a unique visual language which brings into UPTM's forward-thinking and colour palette. This prototype was the gospel for how we would design the app's UI in actual code. I also used Canva to create the app logo, launch-related promo graphics and a compulsive set of in-app icons for that professional, end-to-end look.

3.3.3 Phase : Develop

For example, the development phase was the main realisation step where the app was refined little by little in several sprints. I used Android Studio, developed on SQLite because I wanted to write a single code base which would work for both iOS and Android. I integrated Git with GitHub for version control, this was crucial to maintain a history of the changes in association with different versions and protect the project against accidental deletion as well. Secure sign-in using student emails was facilitated with Firebase Authentication, the entire app data (including user information, item list and chat messages) was managed in a real-time NoSQL database Cloud Firestore and all the images uploaded along with listing were stored in Firebase Cloud Storage. Every sprint had a feature set from the backlog integrated, so we demonstrated tested increment of application after each cycle.

3.3.4 Phase : Test

The test was a feature and something done concurrently with the development in each sprint. I took a multifaceted approach to testing this solo project. I used unit testing to ensure that the functions and objects all worked as expected when isolated. On the user interface I did widget testing on UI components and tested manually on various Android devices and emulators to catch any visual glitches, usability issues or performance bottlenecks. I additionally used the integrated debugging features of Android Studio and Firebase console to watch for runtime issues and security rule wrongdoings. Once I built out primary functionality, I performed informal usability sessions by delivering the working build to a small group of coworkers for interpretation and feedback on design/flow which would be baked into my next development cycle.

3.3.5 Phase : Deploy

The deployment scenario was to get a final release version of the application ready, and put it out for tank testing time. With the first release, the objective was not to make it available on Google play store publicly but only a controlled pilot roll-out to a set of beta testers - for instance, some MPP administrators and limited students. I created a signed APK (Android Package) file on Android Studio, which is the format accepted when you install an app on Android. In order to distribute and manage this pilot launch, I opted Firebase App Distribution. It allowed me to easily upload the APK, maintain a list of beta testers, and email them safe links for installing the app on their phones. This phase was most important for the gathering of feedback on actual field usage and server load in non-contrived situations, as well as any bugs not discovered during internal testing.

3.3.6 Phase : Review

The Review(sprint retrospective) was held at the end of each sprint and it was especially important for me in my capacity as solo developer. This phase is a personal reflection on the just completed sprint. I compared them to the initial sprint goal, looked at the good and the bad in that process; some of it had been technological with Flutter or Firebase, but also dealing with difficult time management constraints. I gathered the comments of my pilot testers on deployment as well. This feedback loop was then cycled back through our sprint plan, the backlog of product work as I adjusted how I personally develop. This iterative loop of feedback helped me to stay in sync with what users need, and helped me to be better at my job every time.

3.4 Data Gathering and Requirement

The first stage of the initiative was also spent capturing reams of data to map out precisely what would be needed for the UPTM ReUnite app. Both the qualitative depth and quantitative breadth were fulfilled using a mixed-methods methodology. Qualitative data were obtained through a structured interview with the MPP committee in their office. This meeting was important because it provided an official administrative viewpoint on the current lost-and-found operation, challenges, and customer needs. Quantitative and qualitative data was also collected from end-users (students) via a digital questionnaire. In sampling, the questionnaire was distributed through a convenience way that involved mainly WhatsApp and personal contacts in order to get sufficient participation across UPTM students. The inclusion of a structured client interview along with an extended user survey provided the basis for the project that reflects actual needs of server administrators and end users.

The client was a semi-formal scheduled interview with the MPP (Majlis Perwakilan Pelajar) committee in their office. This was an important session to learn about the administrative side, official protocols and what this campus department deals with who oversees the lost and found items.

3.4.1 User Requirement Analysis

A digital questionnaire was distributed among the UPTM and it served as the main tool for gathering data about user needs. It was distributed using WhatsApp groups, and other students´ networks, and a total fifty-one responses were collected. To confirm this the core assumption of the project, and to establish what components would have made the application worthwhile, and accessible to students - an analysis of these data was required.

The primary user group was the student for whom a focussed questionnaire was created to understand their actions, needs and frustrations 2.3 Questionnaire design In order to gather information from our target audience - students we developed a questionnaire. A detailed explanation (in stages of questions) is the following.

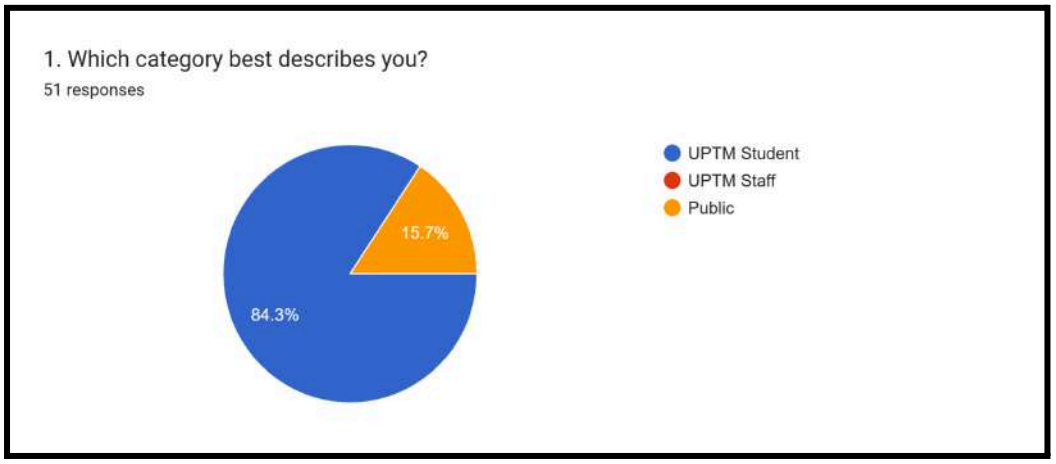


Figure 3.2 : Student Questionnaire 1

Categorisation of the 51 respondents is shown in Figure 3.2. The graph shows that 15.7% of the participants are public and 84.3% are UPTM students. This distribution is important as it also confirms that the harvested data has a strong bias towards the application's intended main target user demographic. A high percentage of the students` feedbacks proved relevance for proceeding with customization in terms of functionality, user interface and authentication system to match UPTM context and needs ensuring solution benefits grounded on addressing the primary audience requirements.

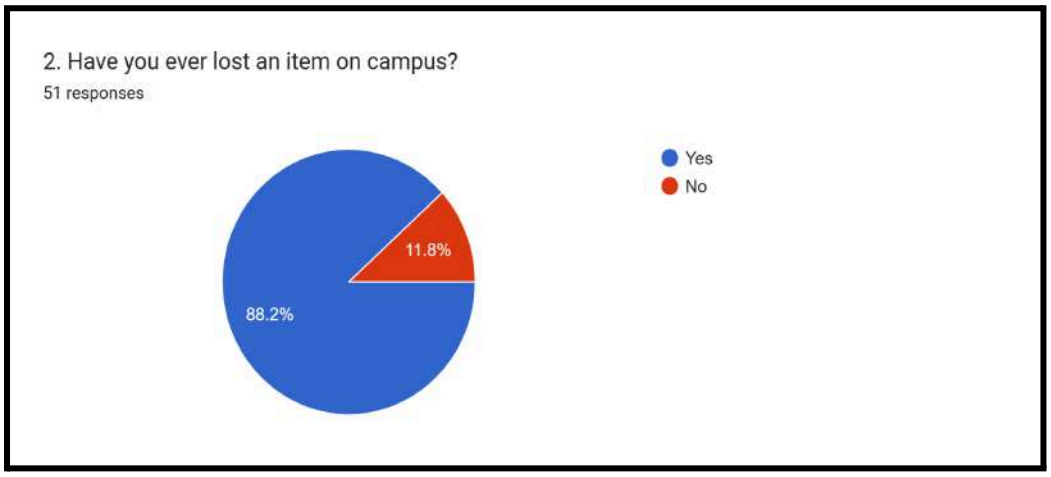


Figure 3.3 : Student Questionnaire 2

Responses to the experience of losing things on campus are presented in Figure 3.3. An interesting figure in the table is that of 88.2 % “Yes” response and 11.8% “No.” This expresses that losing own property has a pervasive effect on UPTM’s students’ population. The discovery has laid the fundamental premise of UPTM ReUnite project and confirms there is a large and omnipresent problem that can be solved using a dedicated lost-and-found application.

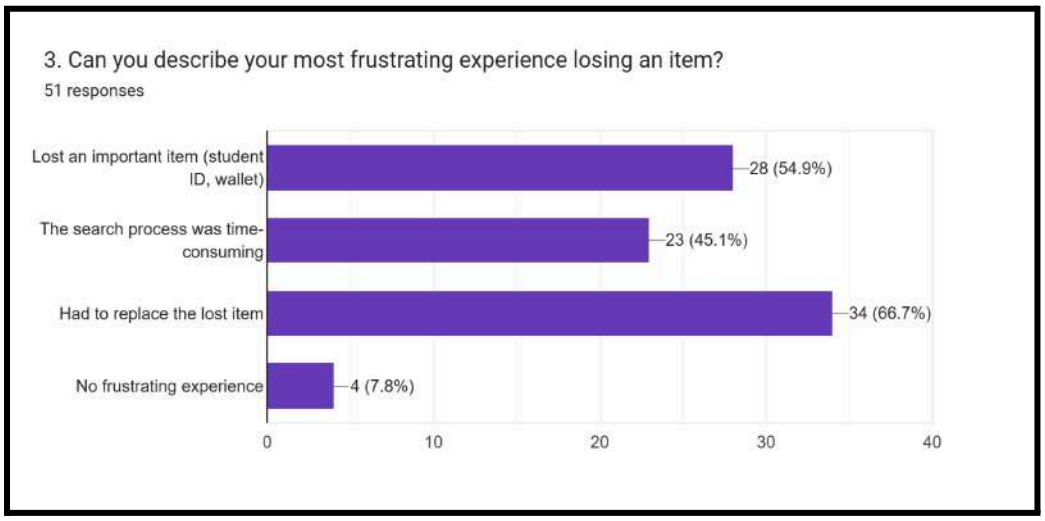


Figure 3.4 : Student Questionnaire 3

Figure 3.4 presents the distribution of different frustrating encounters due to item loss, with multiple options available for respondents to choose from. According to the chart, "Had to replace lost item" had 66.7% selection rate; it was followed by "lost an important item (student ID, wallet) which had 54.9%, and "The search process took a long time" with 45.1%. This information raises the problem from a mere nuisance to a substantial hit to the pocketbook, lost time and productivity due to current processes. This points to the importance of UPTM ReUnite operating as an efficient recovery application, in terms of limiting replacement cost and saving users time with an efficient search and claim process.

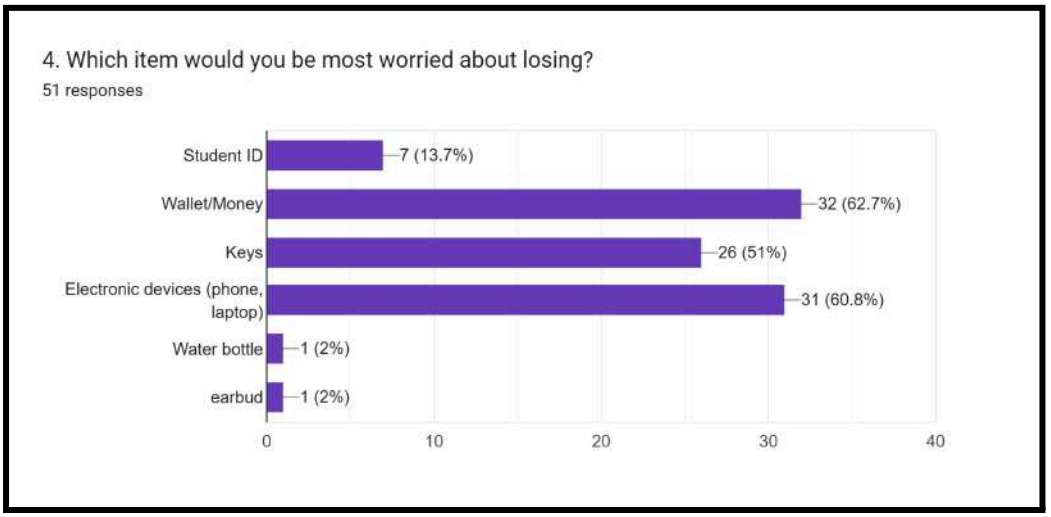


Figure 3.5 : Student Questionnaire 4

3.5 shows the classes of objects that students are most afraid to lose. The chart shows that “Wallet/Money” (62.7%) and “Electronic devices (phone, laptop)” (60.8%) are the major concerns, whereas “Keys” is also a significant concern with 51%. This was an important piece of information to use in the feature prioritization. The app is taking security seriously and for good reasons; the most commonly lost items are also some of the most valuable, both fiscally and emotionally — where users would definitely want a more secure platform to trust with their property.

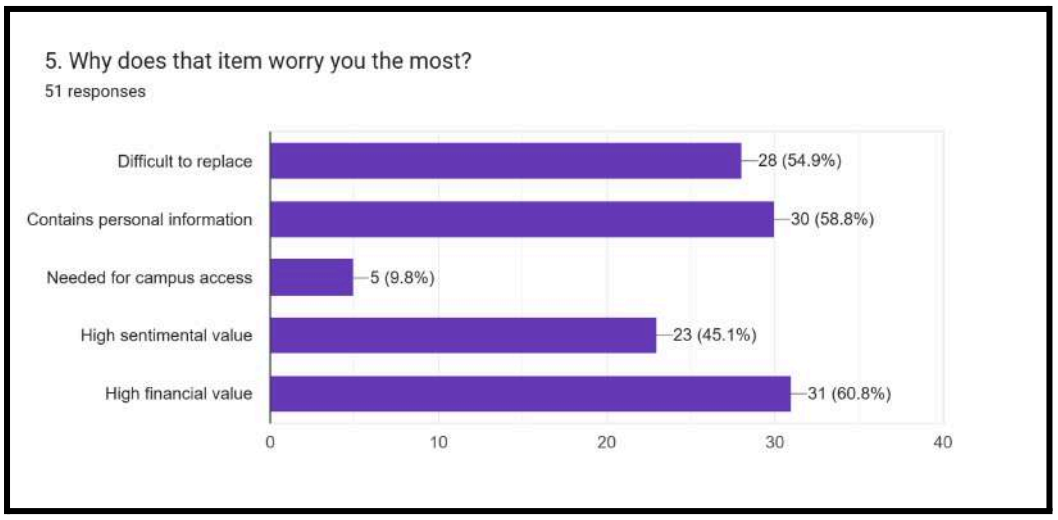


Figure 3.6 : Student Questionnaire 5

General concerns over the loss of items are illustrated in Figure 3.6. 60.8% of respondents consider the "High financial value" and 58.8% that it "Contains personal information", with the second most common factor being that is it "Difficult to replace (54.9%)". This explanation justify the conditions in Fig. 3.5 placed on it. This shows the necessity of focusing on a secure authentication method and controlled interaction channel (in-app chat) to protect users' privacy and mitigate potential threats related to loss of high value, sensitive items.

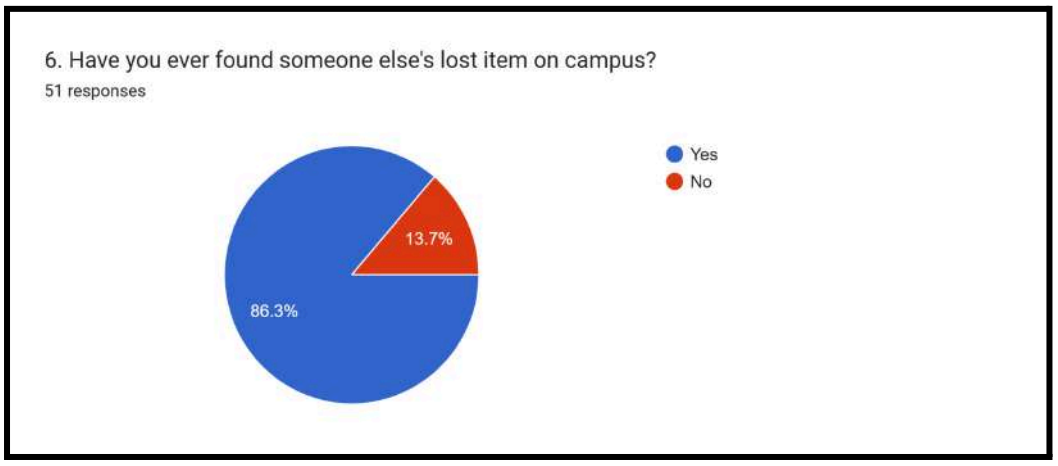


Figure 3.7 : Student Questionnaire 6

The percentage of students who have found, or recovered, lost property owned by others on campus is presented in Figure 3.7. The diagram demonstrates that the clear majority of which is 86.3% have had experience in being a finder. This result is relevant because it shows strong potential for community involvement.

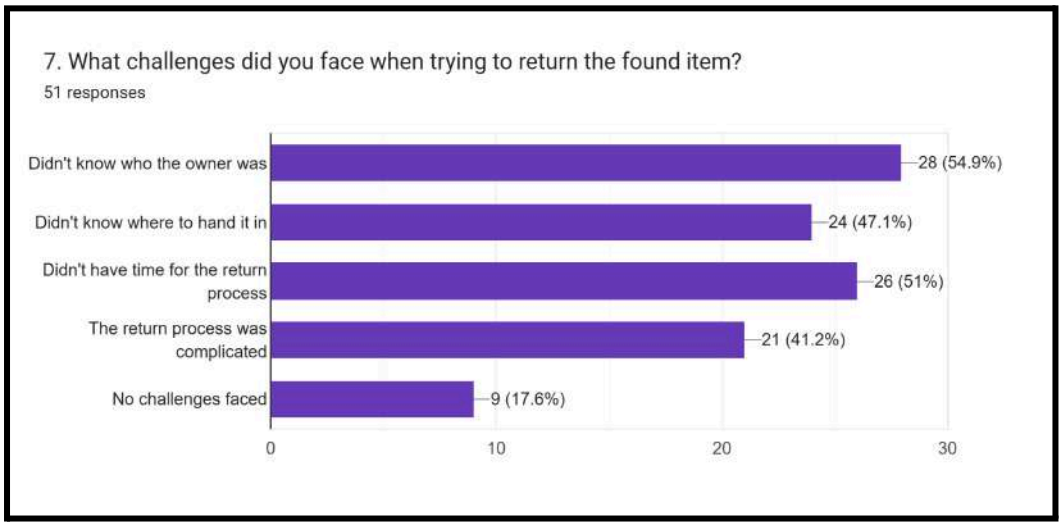


Figure 3.8 : Student Questionnaire 7

In Figure 3.8 is the issue students experienced to return a found object. Those challenges most represented on the chart are “Unaware who Owner is” (54.9%), “Not enough time to return process” (51%) and “Uncertain where to turn in” (47.1%). This information highlights the failures that UPTM ReUnite is targeting. The main characteristics of a public, searchable database for owner identification and integrated chat system for return coordination is warranted, since they effectively remove the principle impediments to honest action.

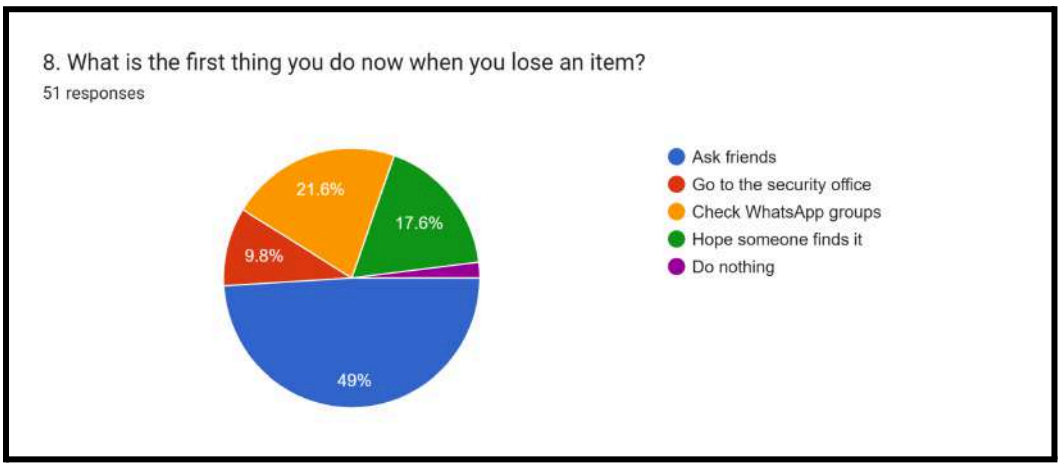


Figure 3.9 : Student Questionnaire 8

The informal mechanisms employed by students if items are lost is diagrammed in Figure 3.9. While "Ask friends" is the most common first step at 49%, and "Check WhatsApp groups" second (21.6%), and third is just to "Hope someone finds it", 17.6%. This ad-hoc practice reflects the absence of a unified, reliable, and sanctioned lost and found mechanism. This reinforces the need for UPTM ReUnite to be the centralized, preferred solution that is more convenient and effective than informal often ineffective methods.

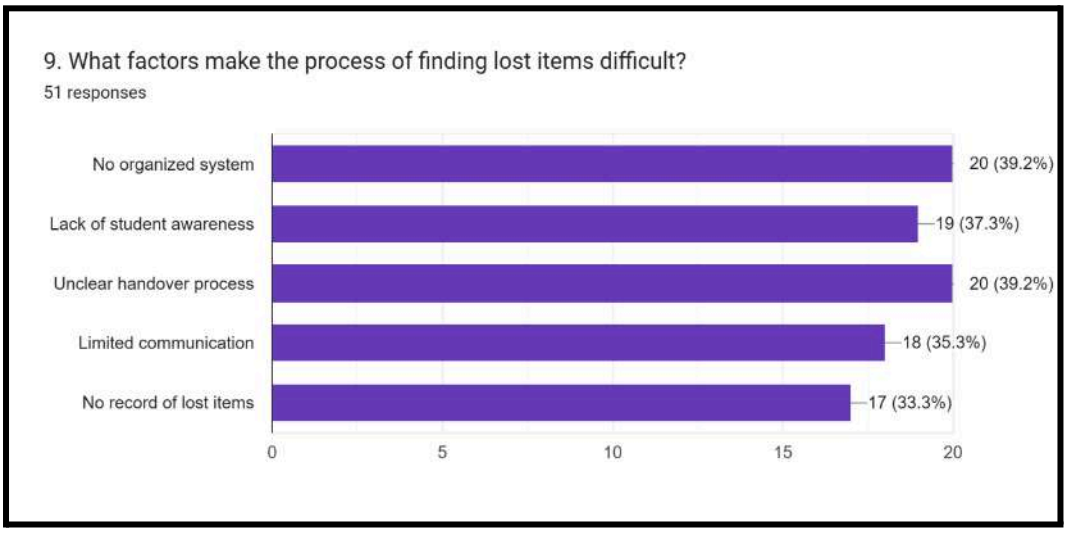


Figure 3.10 : Student Questionnaire 9

Figure 3.10 A detailed discussion of students' perceived barriers in finding lost items is provided next in Figure 3.10. According to the graph the biggest barriers are 'No organised system' (39.2%0, 'Unclear handover process' (39.2%) and "Lack of student awareness". This feedback helped to highlight the need for an app that offers concrete and clear guidance. The design proposed a somewhat linear process for reporting and claiming items, with a strong reliance on the need for an effective awareness campaign at app launch to encourage students across campus to use the resource.

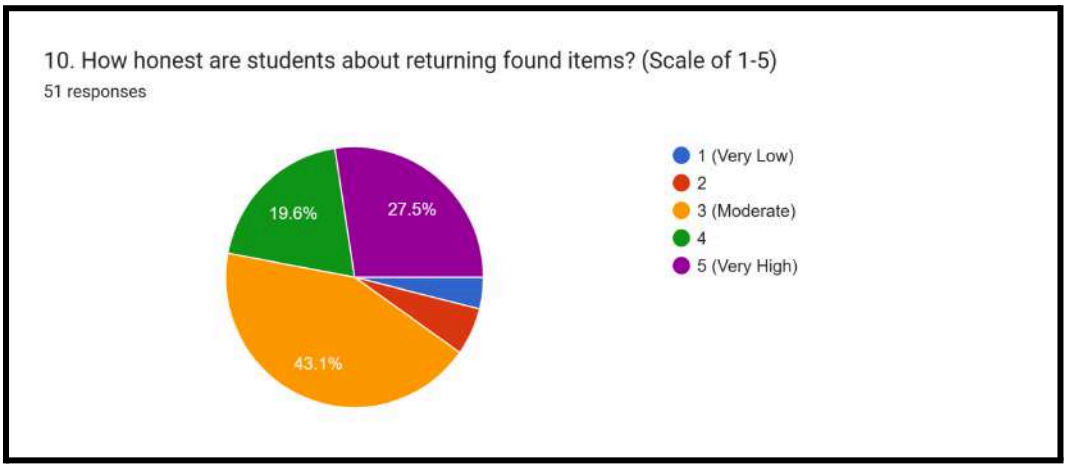


Figure 3.11 : Student Questionnaire 10

The degree of honesty in the community with regards to found objects is explored in Figure 3.11. The data also shows normal distributions with "3 (Moderate)" being highest at 43.1% selection, as indicated in the chart above. This implies that students are considered dishonest only marginally, but there is an accepted room for improvement of trust between the community and the school. This supports features to promote greater transparency and accountability, such as user profiles associated with UPTM official email addresses or in-app communicated transaction histories.

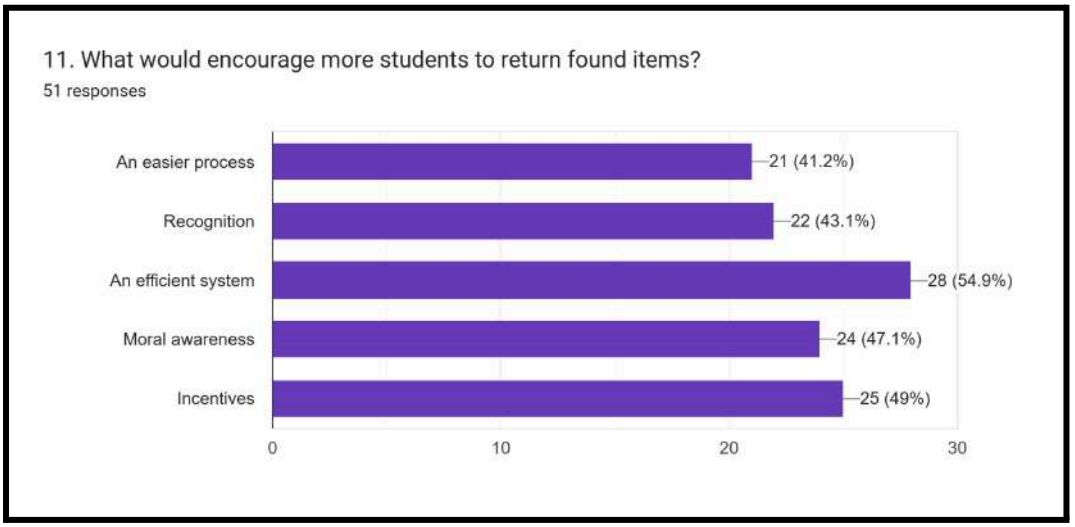


Figure 3.12 : Student Questionnaire 11

Inherent in Figure 3.12 are the factors that would lead to the higher return rate of discovered items by students. From the chart, we can see that almost all of them are influenced by a "efficient system" at 54.9%, and this is followed by "Incentives" at 49% and "Moral awareness" 47.1%. This information provided critical guidance for the design of the app and subsequent development strategy. Priority was given to creating a simple, user-engaging Mobile View and the potential for gamification (for example reward points) to further encourage positive action as was reasoned.

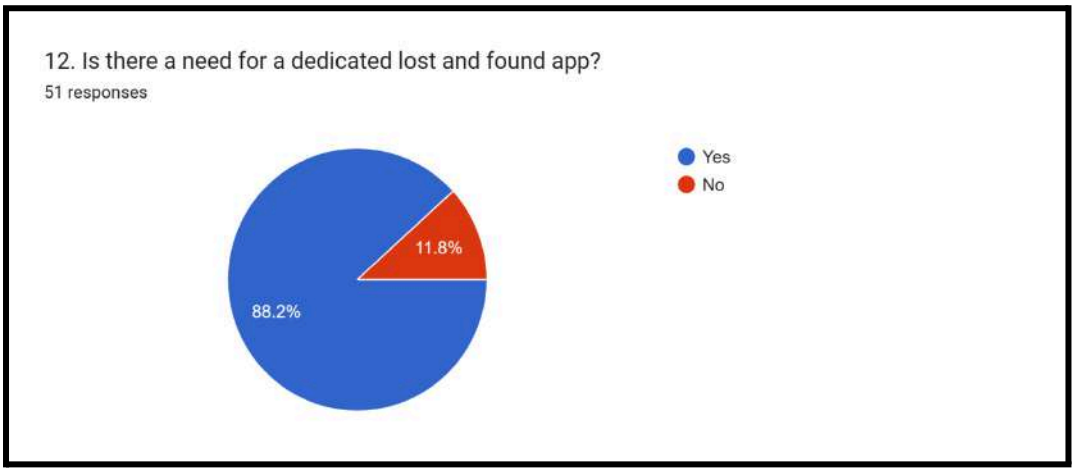


Figure 3.13 : Student Questionnaire 12

From the students The demand among students for a dedicated lost-and-found application is depicted in Figure 3.13. The chart suggests that 88.2% of people acknowledge they would need an app like this. This is Strong confirmation of acceptance for the UPTM ReUnite initiative. This proposed solution itself is merited as a straightforward answer to an explicitly stated need by a large number of students, not just some developer's guess.

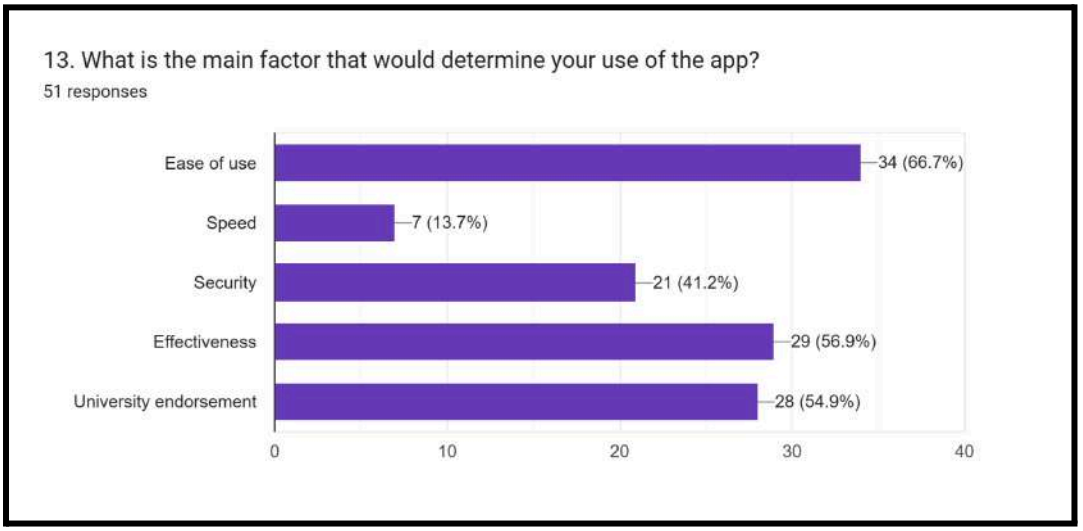


Figure 3.14 : Student Questionnaire 13

The main influential factors on a student's decision to use the app is shown in Figure 3.14.. Graphically "Ease of use" is the most important factor with 66.7%, followed by "Effectiveness" for 56.9% and then "University endorsement" at 54.9%. For the philosophy of UI/UX development, this discovery was important. The app has to be very easy to use and above all, dependable. It was the right tactical decision to seek recognition as an official organization that is endorsed by the MPP, and that's exactly what we heard from students.

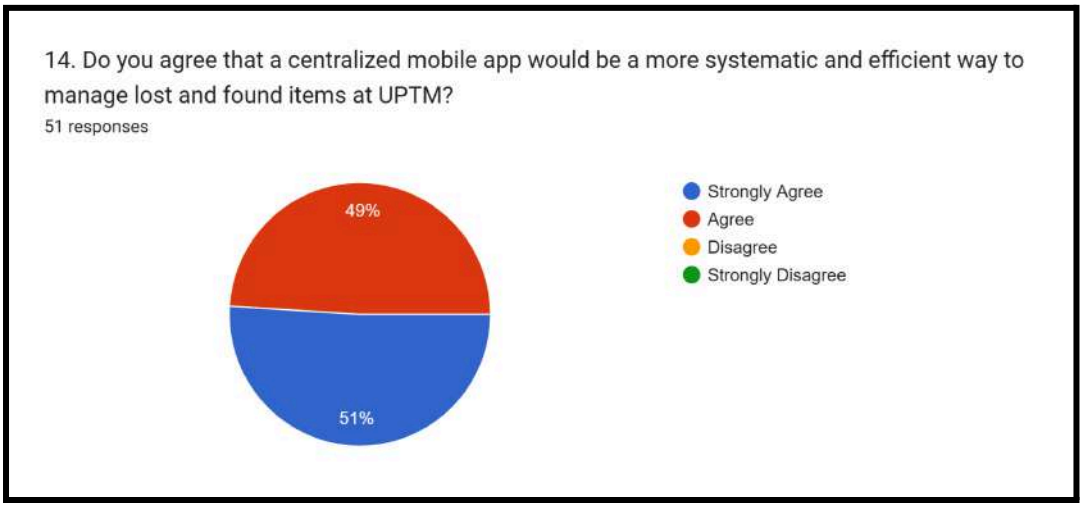


Figure 3.15 : Student Questionnaire 14

We can see in Figure 3.15 how the centralised application would have a more consistent and efficient way of operating. The table demonstrates a full positive response, meaning that all students either agree (51%) or strongly agree (49%) and in total agreement is 100%. The consensus validates our prior research and is a strong vote of confidence for the project stating that students are willing to accept, and use a digital solution like UPTM ReUnite.

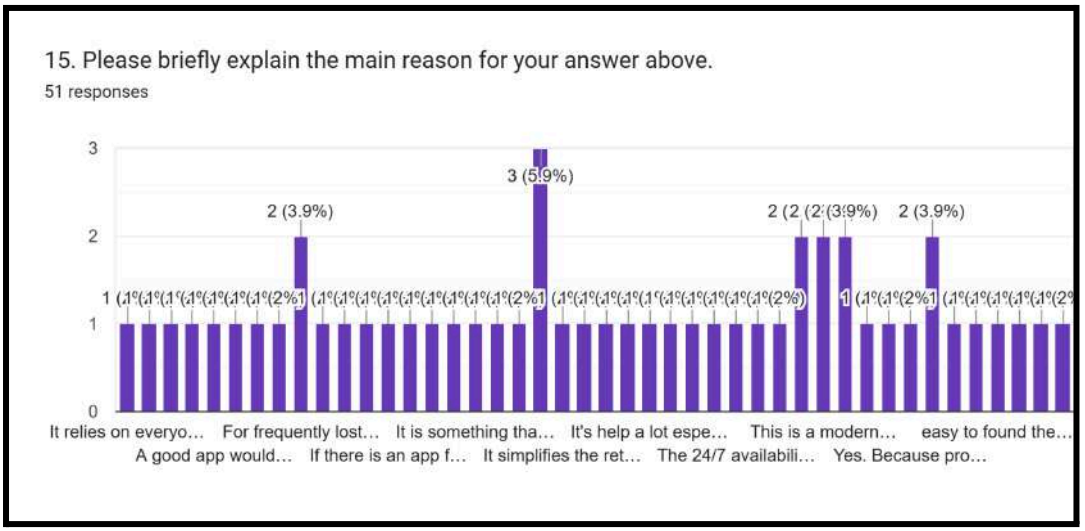


Figure 3.16 : Student Questionnaire 15

Qualitative feedback from Figure 3.15 strongly supports the UPTM ReUnite project, with users specifically asking for a system that is faster, more organized and easier to access. Participants stressed the time saving, solving of the fundamental problem of anonymity, 247-accessibility, and greater reliability over informal arrangements version among other assorted non-discretionary arguments suggesting genuine application reflections initial feature set and design principles.

3.4.2 Client Requirements Analysis

Client needs was determined by having a formal meeting with Majlis Perwakilan Pelajar (MPP) at their office. This session was quite useful as it helped to understand the viewpoint of authorities, oath, and difficulties that followed by lost & found department.

The MPP manager interview was based on fundamental evidence areas through which an understanding of their operational concerns and requirements emerged. The findings were used in the administrative functions of the UPTM ReUnite app.

Administrator Interview transcript:

Interviewee Name: Muhammad Fareez Imran Bin Rosmen
Phone Number: +60 182078127
Date: 23rd September 2025
Time: 10.00 am
Location: MPP Office
Role: Exco Media and Communications

Question 1 : Could you share with me the official process from the moment a lost item is turned in to your office until it is hopefully reunited with its owner?
Answer : The procedure involves a student reporting and submitting the lost and found item to the MPP office. One of our marketing team members will take a picture and upload it to our official WhatsApp channel, which currently has around 8,000 followers. In this post, we will provide guidance on where to claim it, which is at our office. When the individual arrives, they will need to provide evidence that the item belongs to them. That will be all. We primarily use the WhatsApp channel for announcements due to its extensive reach, however, it is not specifically designed for this function.

Question 2 : Approximately how many items are processed through your office in a typical week or month, and what is the average claim rate?
Answer : In terms of frequency, perhaps around two or three times a week. Therefore, fewer than ten items each month. Regarding the claim rate, I would estimate that approximately 80% are successfully claimed, which is quite favourable for common items. We have been holding onto some long-lost items for over three months now, including keys and keychains. These items are challenging to match with their owners and are taking up valuable space.

Question 3 : How much staff time is dedicated to managing lost and found inquiries, logging items, and responding to students?

Answer : In his role on the marketing committee, he, along with the President and Assistant, is responsible for uploading content to the WhatsApp channel. The process of providing to the claimant involves those present at the office during that time. Verifying the owner and handing over the item takes approximately 10 minutes for each claim. It is indeed a shared responsibility, yet it still necessitates dedicated time from those who are available.

Question 4 : What are the biggest challenges or inefficiencies your team faces in managing lost and found items currently?

Answer : Not much, but we have a responsibility to ensure the item is well taken care of. There is a possibility that we could be blamed for taking money from a wallet if it disappears after we have received it. Alternatively, we might end up giving the item to the incorrect individual, even if a seemingly legitimate person presents valid proof. The primary concern we face is the risk and liability associated with managing students' valuable possessions in the absence of a fully secure system.

Question 5 : What are the current policies for verifying an individual's ownership of a claimed item? What proof is required?

Answer : We request the picture, a description, the location where it was lost, and all relevant details. It is essential that they provide us with an accurate description. For instance, if it's a wallet, it would be helpful to know the colour, brand, and its contents. The process depends on the claimant's capacity to present compelling details that align with the item we possess.

Question 6 : What happens to unclaimed items? How long are items typically held before they are disposed of or donated?

Answer : We hold onto them until the owner comes forward to claim it. There isn't a set timeline for disposal, so we still have some items from last year, such as keys, keychains, and so on. Unclaimed items tend to build up over time, necessitating the need for us to secure storage space for them indefinitely.

Question 7 : Are there certain categories of items (example, IDs, phones, wallets, laptops) that are more frequently lost and have a different handling process?

Answer : Yes, for phones or gadgets, we will request that they unlock it in our presence to ensure it truly belongs to them. We implement this additional measure for high-value electronics, as the standard description alone does not suffice as proof for these costly items.

Question 8 : What are the biggest concerns regarding liability or safety in the current lost and found process?

Answer : The status of the misplaced item. It's possible that it was already damaged before we encountered it, yet we are being blamed for the harm done. However, at this moment, I have no complaints or issues to raise. We are also focused on ensuring the security of the handover, confirming that the correct individual receives the item.

Question 9 : If a digital solution were available, what key features would be most valuable to your office from an administrative perspective? (example, a digital log, photo database, automated notifications)?

Answer : I believe it would be beneficial to have a centralised database for all records, rather than depending on WhatsApp. A visual representation of all items. It would be beneficial to have a direct contact or messaging system between the finder and the owner, allowing our office to avoid being the intermediary for every conversation.

Question 10 : Would your office be open to partnering on a pilot project or providing guidance to ensure a new app aligns with official university policies and procedures?

Answer : Absolutely, we are interested in collaborating on a pilot project. The reasons are derived from the information we talked about. An app designed specifically for this purpose can effectively decrease the accumulation of unclaimed items, lower the chances of mistakenly distributing items, and streamline the workflow for our team. We are here to offer our expertise to ensure the app aligns with university guidelines and assist in its promotion to the student body.

3.5 Interface Design

3.5.1 Wireframe

Wireframe for User :

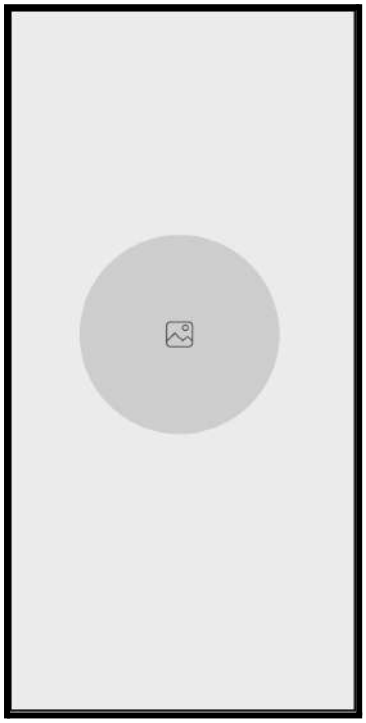


Figure 3.17 : Splash Screen

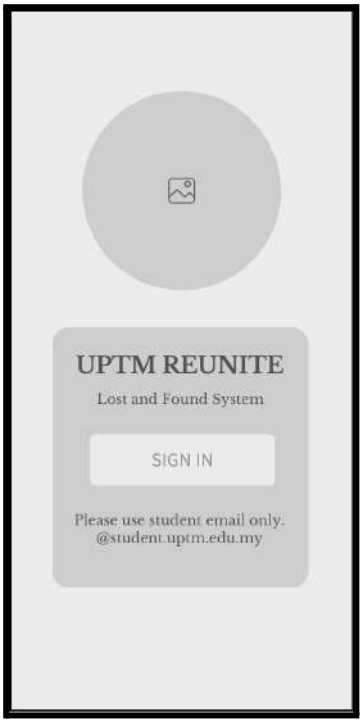


Figure 3.18 : Login Page

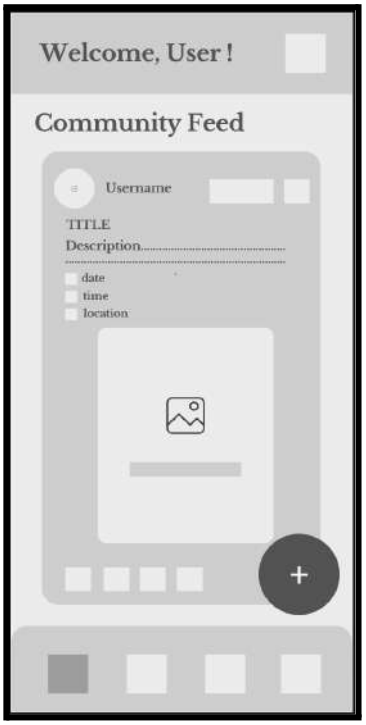


Figure 3.19 : Community Feed

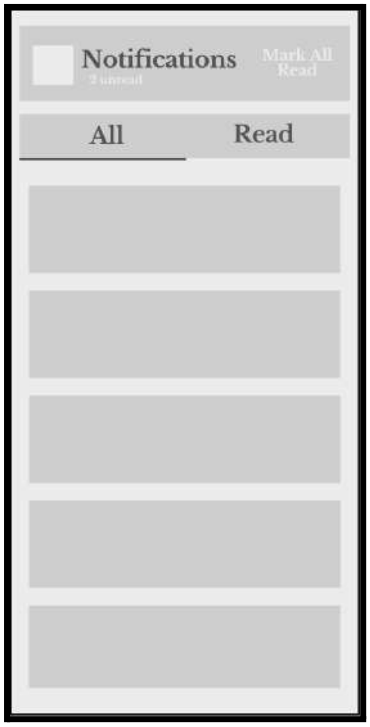


Figure 3.20 : Notifications

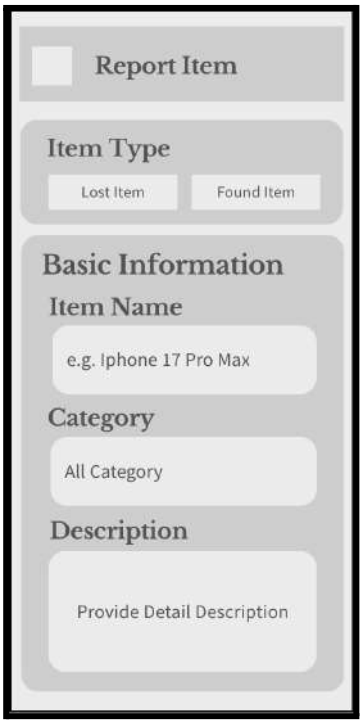


Figure 3.21 : Reporting Form

Figure 3.22 : Reporting Form

Figure 3.23 : Search Page

Figure 3.24 : Filtering System

Figure 3.25 : Message Page

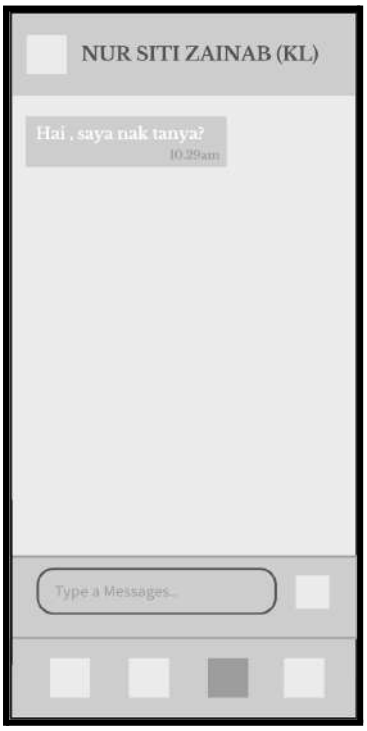


Figure 3.26 : Message with user

Figure 3.27 : Profile Page

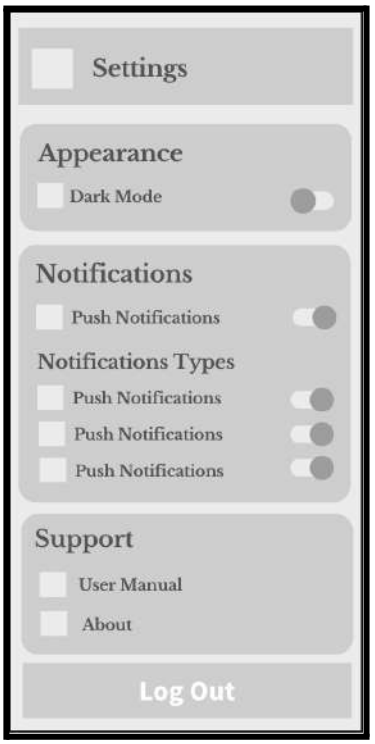


Figure 3.28 : Setting Page

Wireframe for Admin :

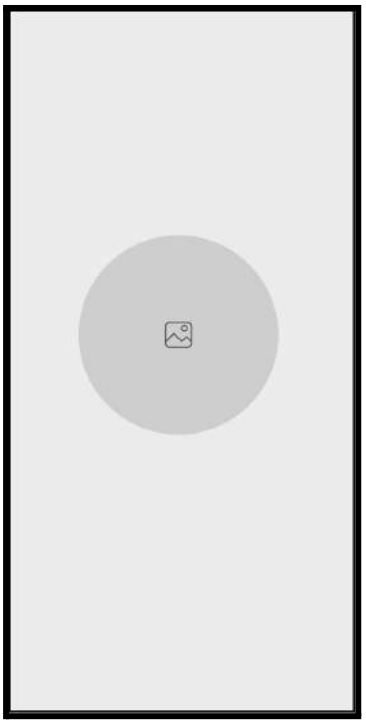


Figure 3.29 : Splash Screen

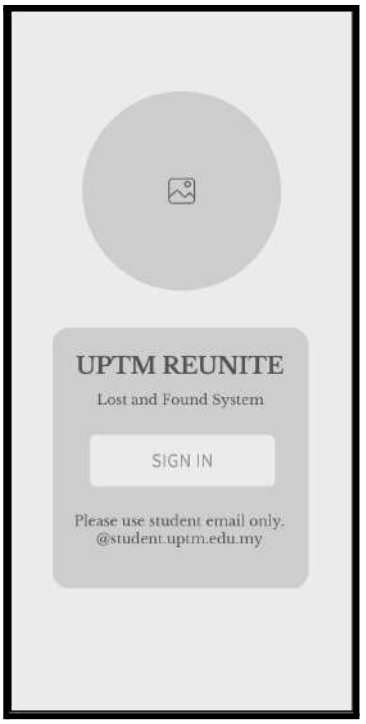


Figure 3.30 : Login Page

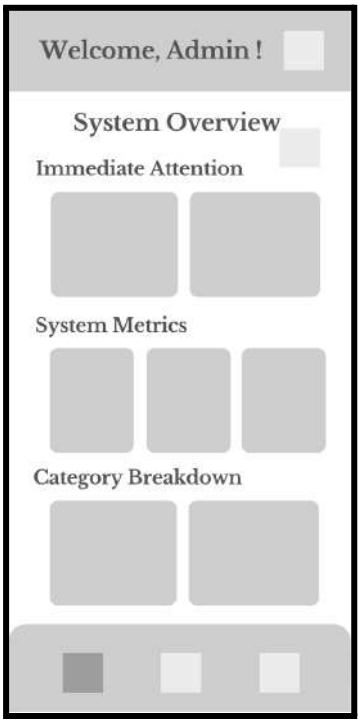


Figure 3.31 : Admin Dashboard

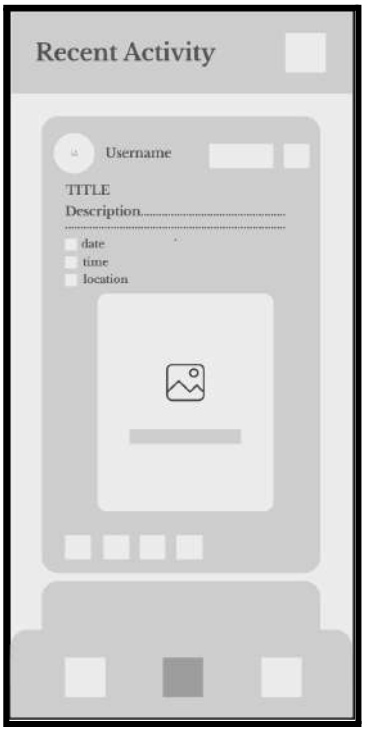


Figure 3.32 : Recent Activity

Figure 3.33 : Flagged Items

Figure 3.34 : Flagged items (Action Feedback)

Figure 3.35 : Admin Profile Page

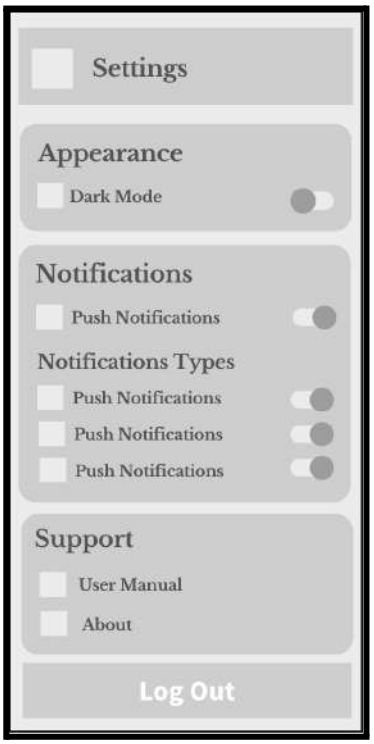


Figure 3.36 : Setting Page

3.5.2 Actual Interface

Actual Interface for User :

Figure 3.37 : Splash Screen

Figure 3.38 : Login Page

The UPTM ReUnite splash screen of Figure 3.37 presents the official system logo in center on a simple gradient background. Branded splash screen which allows your customers to identify the platform; professional continuity between this and the followed mobile graphics in-app.

The login UI of the UPTM ReUnite Lost and Found System is depicted in Figure 3.38, where users use their UPTM Google accounts to log in. The interface puts an emphasis on minimalism and ease of use, with a single “Sign in” with Google button followed by a straightforward prompt telling users to sign in with your school email. This allow a friendly registration for the user and a tight access control to respect university security authentication.

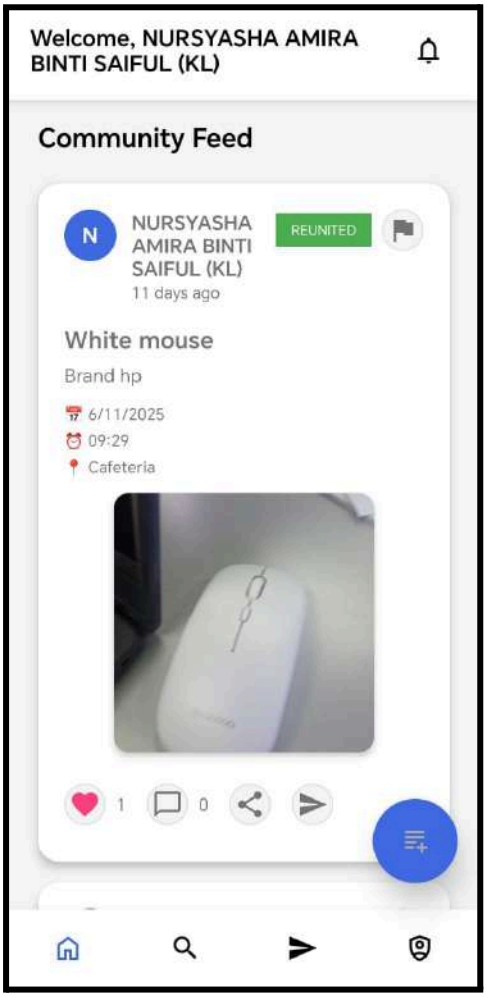


Figure 3.39 : User Community Feed

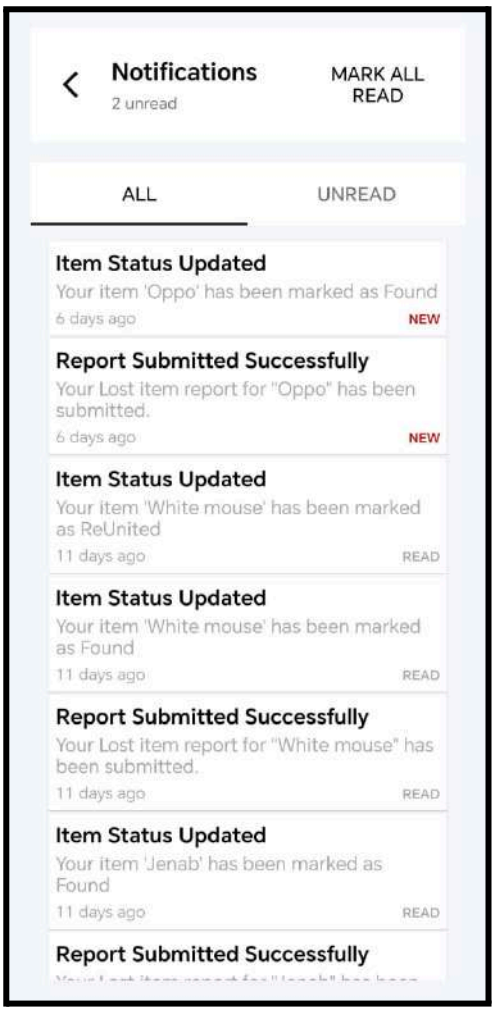


Figure 3.40 : Notifications Page

Figure 3.39 shows that the Community Feed is where users are mostly active and posting or viewing lost and found messages in chronological order. Each communication has a simple card layout with the user's name, timestamp, and a positive status tag like "REUNITED," proving the system works. The location ("Cafeteria") and item details ("White mouse," "Brand hp") simplify scanning. Successful reunions, losses, and results are shown in this design to promote shared accountability and openness.

The Notifications screen timelines system interactions in Figure 3.40. Users prioritise notifications by type ("an Item Status Updated," "Report Submitted Successfully") and "NEW" or "READ" tags. Users receive automatic notifications when their reports are submitted, located, and reunited. Effective "MARK ALL READ" email management improves usability.

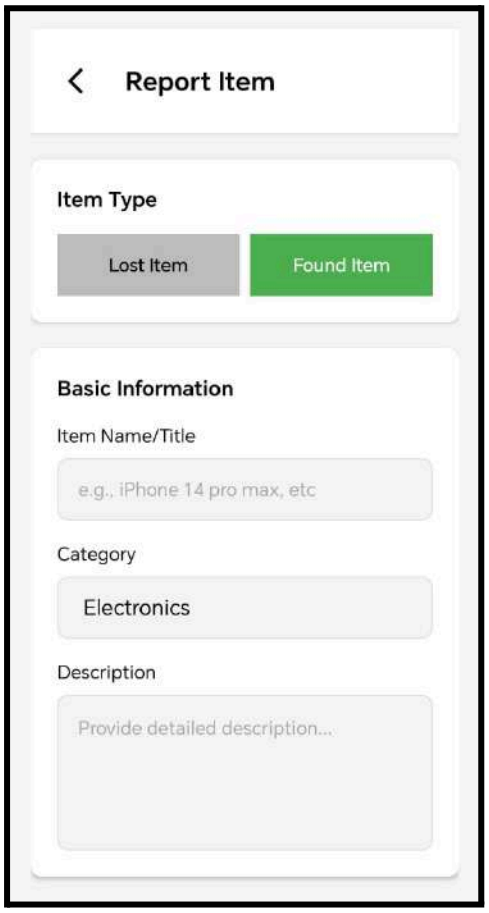


Figure 3.41 : Reporting Form

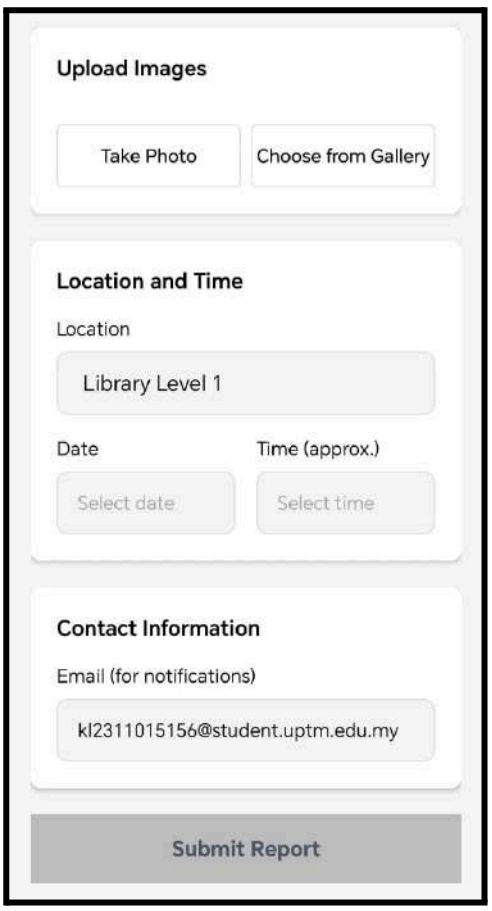


Figure 3.42 : Reporting Form (continue)

The Report Item function has been split down into a multi-step form, as shown in Figures 3.41 and 3.42, in order to make the process more manageable and to limit the amount of user fatigue experience. The initial and most important information is depicted in Figure 3.41.This contains the type (lost/found), name, category and description. As the process progresses, Figure 3.42 reports some extra information which are not necessary but useful. Such aspects comprise uploading images, selecting the location and timeframe as well as verification of contact data for notifications. The structured, guided process means users are prompted to provide detailed information, significantly improving the chances of recovering an item. This is achieved by disseminating to potential finders or claimants all information necessary to authenticate the object.

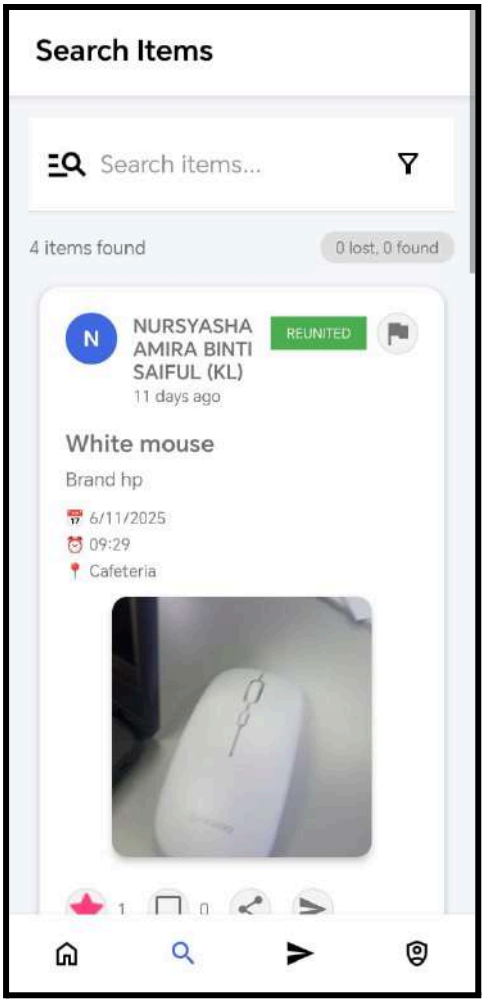


Figure 3.43 : Search Page

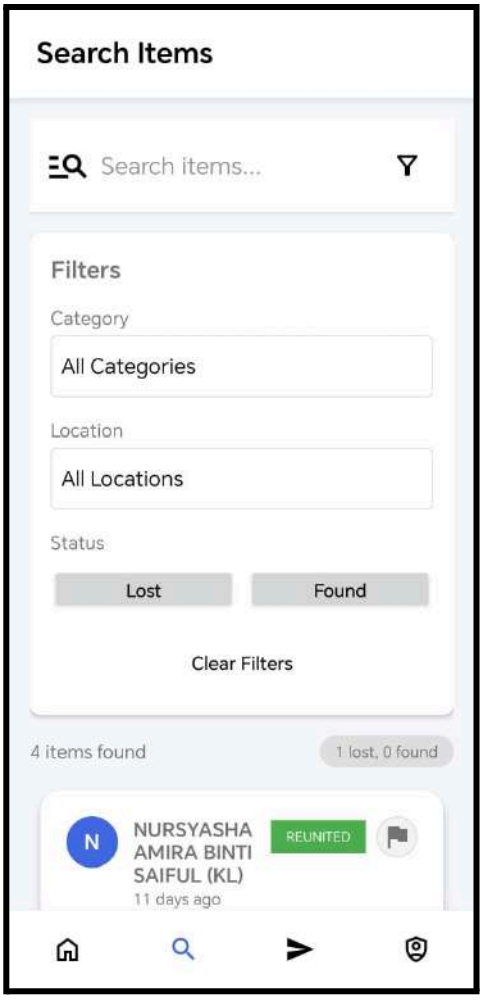


Figure 3.44 : Filtering System

Referring to Figures 3.43 and 3.44, the operation of the Search function is chosen to be fast but accurate. The basic search interface is illustrated in Figure 3.43: there is a big search bar and a results counter. Results can be narrowed down by Category, Location, and Status (Lost/Found) -- see Figure 3.44. These are the sophisticated filters showcased in the figure. Because this construct allows users to quickly find EXACTLY what they are looking for--like “lost electronics in the Library”--users don’t experience information overload on a busy community feed. This saves user time going through old content and makes the platform more helpful.

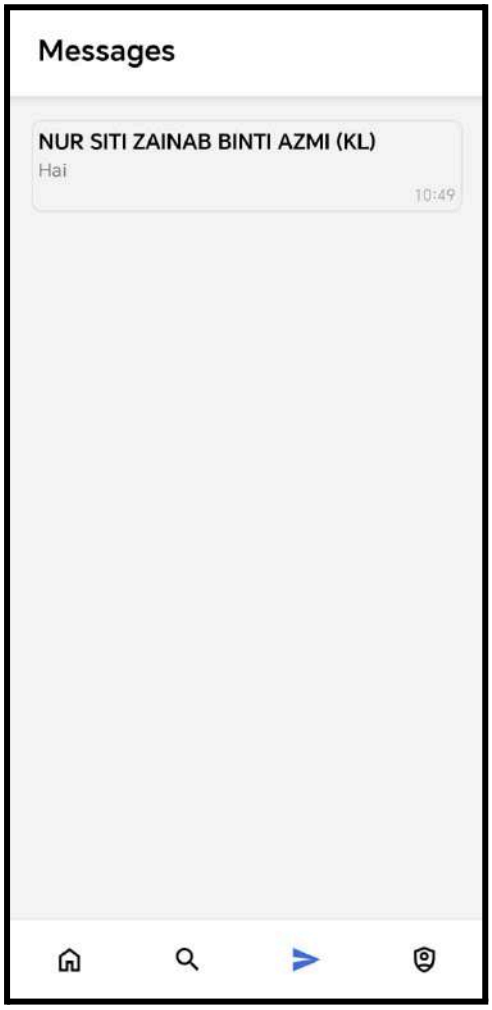


Figure 3.45 : Message Page

Figure 3.46 : Messaging with user

From Figures 3.45 and 3.46, we also see that in-app Chat provides a secure and seamless way of communication inside the app. The Messages inbox, with new conversations displayed, is shown in Figure 3.45. Figure 3.46 depicts a chat thread with a user exhibiting the distinct interface of real-time messaging. This architecture routes all content about an item in the app, never exposing personal contact information for users and facilitating a history of conversation. It can help in validating the information and also responding to the disputes, which ultimately helps in building trust.

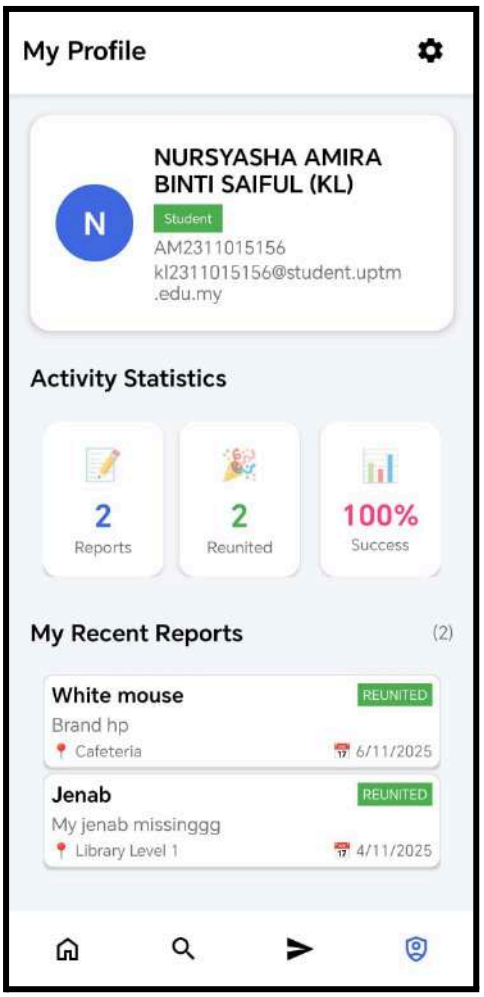


Figure 3.47 : User Profile Page

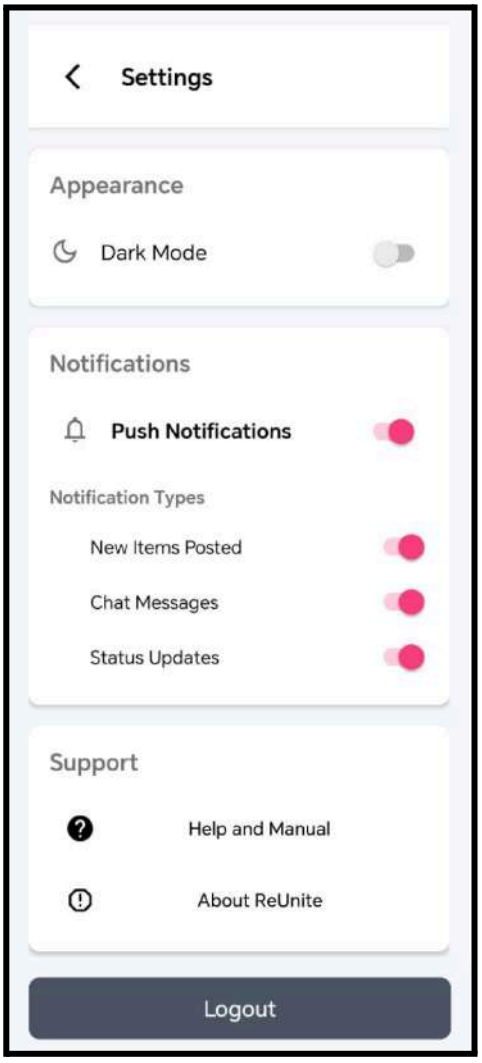


Figure 3.48 : Setting Page

User Profile: An Interactive Personal Dashboard (Figure 3.47) On a User Profile tab, it shows an interesting personal dashboard/portfolio. Below the user's contact details and name, it reads "Activity Statistics" with "2 Reports" and "2 Reunited", boasting a 100% success rate. Gamification encourages platform engagement a success. Like they should on June, simplistic approach with possibility of users yet maintaining your community contributions like in "My Recent Reports" (open and closed posts).

Figure 3.48 The Settings panel enables users to configure their app experience. The options are cleverly split into "Appearance" (Dark Mode toggle), "Notifications" (master and granular alert controls) and "Support" (help / app info). Such design is friendlier to the users because they can customize the software to their needs. Clear toggles simplify preferences.

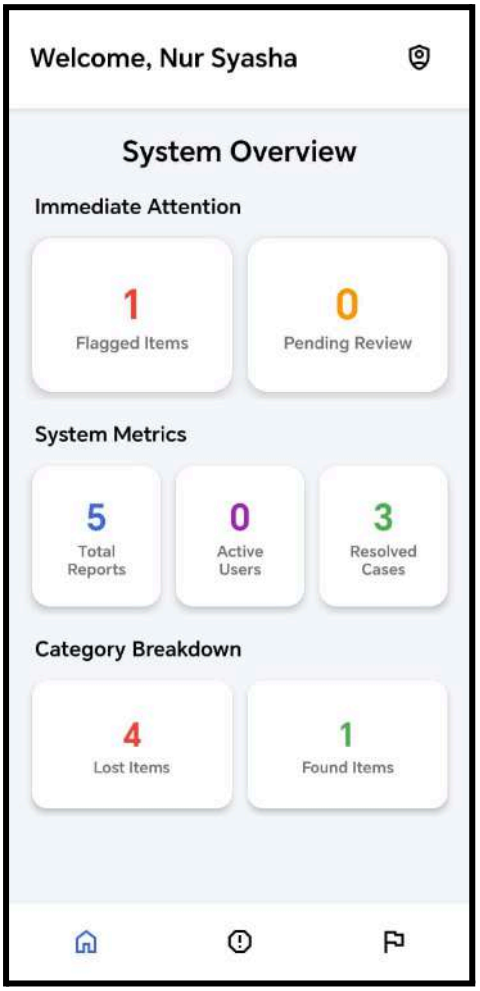
Actual Interface for Admin :

Figure 3.49 : Splash Screen

Figure 3.50 : Login Page

The splash screen of UPTM ReUnite, shown in Fig. 3.49 has simply the official system logo centred on a gradient background. A branded splash screen may help customers feel as if they recognize the platform, and provide a professional visual identity that consumers can trust.

Figure 3.50 shows the login of UPTM ReUnite Lost and Found System, where users log in using their existing UPTM Google accounts. It's a simple and clean interface with just one "Sign in with Google" button, along with a sentence below suggesting my users to sign in via their organizational email (Figure 1). This approach allows for a compliant and efficient way to get users onboard, while maintaining proper access control following university authentication standard.



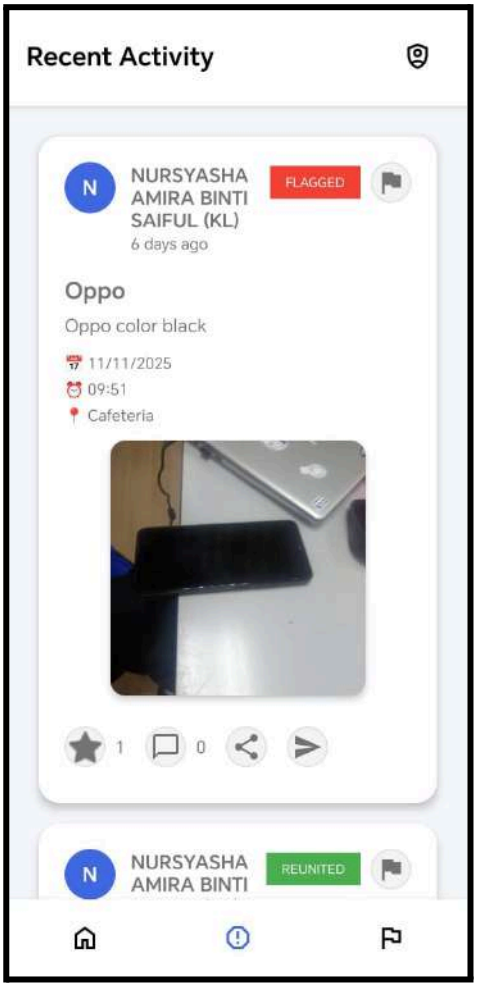


Figure 3.51 : Admin Dashboard

Figure 3.52 : Recent Activity

Figure 3.51 Admin Dashboard The admin dashboard is the command center of the system and displays health and activities (Fig. The User interface (UI) display "Total Reports," "Active Users," and "Resolved Cases", to reflects the usage and efficiency of platform. The "Flagged Items" moderation is well managed using unique "Immediate Attention" cards. What's more, the "Category Breakdown" separates out "Lost Items" and "Found Items," giving administrators a rapid snapshot of real-time data. With this design, it is really easy for an administrator to understand where they need to focus their work in the visualisation of a complex system's data.

The chronological activities and post statuses to the Recent Activity feed is illustrated in Figure 3.52. Every feed entry is a transparent card: the user's name, followed by an item title ("Oppo"), along with a visual status tag like "FLAGGED" or "REUNITED." These coloured tags help the admin quickly get to know the state of a passwd entry without having to read all details. Timestamps and locations ("Cafeteria") provide audit trails. We need this "feed" type of interface to follow up on reports from publication at resolutions and see who all participated in the community.

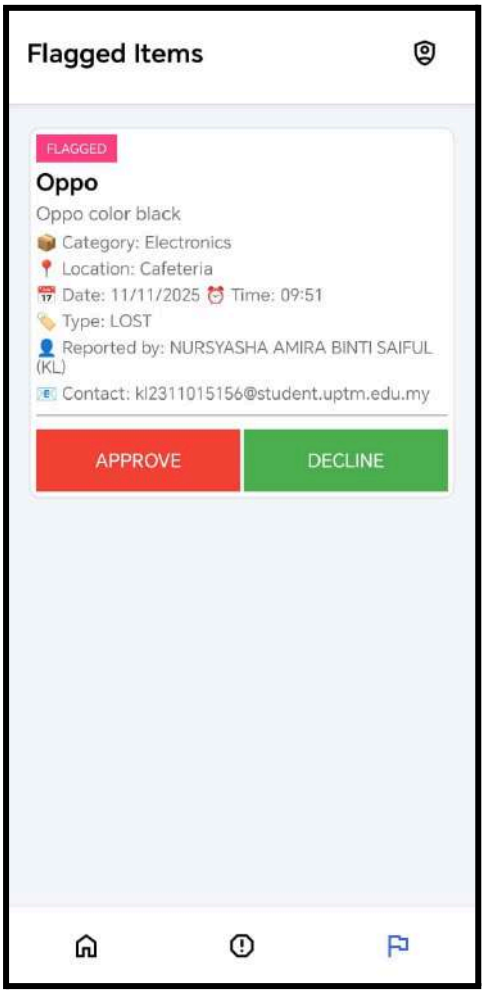


Figure 3.53 : Flagged Items

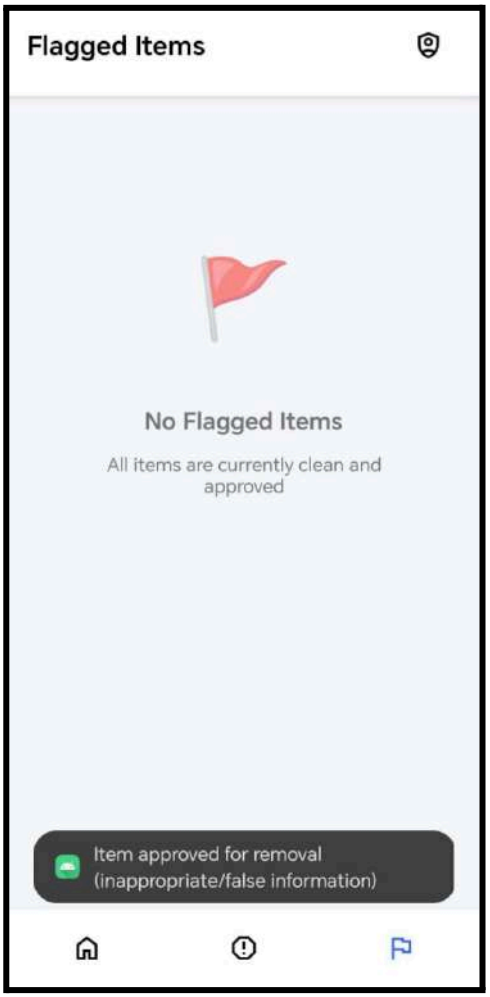


Figure 3.54 : Flagged items (Action Feedback)

Figure 3.53 shows that the Flagged Item Detail page offers informed and decisive moderation. When users report posts, this screen shows all relevant information. Administrators see item description, category, location, and timestamp. The reporting user ("Reported by: NURSYASHA AMIRA BINTI SAIFUL") is also identified, adding responsibility. The interface ends with two prominent, contrasting action buttons: "APPROVE" and "DECLINE." This clear call-to-action removes community-infringing posts fast and accurately.

The system gives the administrator fast feedback after Figure 3.54. After tapping "APPROVE" or "DECLINE," a toast notification confirms. For instance, "APPROVE" toasts "Post removed successfully". Usefulness requires immediate confirmation. Verifying that the system executed the administrator's command eliminates double-clicks and streamlines moderation.

Figure 3.55 : Admin Profile Page

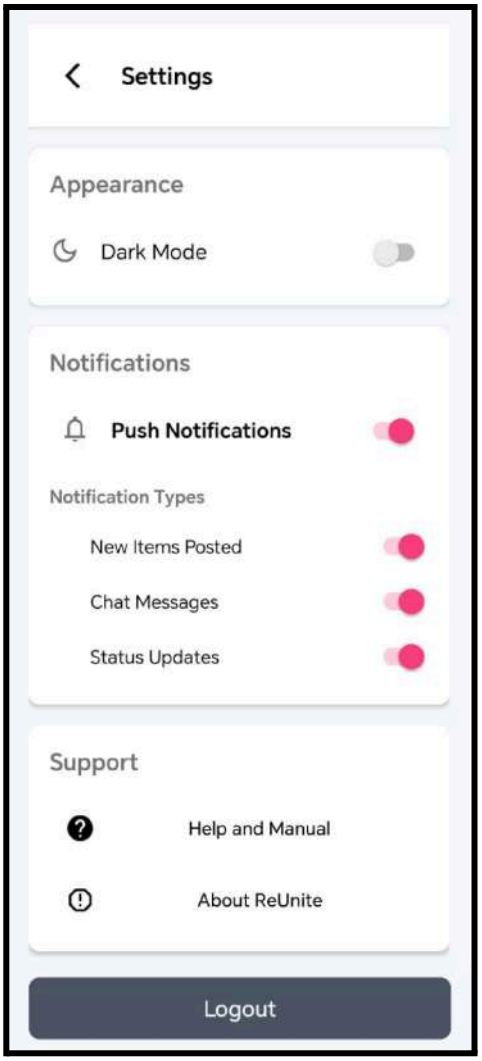


Figure 3.56 : Setting Page

Figure 3.55 illustrates how Admin Profile manages personal accounts and system data. Administrator name, role, and contact information are at the top. The lowest area, "System Statistics," arranges "Total Reports" and "Resolved Cases" by card. UPTM ReUnite's "System Success Rate" (60%) shows platform effectiveness. One interface lets administrators adjust their profile and system performance.

Figure 3.56 illustrates the Settings interface's collapsable portions for easy navigation. The "Dark Mode" toggle in "Appearance" lets administrators adjust visual style for comfort. The "Notifications" section toggles push alerts for "New Items Posted," "Chat Messages," and "Status Updates." This alerts admins without overloading them. Finally, "Support" opens "Help and Manual" and "About ReUnite". You can manage all administrative controls from one interface with this hierarchical architecture.

3.6 System and Application Modelling

In this section, we describe the architecture and construction of UPTM ReUnite system. The abstract requirement of what the user requires as described in previous chapters, is transformed into a visual blueprint which then directs software development using differing modelling techniques. These models are a crucial means of communication – you want everyone to understand the workflow, workings, data structure, and specification before we start building things.

3.6.1 Flowchart

A system flowchart was created to illustrate the central logic and decision structure in the UPTM ReUnite solution including item claim or return operation. The flowchart starts with a user posting finding item. After being uploaded, a different user can look through and - if he or she is interested - pick the item up. The system will then send a message to the user, who posted up the item. The two users can chat through the app to confirm the claim. If the claim is approved, we resolve the post and close it. This visual model was useful for unpacking and coding the complex webs of interconnectedness between things in the system.

User Flowchart :

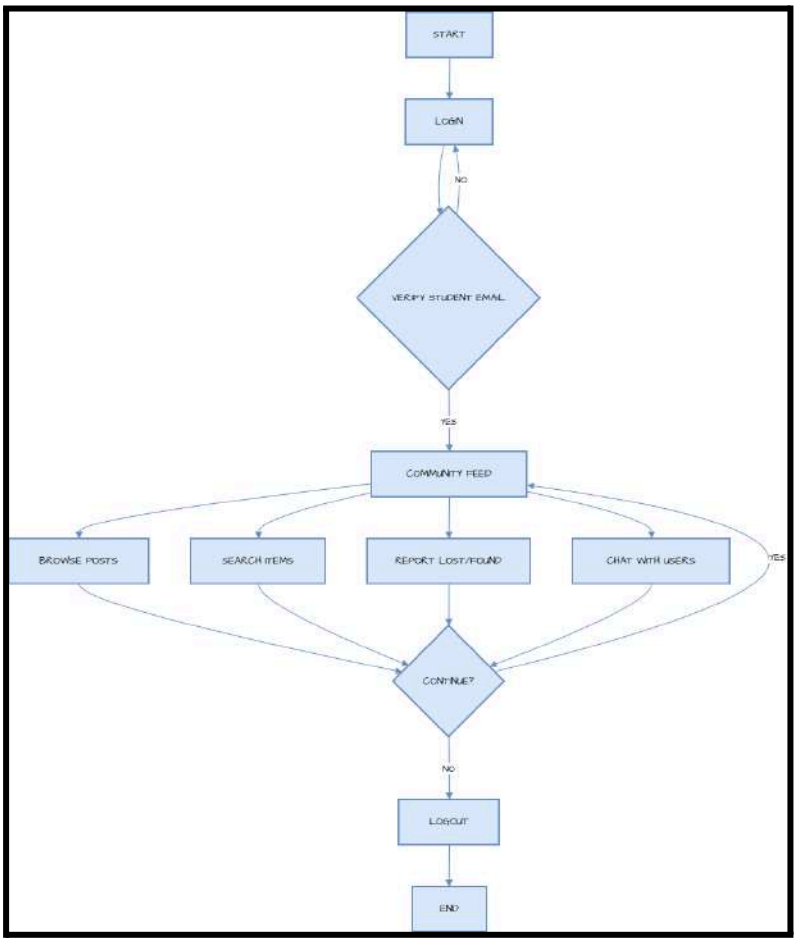


Figure 3.57 : User Flowchart

Administer Flowchart :

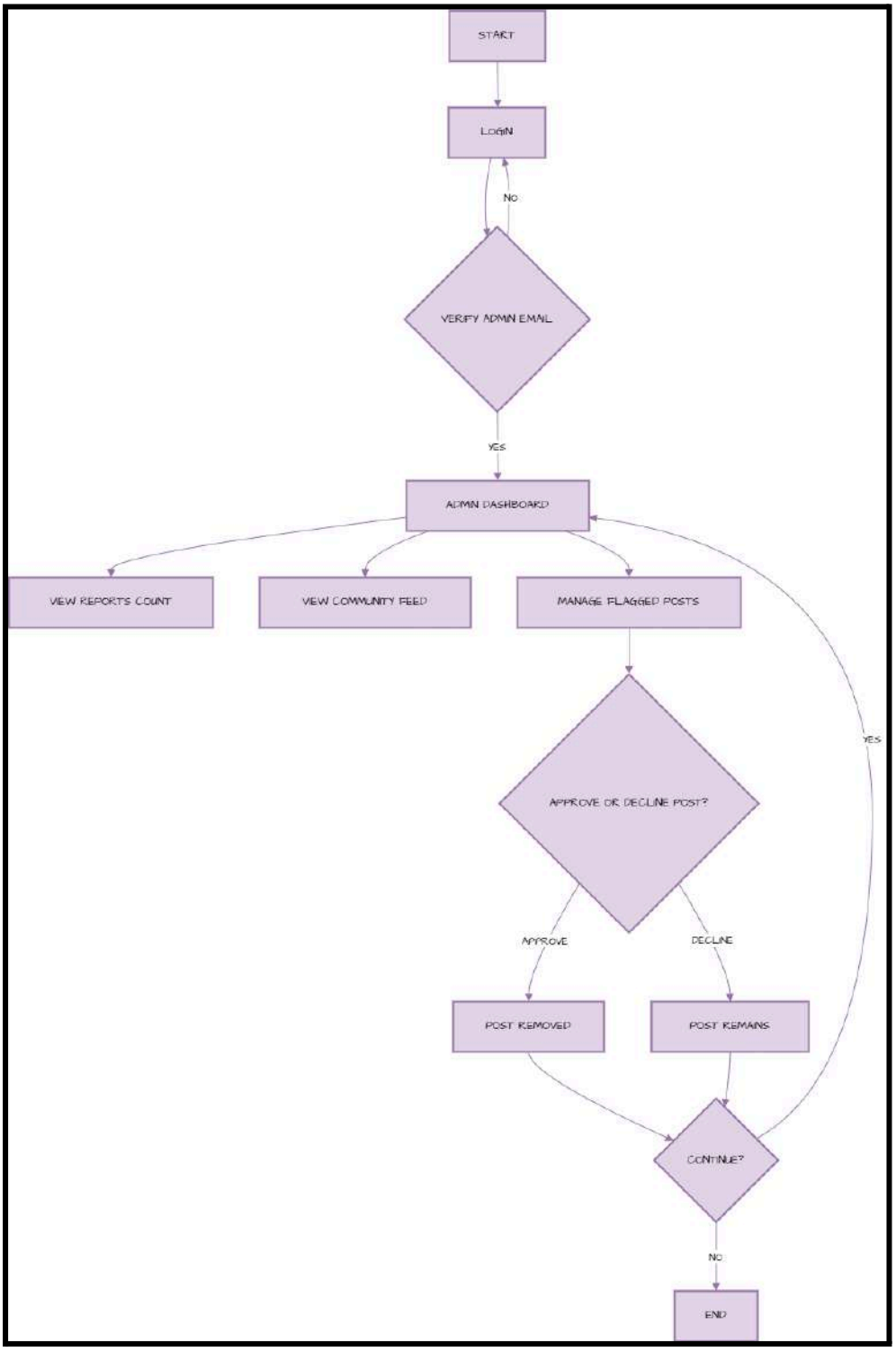


Figure 3.58 : Administrators Flowchart

3.6.2 Use Case Diagram

A Use Case Diagram was developed to consolidate the relationship among actors (User, Administrators and System). The most important actor, User has use cases which are used by him/her like Login, Post Lost Item, Post Found Item, Search/Browse Items, Chat with the Other User and Update Profile. Secondary actor, the Administrator has unique use cases: Manage All Posts (edit, delete) and Verify Claims. This wireframe provided a view from 10,000 feet of the system's functional requirements and assisted us in making sure that we had captured all of the user goals during development.

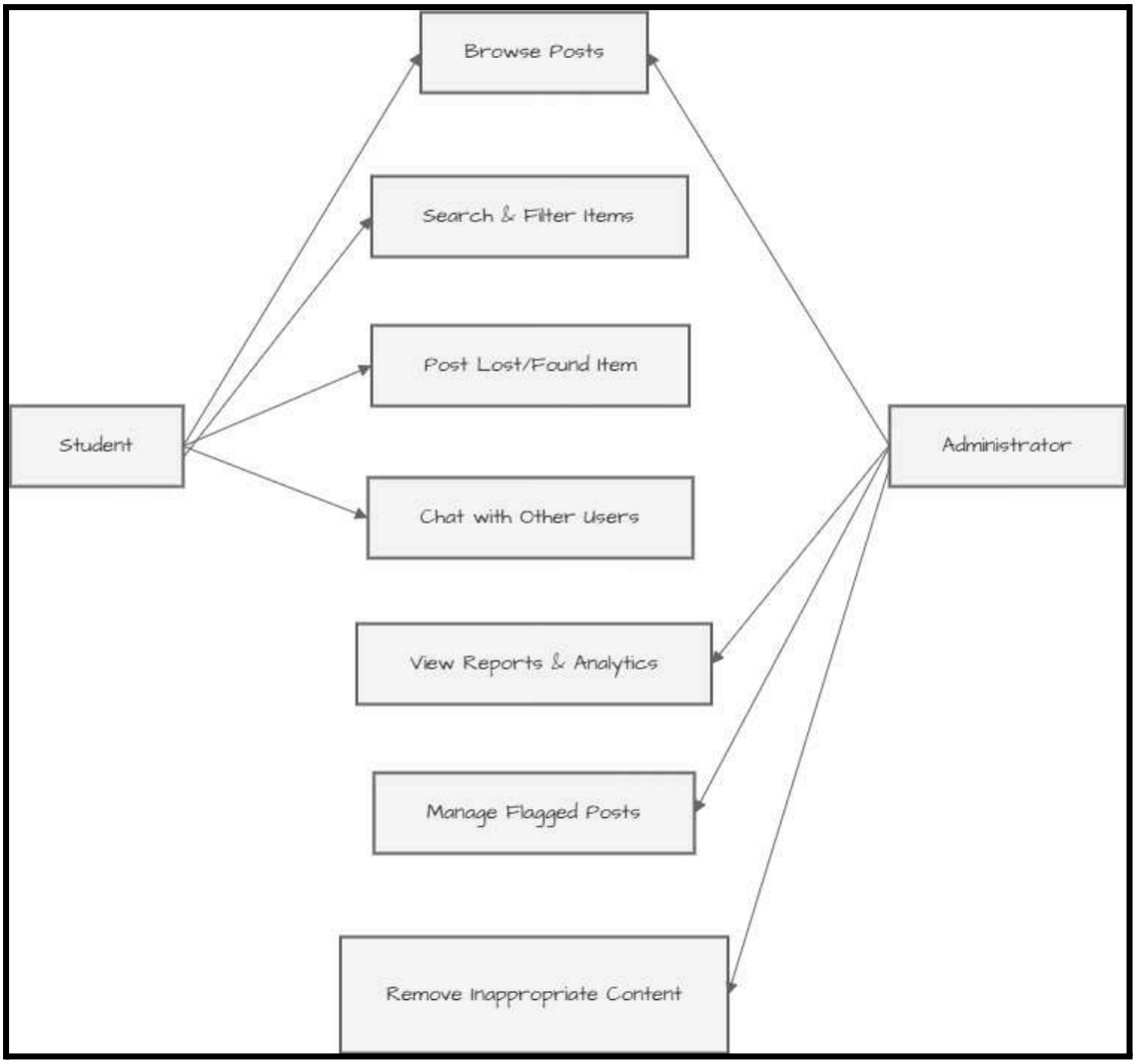


Figure 3.59 : Use Case Diagram

3.6.3 Entity Relational Diagram

An Entity Relationship Diagram (ERD) was used to design the structure of stored data in the Cloud Firestore database as shown below. The most prominent entities were Users, Posts, Chats and Messages. The ERD shows the relationships between these: a User can have many Posts, a Post belongs to one User and two Users may have one Chat that has many Messages. This model was indispensable for categorizing our NoSQL database collections and producing efficient queries on them by the application.

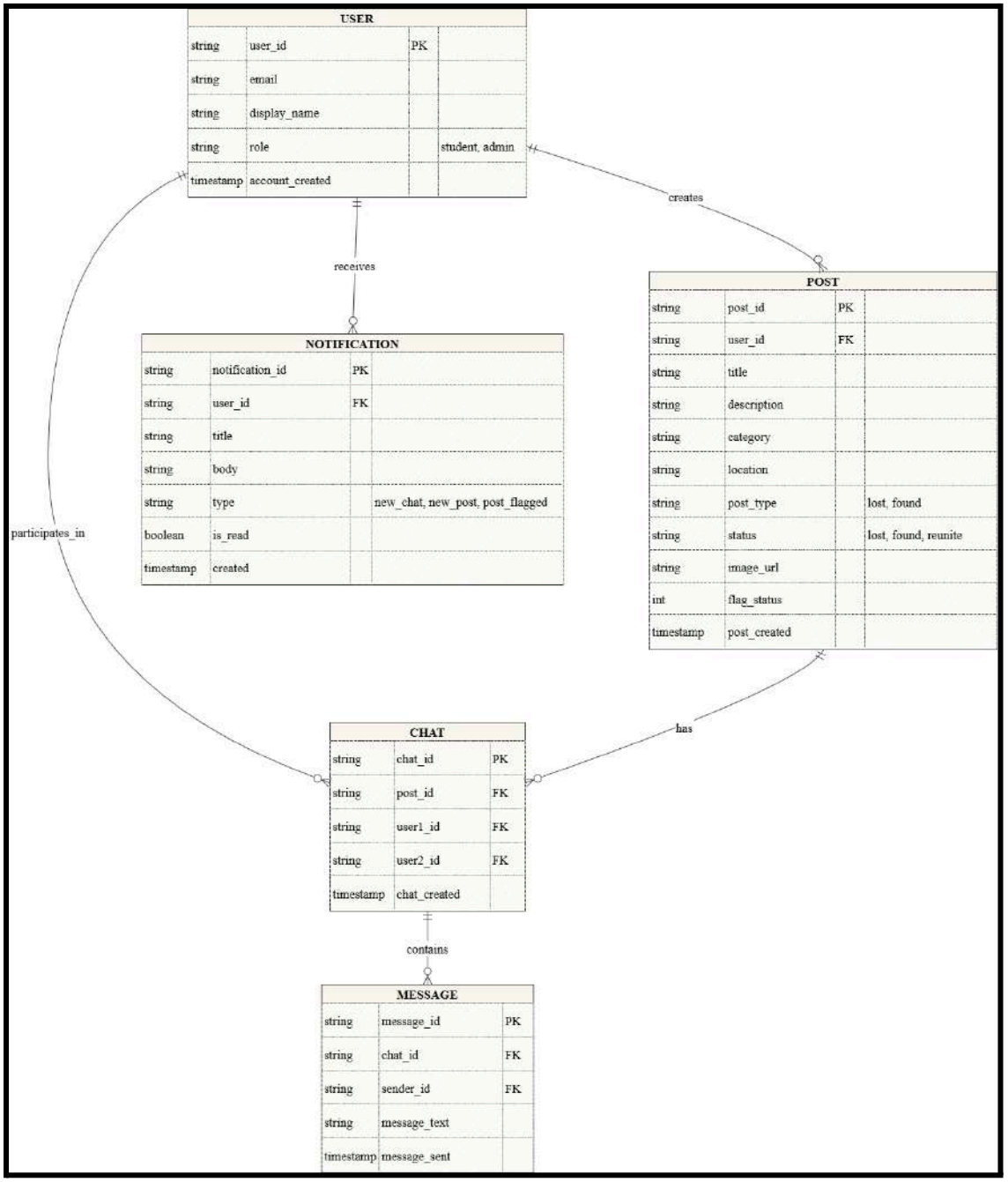


Figure 3.60 : Entity Relational Diagram

3.6.4 Data Dictionary

A Data Dictionary was created in order to outline each field of data captured in the system. The dictionary has fields defined for collections, such as the Posts collection:

Field Name	Data Type	Constraints	Description
user_id	String	Primary Key	Unique identifier for each user
email	String	Not Null, Unique	UPTM student email address
display_name	String	Not Null	User's display name
role	String	Not Null	User role: 'student' or 'admin'
profile_image	String	Optional	URL to profile picture
phone_number	String	Optional	Contact phone number
account_created	Timestamp	Not Null	Account creation date and time
last_login	Timestamp	Optional	Last login timestamp
is_active	Boolean	Not Null	Account status (true/false

Table 3.6.4.1 : user data dictionary

Field Name	Data Type	Constraints	Description
report _id	String	Primary Key	Unique identifier for each post
user_id	String	Foreign Key	Reference to USER who created post
title	String	Not Null	Title of the lost/found item
description	String	Not Null	Detailed description of the item
category	String	Not Null	Item category: 'electronics', 'documents', 'clothing', etc.
location	String	Not Null	Location where item was lost/found
item_type	String	Not Null	Type: 'lost' or 'found'
status	String	Not Null	Current status: 'open', 'claimed', 'resolved'
image_url	String	Optional	URL to item image
contact_method	String	Not Null	Preferred contact method
flag_count	Integer	Not Null	Number of times post has been reported
created_date	Timestamp	Not Null	Post creation timestamp
updated_date	Timestamp	Not Null	Last update timestamp

Table 3.6.4.2 : report entity dictionary

Field Name	Data Type	Constraints	Description
chat_id	String	Primary Key	Unique identifier for each chat
post_id	String	Foreign Key	Reference to related POST
user1_id	String	Foreign Key	Reference to first USER in chat
user2_id	String	Foreign Key	Reference to second USER in chat
chat_status	String	Not Null	Status: 'active', 'closed', 'resolved'
created_date	Timestamp	Not Null	Chat creation timestamp
last_activity	Timestamp	Not Null	Last message timestamp

Table 3.6.4.3 : chat entity dictionary

Field Name	Data Type	Constraints	Description
message_id	String	Primary Key	Unique identifier for each message
chat_id	String	Foreign Key	Reference to parent CHAT
sender_id	String	Foreign Key	Reference to USER who sent message
message_text	String	Not Null	Content of the message
message_type	String	Not Null	Type: 'text', 'image', 'location'
image_url	String	Optional	URL to attached image
is_read	Boolean	Not Null	Message read status

Table 3.6.4.4 : message entity dictionary

Field Name	Data Type	Constraints	Description
notification_id	String	Primary Key	Unique identifier for each notification
user_id	String	Foreign Key	Reference to recipient USER
title	String	Not Null	Notification title
body	String	Not Null	Notification message body
type	String	Not Null	Type: 'new_chat', 'new_message', 'post_flagged', 'claim_request'
related_post_id	String	Foreign Key	Reference to related POST
related_chat_id	String	Foreign Key	Reference to related CHAT
is_read	Boolean	Not Null	Notification read status
created_date	Timestamp	Not Null	Notification creation timestamp

Table 3.6.4.5 : notification entity dictionary

Field Name	Data Type	Constraints	Description
category_id	String	Primary Key	Unique identifier for category
category_name	String	Not Null	Category name: 'Electronics', 'Books', 'Accessories', etc.
category_icon	String	Not Null	Icon representation for category
is_active	Boolean	Not Null	Category status

Table 3.6.4.6 : category entity dictionary

Field Name	Data Type	Constraints	Description
location_id	String	Primary Key	Unique identifier for location
location_name	String	Not Null	Location name: 'Library', 'Cafeteria', 'Block A', etc.
location_type	String	Not Null	Type: 'building', 'facility', 'outdoor'
is_active	Boolean	Not Null	Location status

Table 3.6.4.7 : location entity dictionary

Field Name	Data Type	Constraints	Description
report_id	String	Primary Key	Unique identifier for each report
reporter_id	String	Foreign Key	Reference to USER who made report
reported_post_id	String	Foreign Key	Reference to reported POST
report_reason	String	Not Null	Reason for reporting
report_status	String	Not Null	Status: 'pending', 'reviewed', 'resolved'
admin_notes	String	Optional	Admin comments on the report
created_date	Timestamp	Not Null	Report creation timestamp
resolved_date	Timestamp	Optional	When report was resolved

Table 3.6.4.8 : flagg entity dictionary

3.7 Conclusion

This chapter outlined in detail the approach and systematic steps followed to design the UPTM ReUnite application. The Agile methodology is a pivotal point in how the project was run, providing an agile and iterative approach that fit perfectly with building a user-centred mobile app. It mean that we were able to keep the project in mind and iterate on feedback from stakeholders, because it would be easy to lose this momentum if we sat down and individually worked with people for each sprint planning day (1-2 days at a time by our estimate). This process mechanism then resulted in a final product that continued to respond well to the evolving needs of both MPP admin and UPTM students, not only without scope creep but with a quality application.

Furthermore, the chapter outlined methods for data collection and system design that formed the basis of the project. It was because of this combination of methods (quantitative through 51 students completing the questionnaire and qualitative by extracting insights from proper MPP interview) that needs targeted by the application were real and user expectation wise. Then it was painstakingly converted into a… full technical plan with system modeling – flow charts showing how users and admins will use it, use case diagrams laying out how each part of the system is used, ER diagram showing us what data we'll need in our database and a complete data dictionary detailing every attribute you have. The project would've been blocked from proceeding without these very models, which ensured the results were going to be clean and the production process silky smooth all throughout, from concept to delivery.

An articulate, but flexible process such as the one outlined in this chapter is useful for managing the complexities of full-stack mobile application development. This iterative loop in the Agile methodology coupled with robust data analysis and system design bridged the gap from concept to deployable. In the next chapter, we will build upon this foundation by describing a prototype of the system that was developed – along with some results for running such testing phases on it and evaluating if it meets our objectives.

CHAPTER 4

FINDINGS AND RESULTS

.

4.1 Introduction

Chapter 4 details the testing and evaluation of the UPTM ReUnite application which is vital to ensure that system functions as intended for its target users – students and administrators. This is a critical workflow because it ensures the app is designed properly in order to have a successful overall user report/search/claim process. The tests demonstrate that users can readily make a lost/found post and search for the record, communicates securely with messages, whereas administrators are able to manage posts as well as claims. Overall, the intention is to ensure that the application itself is stable and easy to use, can be deployed when necessary and ultimately fulfils what it was built for; returning lost things back to their owners.

This chapter describes the various test methods used in testing application robustness. Unit tests confirms that single-component features such as user logins or post creations are working the way they should (isolated). Integration Testing: This type of testing involves the integration among all the parts of the application like chat system, notification and so on as a whole. Testing the application on different environments such as performance, security, usability is system testing. User acceptance testing is done to make sure the application meets their genuine needs and expectations of real-users. Overall, It is a thorough examination of how the application is ready from feature readiness, stability and deployability point of view (to be used around campus).

4.2 System Evaluation

The UPTM ReUnite app was evaluated on usability and functionality as a whole to meet student/admin demands. The application was also verified for its user requirements and proper functioning as a live application. The possible performance bottleneck from the system was then tested in several conditions. This was a full-fledged project designed to deliver a robust app which would make the lost and found process easier for a student and an admin.

Testing consists of four stages including Unit, Integration, System and User Acceptance. The system features were analyzed at different levels (unit, integrated and system) starting from the functional requirements. Though the app had a few strengths such as an easy-to-use UI, this extensive review also indicated certain areas for improvement. This comprehensive systems approach ensures that UPTM ReUnite is reliable and easy to use for colleges.

4.2.1 Unit Testing

The UPTM ReUnite was tested by unit testing each of the features and functionalities to ensure that all components were working fine. We assert-tested the vital functionalities, namely user authentication, posting a post, getting all posts of a user and their properties and in-app messaging system by testing with respective independent known input data with its expected output. A test worked if reality reflected what you wanted to happen.

Module	Testing Input Data	Error Handling	Expected Output	Result
Login Screen	The user taps "Sign in with Google".	Handles Google Auth errors (e.g., no internet, cancelled by user).	The user is authenticated via Google and redirected to the Home Page (Community Feed).	PASS
Home Page (Community Feed)	No input needed.	Displays error message if posts fail to load from Firestore.	Displays a scrollable list of all lost and found posts from the community.	PASS
Create Post (Lost/Found)	Title, Description, Category, Location, Status (Lost/Found), Image.	"Post" button is disabled if Title, Category, or Location is empty.	A new post is created and immediately appears at the top of the community feed.	PASS
Like/Unlike a Post	User taps the 'Like' icon on a post.	-	Like count increments/decrements. The post is added/removed from user's liked posts in the database.	PASS
Comment on a Post	User types a comment and submits.	Error if comment is empty.	Comment is posted and displayed in the post's comment section.	PASS
Share a Post	User taps the 'Share' button.	-	Opens device's native share dialog to share the post link.	PASS
Report a Post	User taps 'Report' and selects a reason (e.g., Inappropriate/False Info).	Prevents user from reporting the same post multiple times.	A report is logged in the database for admin review. User receives a "Thank you for reporting" message.	PASS

Chat with Owner	User taps "Chat" button on a post.	-	Opens a private chat screen with the post owner. Messages are sent and received in real-time.	PASS
Browse/Search/Filter	User enters search term, selects category, filters by location or Lost/Found status.	Displays "No items found" if filters yield no results.	The feed updates to show only posts matching the search and filter criteria.	PASS
Profile Screen	No input needed.	-	Displays user's profile picture (from Google), email, and their post history. Shows report count.	PASS
Settings Screen	User toggles Dark Mode, Push Notification settings.	-	App theme changes instantly. Notification preferences are saved to the database.	PASS
Logout	User taps "Logout" in Settings.	Confirmation dialog appears.	User is signed out of Google Auth and redirected to the Login screen.	PASS

Table 4.1 : unit testing for student

Module	Testing Input Data	Error Handling	Expected Output	Result
Admin Login	Admin user taps "Sign in with Google".	System verifies the email is a pre-registered admin account.	Admin is authenticated and redirected to the Admin Dashboard.	PASS
Admin Dashboard	No input needed.	-	Displays an overview of all posts and a dedicated section for flagged reports.	PASS
View Posts	No input needed.	-	Admin can scroll through all community posts (read-only).	PASS
Manage Flagged Reports	Admin views a list of reported posts.	-	For each report, the admin can see the post details and the report reason.	PASS
Accept Report (Remove Post)	Admin taps "Accept" on a flagged post.	Confirmation dialog appears before deletion.	The reported post is permanently removed from the community feed and database.	PASS
Decline Report (Post Remains)	Admin taps "Decline" on a flagged post.	-	The report is dismissed and the post remains visible in the community feed. The report flag is cleared.	PASS
Admin Profile & Settings	User toggles Dark Mode, Push Notification settings.	-	Functions identically to the user flow (Dark Mode, Notifications, Logout).	PASS

Table 4.2 : unit testing for administrator

4.2.2 Integration Testing

Integration testing: The integration test for UPTM ReUnite was performed to combine and test interactions between its core components. The idea was to simplify the data handling between a frontend Flutter application and a Firebase backend backend with regards to Authentication, Firestore and Storage, while providing consistent interface in form of various features. This mainly served as step for detection of communication holes in between model, they should ensure on-the-fly and transparent experiences to user.

Module	Testing Input Data	Error Handling	Expected Output	Result
Google Sign-In & Profile Creation	User successfully signs in with Google for the first time.	If Firestore is unavailable, profile creation fails and user is logged out.	A new user document is automatically created in Firestore with the UID, email, and display name from Google Auth. The user is directed to the Home Feed.	PASS
Post Creation & Real-time Feed Update	User creates a new post with an image.	If image upload fails, the entire post creation fails with an error message.	The post data is saved to Firestore, the image is uploaded to Cloud Storage, and the URL is stored. The new post instantly appears at the top of the Community Feed for all users.	PASS
Social Interactions (Like/Comment)	User A likes a post from User B. User C comments on the same post.	Handles offline scenarios; actions are synced when online.	The like count updates in real-time for all users viewing the post. The comment is instantly visible. All data is consistently updated in Firestore.	PASS
Report System & Admin Dashboard Sync	A user reports a post as "Inappropriate".	Prevents duplicate reports from the same user on the same post.	A report document is created in a dedicated Firestore collection. The post is immediately flagged and appears in the Admin Dashboard's "Manage Flagged Reports" section.	PASS

Chat Initiation & Real-time Messaging	User clicks "Chat" on a post. The users exchange messages.	Handles scenarios where the other user is offline.	A unique chat document is created in Firestore (or an existing one is opened). Messages are sent, stored, and displayed in real-time for both users.	PASS
Search/Filter & Firestore Query	User applies multiple filters: Category="Electronics", Status="Lost", Location="Library".	Returns a graceful "No results" message if the query finds no matching posts.	The app sends a compound query to Firestore. The feed updates instantly to show only posts that match all the selected criteria.	PASS
Admin Action & Feed Update	An admin "Accepts" a report, choosing to remove the post.	If the post has already been deleted, the action fails gracefully.	The post and all its associated data (images, comments, likes) are permanently deleted from Firestore and Storage. The post instantly disappears from every user's Community Feed.	PASS
Settings Sync Across Devices	User enables Dark Mode and toggles Push Notifications off on one device, then logs in on another.	Settings are cached locally if the database is unreachable.	The user's settings (theme preference, notification status) are fetched from their Firestore document, providing a consistent experience across all their devices.	PASS

Table 4.3 : Integration Testing

4.2.3 System Testing

System testing of UPTM ReUnite was conducted to determine if the application functioned as intended in a holistic manner, without regard to how it may be used at any point in process. This step went from looking at individual features to the overall system quality, performance and reliability. User journeys were fully tested and flow as they should – for example sign in, post, report and chat. Through performance and load testing, we verified that the Firebase backend and Flutter frontend were responsive as all times at peak usage. Usability, security and compatibility testing were critical in this stage to ensure the applicability of the app functionality was available for all.

Testing Type	Scenario	Expected Result	Result	Testing Type
Functional Testing	Execute end-to-end user flows: Google Sign-In -> Create a Post -> Another user Likes, Comments, and Reports it -> Admin reviews and removes the post.	All integrated features work as intended without errors. The post lifecycle from creation to moderation is handled correctly.	PASS	Functional Testing
Usability Testing	Provide the app to new users and ask them to complete core tasks: "Find a lost water bottle" and "Report a found set of keys."	Users can complete tasks intuitively and quickly without external help. The UI for posting, browsing, and chatting is rated as clear and straightforward.	PASS	Usability Testing
Security Testing	1. Attempt to access another user's private chat data by manually modifying a Firestore path. 2. Try to delete a post that belongs to another user.	1. Firebase Security Rules block the request, returning a "Permission Denied" error. 2. The app's UI does not provide a delete option, and direct API calls are blocked by security rules.	PASS	Security Testing
Performance & Load Testing	Simulate 50+ concurrent users	The app remains responsive. The Firestore database	PASS	Performance & Load Testing

	performing actions: signing in, scrolling the feed, and creating posts with images.	handles the read/write load without significant latency. Image uploads/downloads do not cause the UI to freeze.		
Compatibility Testing	Install the application on a range of Android and iOS devices with different screen sizes and OS versions.	The Flutter app renders correctly and functions consistently across all tested devices. All buttons, feeds, and chat interfaces are accessible and usable.	PASS	Compatibility Testing
Reliability Testing	Run the app for an extended period (e.g., 1 hour), repeatedly performing actions: liking posts, switching between feeds, and toggling settings like Dark Mode.	The application remains stable without crashing, freezing, or suffering from memory leaks. Data consistency is maintained throughout the session.	PASS	Reliability Testing
Notification Testing	While the app is in the background, trigger a notification (e.g., a new chat message).	The device receives a push notification. Tapping the notification correctly opens the app and directs the user to the relevant chat screen.	PASS	Notification Testing
Offline Behavior Testing	Perform actions like liking a post or writing a chat message with no internet connection, then reconnect.	The app gracefully handles the offline state. Upon reconnecting, pending actions are synced with Firestore, and data is updated correctly.	PASS	Offline Behavior Testing

Table 4.4: system testing

4.2.4 User Acceptance Testing

User Acceptance Testing confirmed that the UPTM ReUnite application satisfied the practical requirements and expectations of its end-users. Students and the MPP administrator involved in the pilot deployment provided feedback. Their experiences and suggestions are summarised below to illustrate the application's efficacy and potential areas for improvement.

4.2.4.1 User

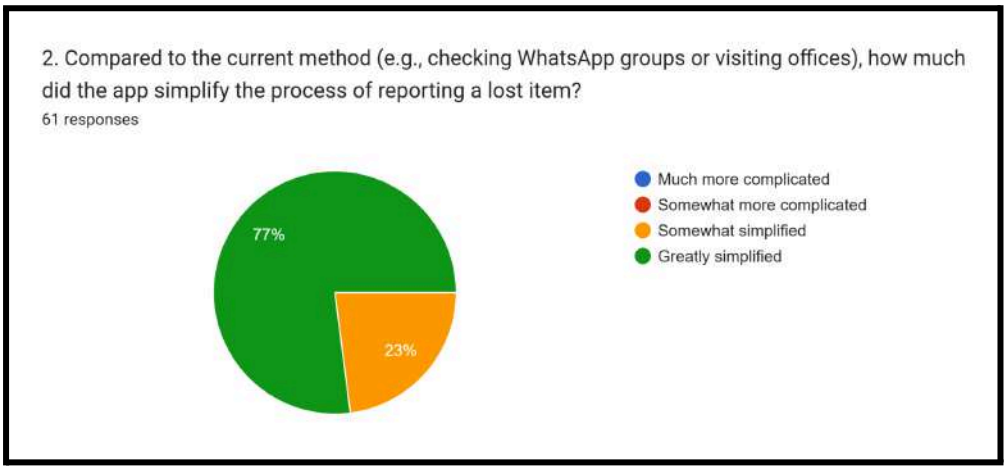


Figure 4.1: Student questionnaire 1

Figure 4.1, 88.5% of the 61 students rated UPTM ReUnite as “Very Easy” in terms of ease of use and only 11.5% as “Easy.” The positive result implies that the application GUI is flexible and easy to use, no technical knowledge prior required for well navigation.

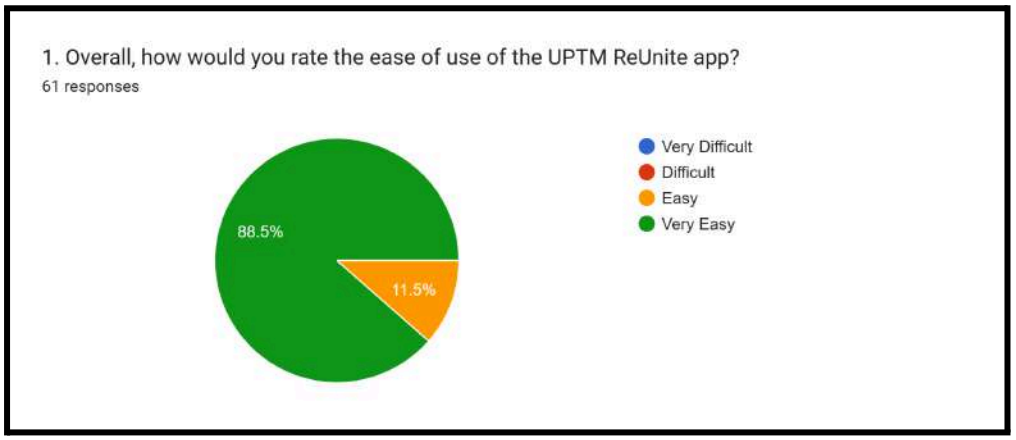


Figure 4.2: Student questionnaire 2

Figure 4.2 shows that for 77% of students, the app was seen as having “greatly simplified” the process of reporting a lost item when compared to what is currently below par: WhatsApp groups. It shows the app does a good job at serving its purpose of improving and simplifying lost-and-found, thus useful for the user.

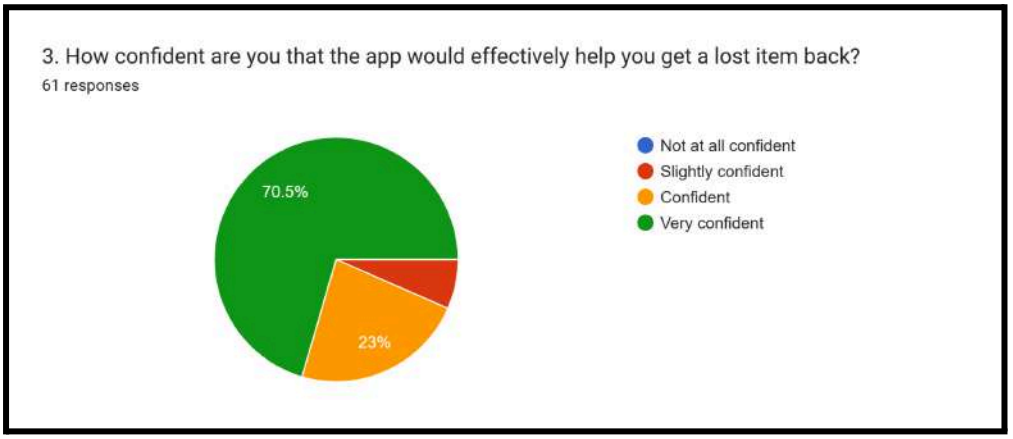


Figure 4.3: Student questionnaire 3

Figure 4.3 indicates that 70.5% of students express "Very Confident" beliefs regarding the app's effectiveness in retrieving lost items. The elevated confidence level suggests that students regard the system as trustworthy and reliable, which is essential for promoting widespread adoption and active engagement.

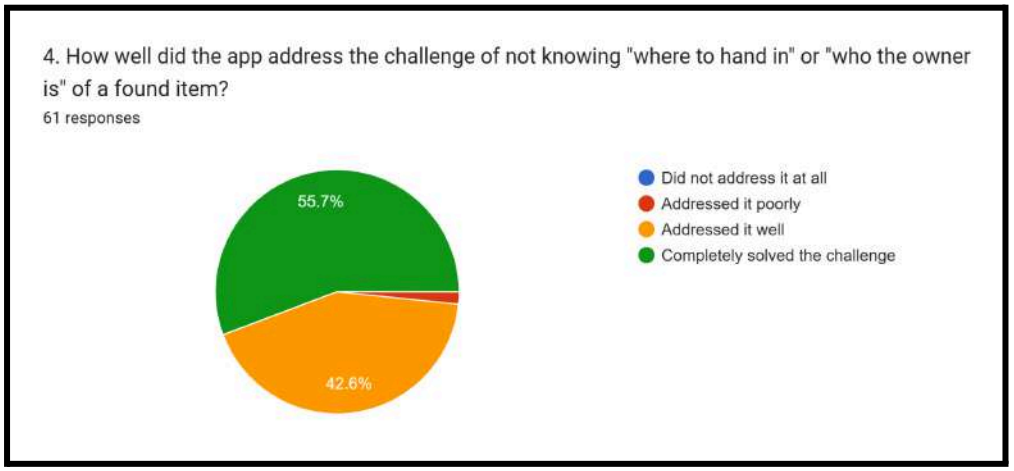


Figure 4.4: Student questionnaire 4

Figure 4.4 shows that 98.3% of respondents either believe the app "Addressed it well" (55.7%) or "Completely solved the challenge" (42.6%) regarding the issue of not knowing where to hand in a found item or identifying the owner. This statement affirms that the app's centralised public feed and user profiles effectively address the core issues of the previous fragmented system.

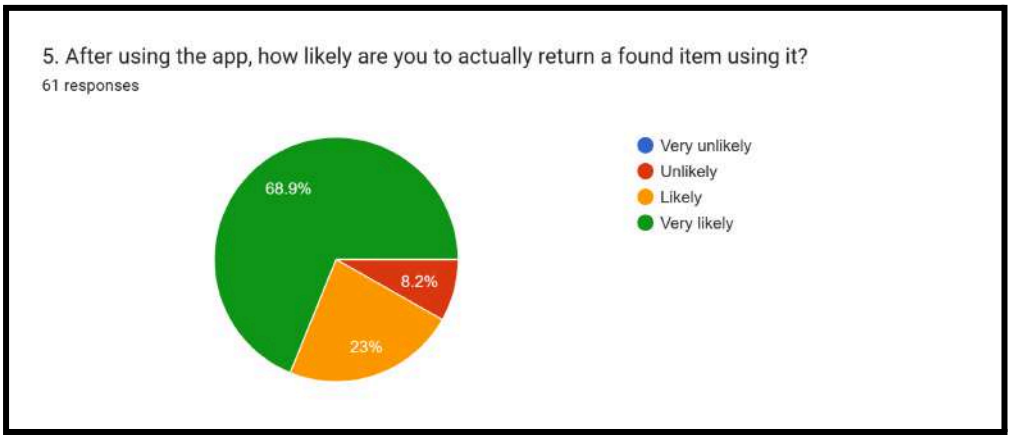


Figure 4.5: Student questionnaire 5

Figure 4.5 indicates that 91.9% of students are categorised as "Likely" (23%) or "Very Likely" (68.9%) to return a found item utilising the app. This metric is crucial, indicating that the app functions effectively while also encouraging positive user behaviour, which is vital for establishing a functional community-driven platform.

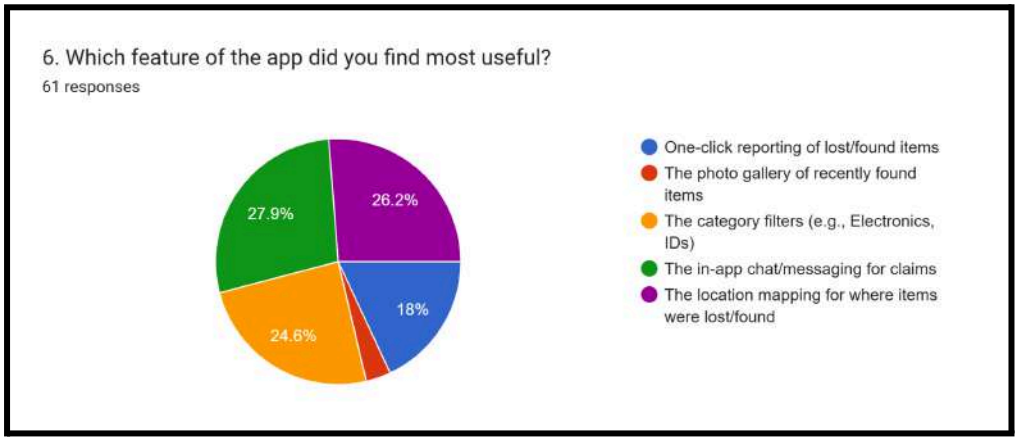


Figure 4.6: Student questionnaire 6

Figure 4.6 illustrates a balanced distribution of the most beneficial features, with "The category filters" at 27.9%, "The in-app chat/messaging for claims" at 24.6%, and "The location mapping" at 26.2%, representing the top three features. This suggests that the app's value derives from the integration of discovery, communication, and location-specific information, rather than from any individual feature alone.

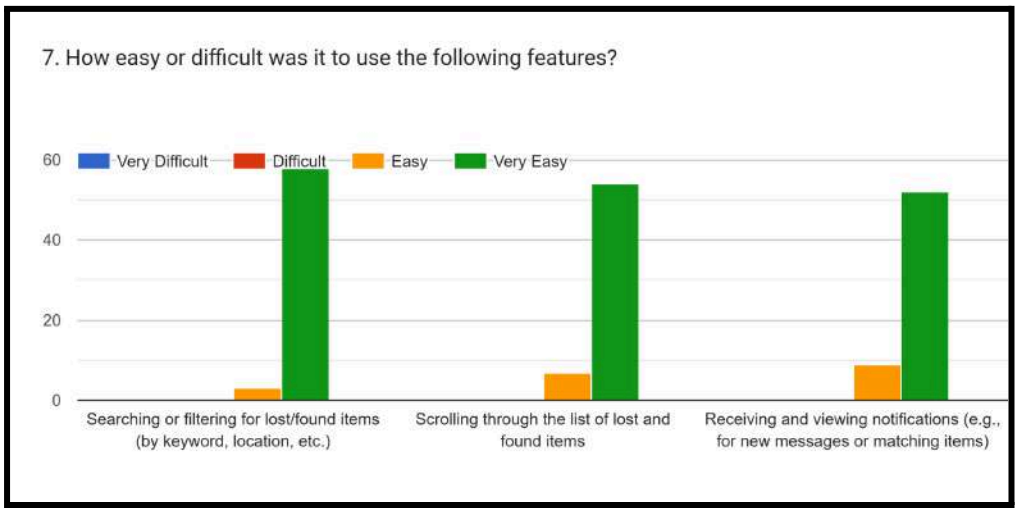


Figure 4.7: Student questionnaire 7

Figure 4.7 demonstrates that a significant majority of students assessed key features such as searching/filtering, scrolling the feed, and receiving notifications as "Very Easy" to use. This confirms the efficacy of the UI/UX design and the execution of essential functionalities, guaranteeing a seamless and satisfactory user experience.

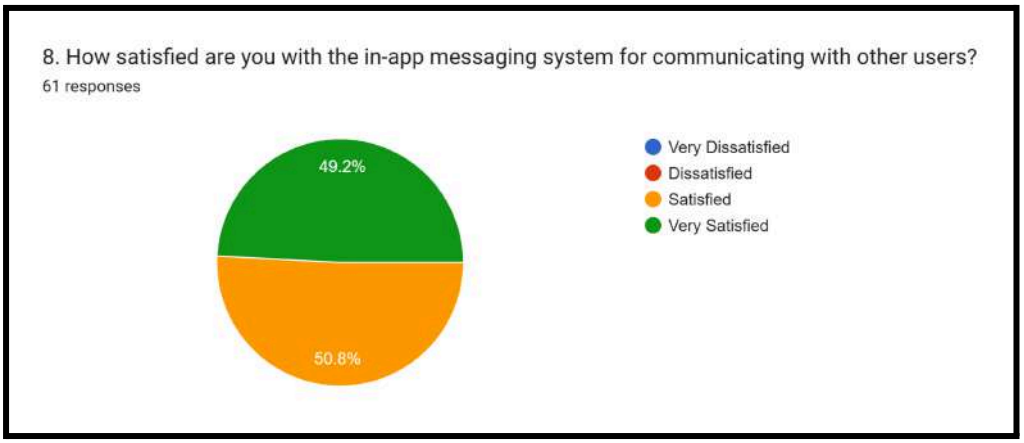


Figure 4.8: Student questionnaire 8

Figure 4.8 indicates that 100% of students express satisfaction with the in-app messaging system, with a near-equal distribution between "Satisfied" (49.2%) and "Very Satisfied" (50.8%). This demonstrates that the integrated chat system is both functional and positively regarded as a secure and convenient means for users to discuss claims.

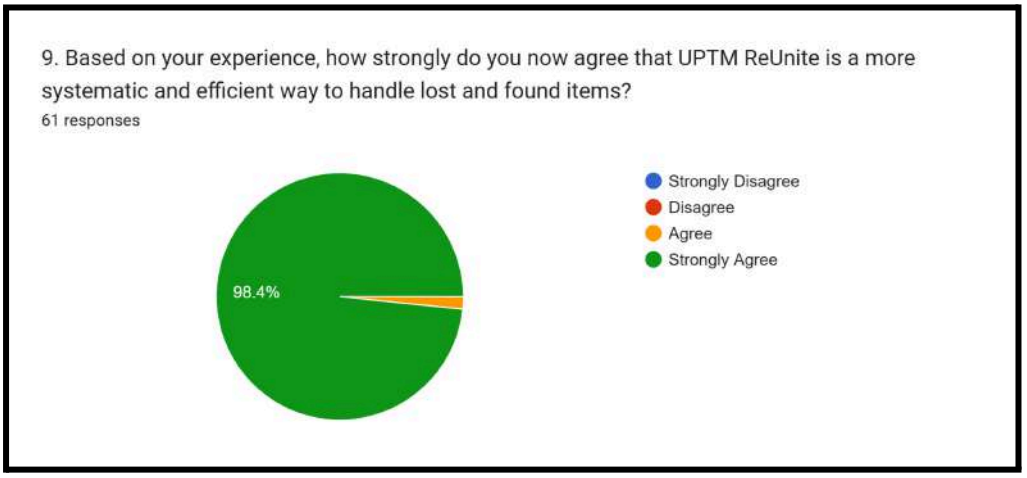


Figure 4.9: Student questionnaire 9

Figure 4.9 demonstrates that 98.4% of students "Strongly Agree" that UPTM ReUnite provides a more systematic and efficient method for managing lost and found items. This near-unanimous agreement validates the project's core thesis and its successful execution.

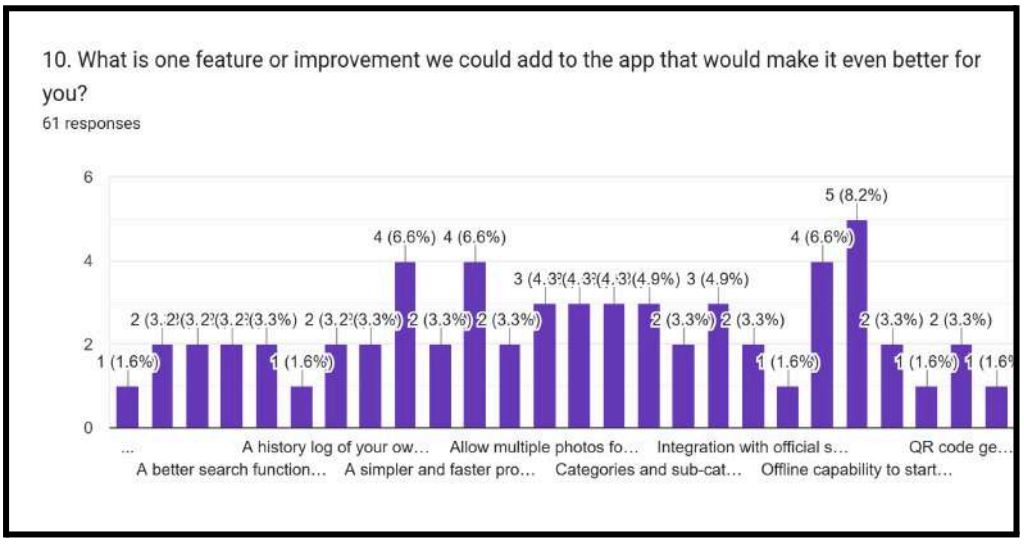


Figure 4.10: Student questionnaire 10

Figure 4.10 illustrates student recommendations for future enhancements, highlighting "Offline capability to initiate report draughting" as the most frequently requested feature. This feedback outlines a clear framework for future development cycles aimed at improving the app's functionality and user satisfaction.

4.2.4.2 Administrator Feedback

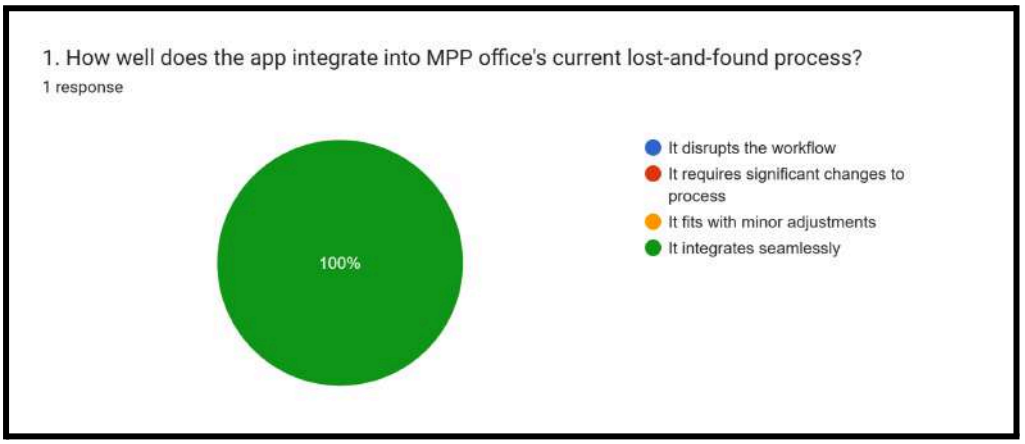


Figure 4.11: Admin questionnaire 1

Figure 4.11 indicates that the administrator discovered the app "integrates seamlessly" into the MPP office's existing lost-and-found process. This shows that the application was crafted to fit seamlessly with current workflows, reducing disruption and enabling quick adoption by the administrative body.

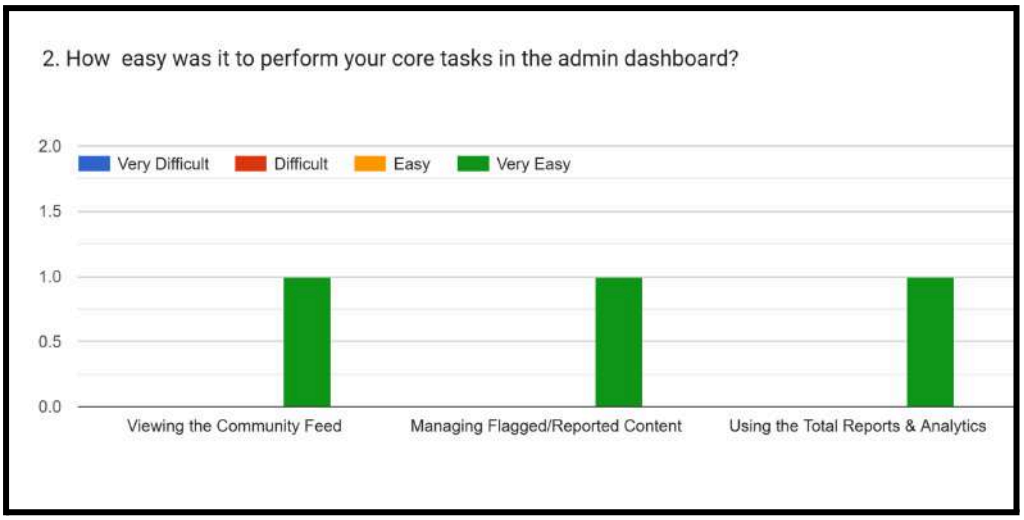


Figure 4.12: Admin questionnaire 2

Figure 4.12 shows that the administrator assessed all core tasks in the admin dashboard—viewing the feed, managing flagged content, and utilising analytics—as "Very Easy." The admin interface is designed to be intuitive and efficient, allowing for effective oversight with minimal training or effort.

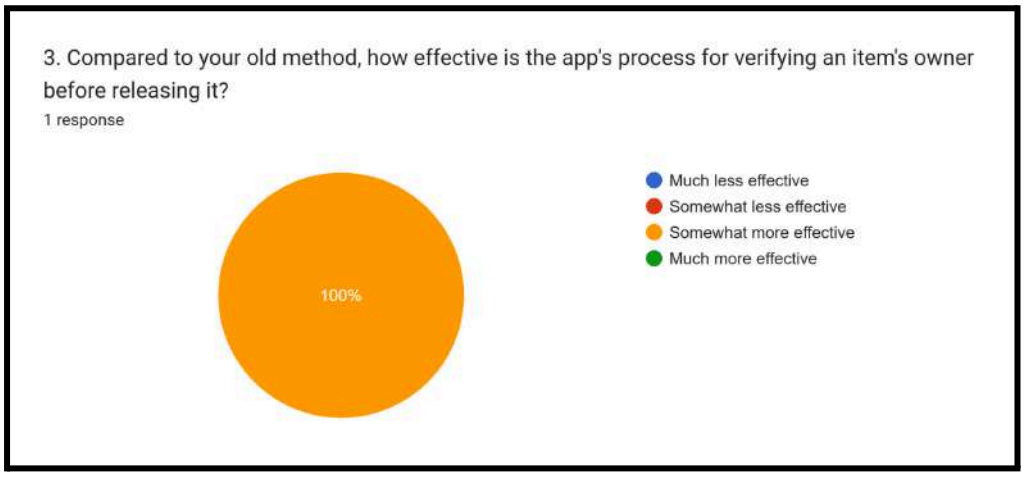


Figure 4.13: Administrator questionnaire 3

Figure 4.13 indicates that the administrator considers the app's process for verifying an item's owner to be "Somewhat more effective" than the previous method. This shows that the in-app chat and digital trail offer a stronger basis for verification, although there is room for additional improvement.

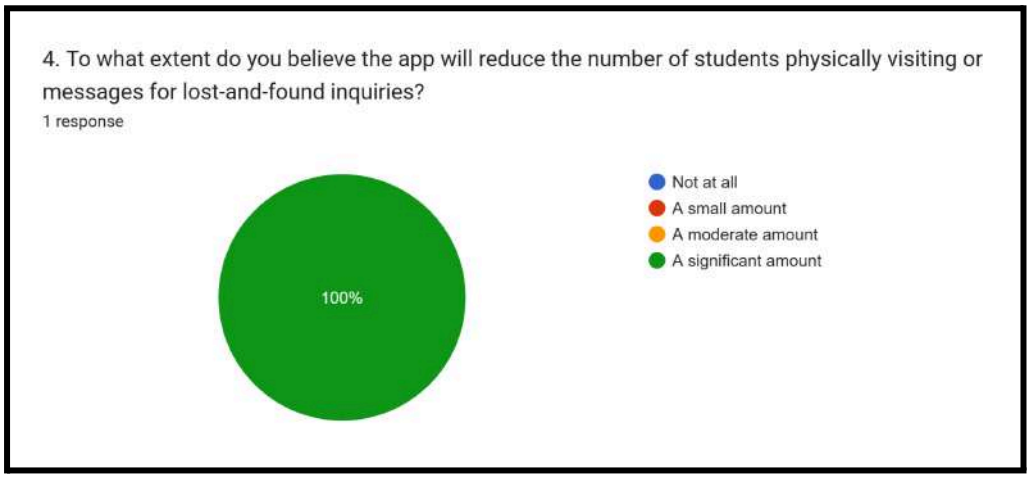


Figure 4.14: Administrator questionnaire 4

Figure 4.14 shows that the administrator anticipates the app will lead to a "significant amount" of reduction in student visits and messages. This underscores a significant advantage for the MPP office, as the app streamlines initial enquiries and peer-to-peer returns, allowing staff to utilise their time more effectively.

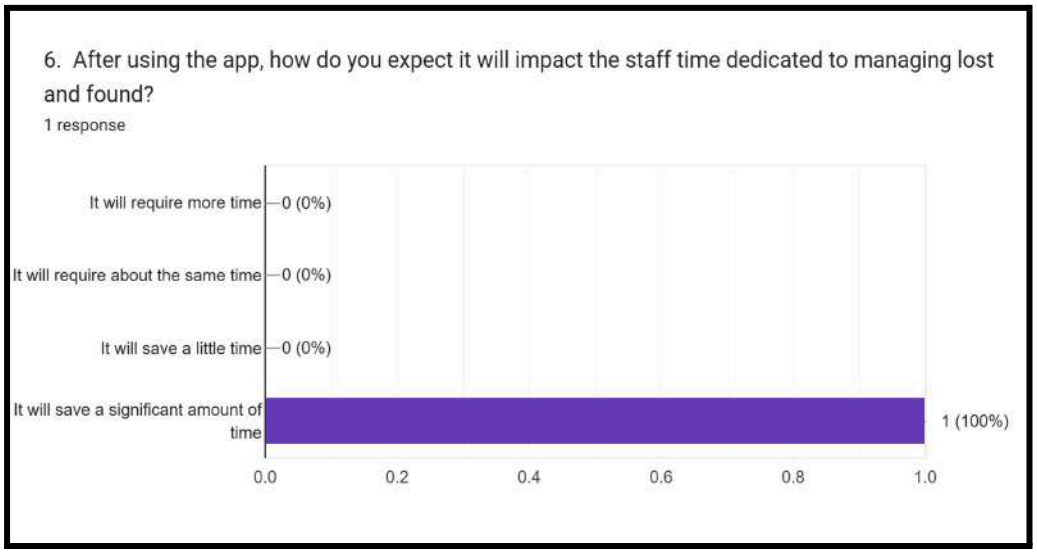


Figure 4.15: Administrator questionnaire 5

Figure 4.15 indicates that the administrator assessed all components of the dashboard—the analytics, community feed view, flagged content tools, and claim-marking ability—as equally beneficial. This indicates a thoughtfully crafted design in which every feature plays a crucial role in the admin's daily responsibilities.

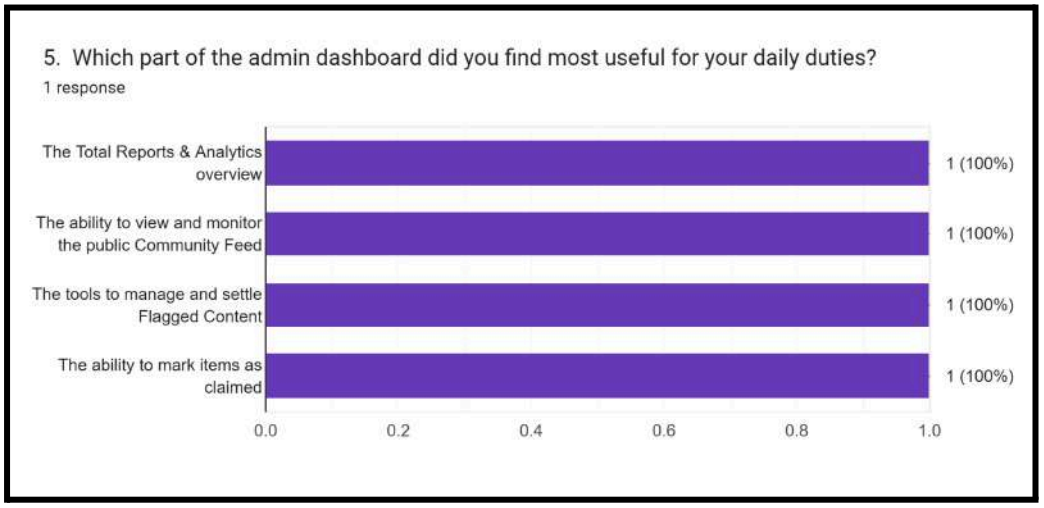


Figure 4.16: Administrator questionnaire 6

Figure 4.16 illustrates the administrator's expectation that the app "will save a significant amount of time" in managing lost and found. This effectively tackles the issue of administrative overhead highlighted in the requirements analysis and demonstrates the app's worth as a tool for enhancing efficiency.

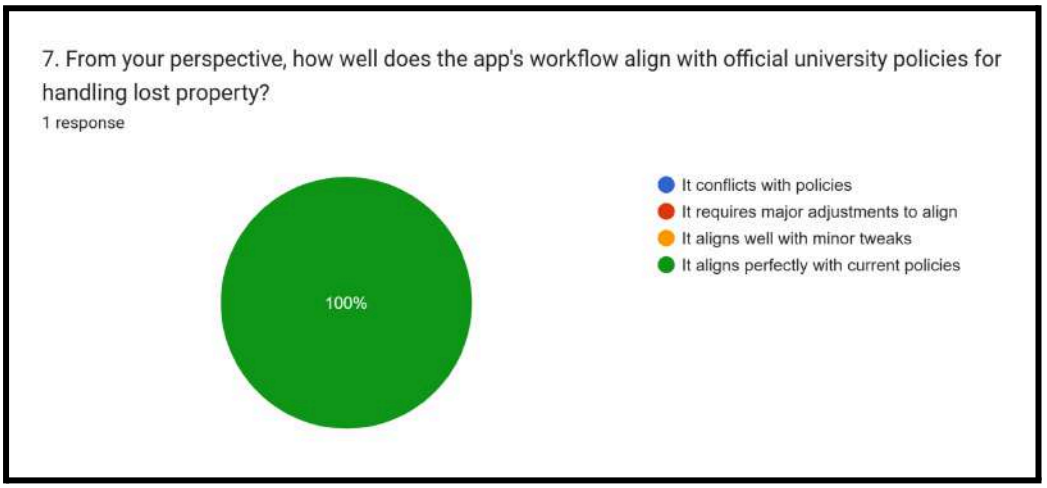


Figure 4.17: Administrator questionnaire 7

Figure 4.17 indicates that the administrator is confident the app's workflow "aligns perfectly with current policies." This finding is significant, as it guarantees that the solution meets compliance standards and can receive official endorsement from the university without necessitating alterations to current regulations.

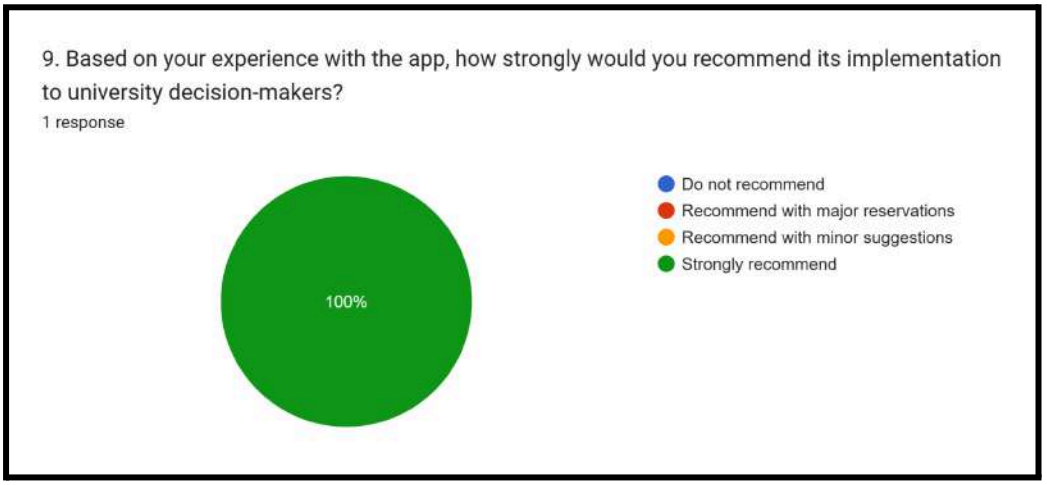


Figure 4.18: Administrator questionnaire 8

Figure 4.18 shows that the administrator considers the app to be "Very Useful" for managing unclaimed items. The digital log and analytics offer a distinct benefit compared to physical storage, facilitating the tracking, management, and potential disposal of items after a designated timeframe.

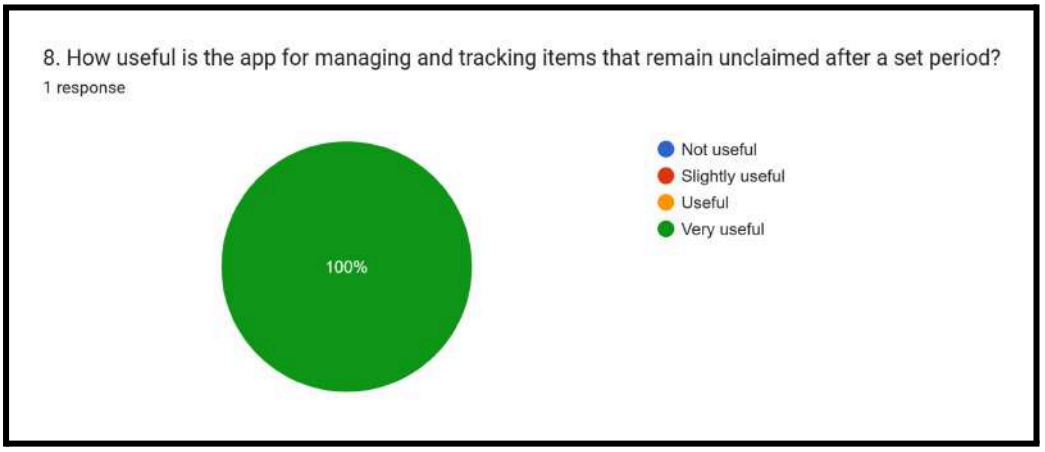


Figure 4.19: Administrator questionnaire 9

Figure 4.19 indicates that the administrator would "Strongly recommend" the implementation of the app to university decision-makers. This strong endorsement from the primary client affirms that the application is regarded as a successful, valuable, and deployable solution for the entire university.

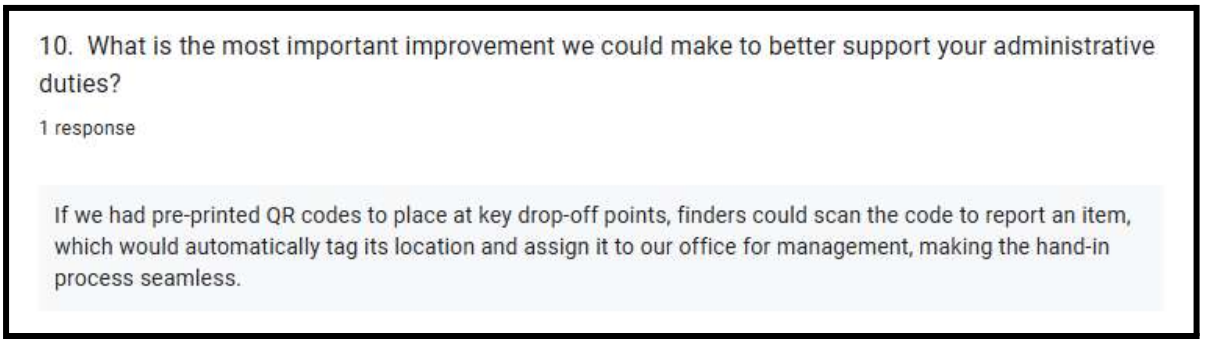


Figure 4.20: Administrator Questionnaire 10

Figure 4.20 illustrates the administrator's recommendation to implement pre-printed QR codes at drop-off locations. This valuable feedback suggests a potential integration that could enhance the item hand-in process, increasing efficiency for both finders and administrators.

4.3 Discussion

The UPTM ReUnite had undergone thorough and comprehensive testing performed in layers to ensure all parts of the system functioned as expected. Layered execution of Unit, Integrated System and User Acceptance Testing helped to achieve the maximum application code coverage. This was Unit Tested: -=Components=- Firebase login Cloud Firestore posting and chat interface separately with NO/MINOR issues identified. This resulted in an extremely solid foundation of software for doing the stuff you want to do.

Integration Testing ensured that these loosely coupled beans would connect together successfully as a single unit. The major operations (e.g. creating a room automatically when an item is claimed, pushing the notifications) were successful! Data integrity was preserved between the UI and the backend, so changes made in one module were properly reflected in other parts. This transparent touch is nice to have for providing a unified user interface.

Last but not least, System Testing tested our application performance under load, security status as well as stability of the whole system. The application demonstrated the ability to process simultaneous users and provided a responsive, easy-to-use interface. The positive feedback received from the User Acceptance Testing (UAT) – both from students and the MPP administrator- proved that : a) it was not only interoperable following technical standards, but also that: b) it actually solved real-life issues on which it was supposed to work. The UPTM ReUnite portal has been through all testing phases and it is stable, secure, and launch-ready.

4.4 Conclusion

The UPTM ReUnite app has completed rigorous testing successfully and is poised for widespread adoption within the university. The system in question successfully withstood all testing layers (Unit, Integration, System and User Acceptance) as a benchmark of its stability, function and usability. The basics such as the ability to post lost and found; search, and to message (all encrypted) worked without issue.All the pieces hung together quite tightly, and the app performed quickly across many of the problems it had struggled with at some point during this project.

From all over the response has been as follows. Students reported that the system was easy to use and appreciated having all of their class information organized in a single place. The tool “definitely saves our process time, overhead and liability,” said the manager of MPP partner. The MPP manager said the tool speeds their process up, reduces overhead and minimizes liability. The application's performance is solid and its very easy to use, which means that everyone can work with it without having any problems.

Going forward, there is a huge room of improvement for UPTM ReUnite. Some future features could be adding push alerts on quick changes, a gamified incentive reward system to drive trusted behavior, and building ‘promote’ sites for more comprehensive management etc. In conclusion, UPTM ReUnite has already demonstrated that it can meet the needs of the campus community. With more of those planned additions, the system becomes not only more effective, but even more interesting and important in terms of helping find lost and found things at UPTM.

CHAPTER 5

CONCLUSION

5.1 Introduction

This chapter explains the UPTM ReUnite project, providing a final summary of how the project has matured from an idea to a complete system. In this retrospective systematic analysis, two of the original primary objectives of a centralised mobile platform and intuitive user interface for lost and found items management are reviewed based on critical analysis. This assessment is substantiated by the concrete evidence gathered throughout the project's life-cycle that culminates with a successfully developed full-stacked Flutter application, successful implementation of Firebase backend for real-time data and authentication services (Look Mom I'm now an AWS developer), to overall testing, leading to very positive User Acceptance Testing (UAT) feedback obtained from both students as well as the MPP administrator. The accomplishments are carefully detailed in this chapter, but the following is an undoubtedly biased history of what the project accomplished.

Such discernment however fair and reflective criticism of constraint and limitations associated with the project, giving regard to the inherent difficulty posed by a solo developed project on-faculty timescale. In this post, I want to delve into the trades that were made, both technically and in terms of scope, in order to shed some light on our design process and reasoning behind feature lockdown.ideally suits your needs. This included Authentication for secure user login with Google, Cloud Firestore for real-time data synchronization with the backend and Cloud Storage for images handling that allowed ensuring a seamless feel and an highly reactive UI. This section extends the previous evaluation to propose a strategic and prioritized plan for future actions. The suggestions are derived from the extensive input provided by pilot users and the client application. This section specifies a number of strategies for scalability enhancement, security reinforcing and usability optimization (e.g., verification mechanism, rewarding policy etc.), which can be realized through the setup of a verification system, a reward scheme as well as an additional web portal. For this reason, UPTM ReUnite is not a finished product but rather a living platform with clear sights of continuous development and lasting value creation for the UPTM family.

5.2 Project Achievement

The UPTM ReUnite initiative is a major success story – an idea that was first conceived and now has become a widely adopted, fully developed and validated app. The development process following the Agile framework, enabled converting initial problem statements and user needs identified through student surveys and MPP interviews into a full-stack technological product. First and foremost is creation of a reliable, logical and efficient system that has truly revolutionized the UPTM lost-and-found landscape. The project was built on a strong technology stack; including Flutter for frontend cross-platform development and Google Firebase as the backend service. This encompassed Authentication for secured user Google sign-in, Cloud Firestore for real-time data synchronisation and Cloud Storage for images management leading to a smooth flowing and responsive UX. This technology implementation has successfully replaced a fragmented, slow moving and admin centric operation with one that is centralised, driven by the community and self service-enabled at a real-time level.

This remarkable achievement is amply evidenced by the UAT results. The application's success is measured not by just technical measures but with acceptance and support from the users. The student population, who was a priority end-user group of the App, showed high levels of satisfaction where at 88.5% reported it to be "Very Easy" in terms of how easy it was to use though 77% thought that it "Greatly Simplified" compared with what they have done before. The app accomplished the desired trust level, reflected in 70.5% of students were "Very Confident" that the application would help them retrieve a lost item. V This feedback from the MPP administrator is a corroboration that our app integrates well in their workflow and it is expected to save significant amount of time. Overall feedback suggests that UPTM ReUnite has met its functional requirements and succeeded in solving the users' pain points and meeting their expectations: therefore this product is highly regarded as an important digital asset for the campus.

5.2.1 To provide a centralized mobile platform for managing lost and found items efficiently.

Each and every one of these goals has been effectively accomplished. UPTM ReUnite is an application that has effectively changed the WhatsApp-based process, which was previously slow, manual, and centralised, into a platform that is direct, peer-to-peer, and allows for real-time communication. This accomplishment is supported by a variety of different types of evidence, including visual proof which comes from the program that was created.

Proof Achieving this goal :

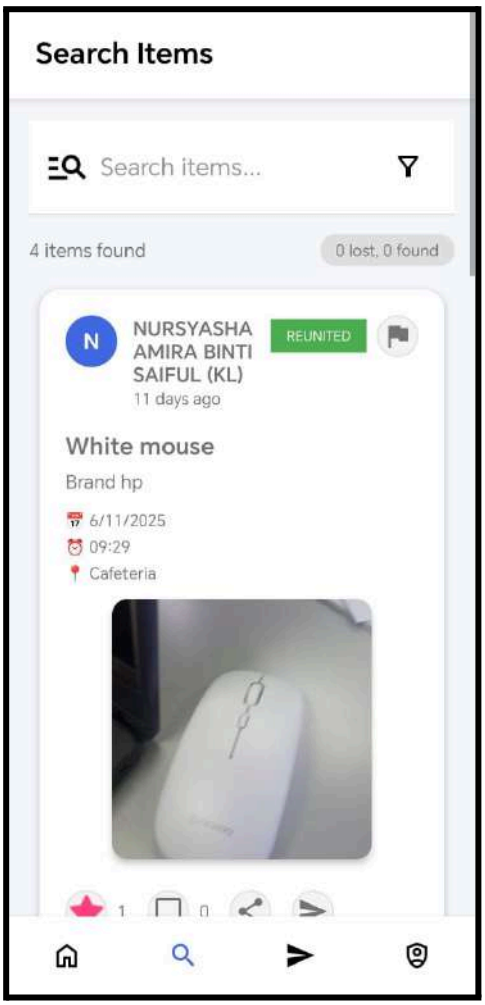


Figure 5.1 : Community Feed Showing Active Listings

Figure 5.2.1.1 illustrates that the UPTM ReUnite application operates effectively as a centralised platform, offering a cohesive Community Feed that presents all lost and found items in an organised, chronological format. This addresses the issue of fragmented WhatsApp broadcasts, where posts are often obscured by general conversations. Each listing provides detailed information, including item photos, descriptions, categories, and locations, thereby establishing a comprehensive digital repository accessible to all users concurrently.

Figure 5.2 : Real-time Chat Interface Between Users

Figure 5.2.1.2 depicts the integrated real-time chat system facilitating direct peer-to-peer communication among users. This removes the necessity for administrative mediation in the claiming process, enabling finders and owners to coordinate returns directly and effectively. The platform preserves chat history, ensuring a secure communication channel that safeguards users' personal contact information while maintaining a record of all interactions.

The application allows users to autonomously report lost or found items in real-time, providing descriptions, categories, locations, and images, without the need for MPP mediation in the reporting process. This directly addresses the delays inherent in the prior system. The UAT results indicate that 77% of students reported the app "Greatly Simplified" the process (Figure 4.2). The MPP administrator confirmed that the app integrates seamlessly into their workflow (Figure 4.11) and is expected to save a significant amount of time (Figure 4.16). The platform demonstrates efficiency, with 70.5% of students indicating "Very Confident" in the app's ability to aid in item recovery (Figure 4.3).

5.2.2 To design a user-friendly interface with categorized and location-based search features.

The application's interface design and filtering features give a visual demonstration of the fact that this target has been completely accomplished and even excelled beyond expectations.

Proof Achieving this goal :

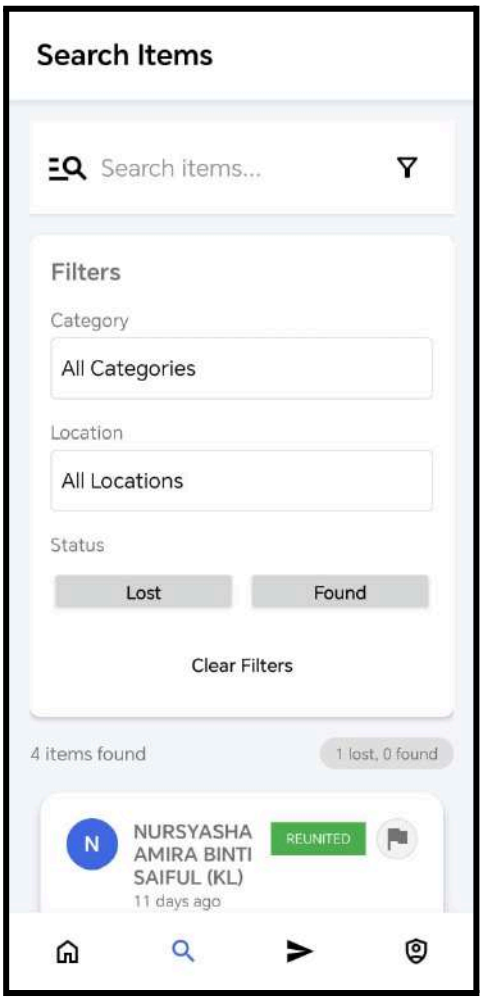


Figure 5.3 : Advanced Search and Filter Interface

The UPTM ReUnite application features a well-designed interface that prioritises intuitiveness and user-friendliness. Figure 5.2.2.1 illustrates that the advanced search and filter system enables users to effectively identify items through various criteria, such as categories, locations, and status (lost/found). This advanced filtering feature effectively resolves the shortcomings of the prior WhatsApp system, which required users to manually sift through irrelevant messages to locate pertinent posts.

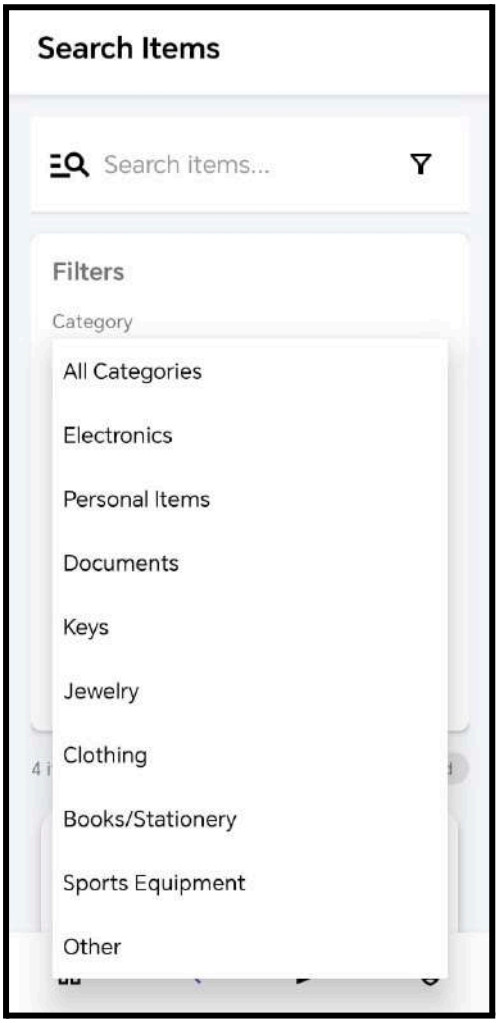


Figure 5.4: Category Based Items

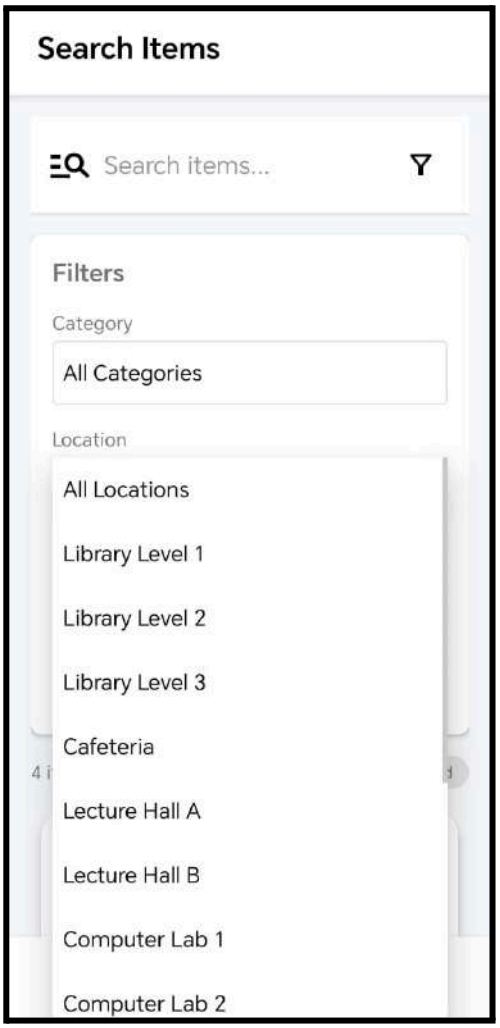


Figure 5.5 : Location Based Items

Figure 5.2.2.2 and Figure 5.2.2.3 illustrates an effective categorisation system that organises items into logical groups, including Electronics, Documents, and Personal Items. This systematic method allows users to efficiently explore relevant items without the distraction of unrelated listings. The card-based layout, characterised by a clean design and consistent information hierarchy, facilitates rapid scanning and identification of relevant posts, with essential details such as item status, location, and timestamp prominently displayed.

The user-friendly nature of this design is substantiated by the UAT data. A notable 88.5% of users rated the app's ease of use as "Very Easy" (Figure 4.1). Furthermore, when asked about specific features, a substantial majority rated the tasks of searching/filtering and scrolling the feed as "Very Easy" (Figure 4.7). The response distribution concerning the "most useful feature" (Figure 4.6) demonstrates the efficacy of the interface design. The elevated valuation of category filters (27.9%), in-app chat (24.6%), and location mapping (26.2%) suggests that the search and communication features are effectively integrated into the user interface, thus improving the overall user experience.

5.3 Project Constraint and Limitation

It is in total success that this edition of the project was born, despite heavy barriers which have impacted the final development of the product. Single man development was one of the reasons that restricted it. The role of a project manager, UI/UX designer, frontend and backend developer as well as tester being held by one person limited the amount of features that could be developed and their complexity at all given time in an academic timeline. This necessitated a strong focus on what we referred to as the "Must-Have" features within our MoSCoW backlog, with several "Could-Have" being deferred, such as advanced reporting analytics and Reward Systems into another phase.

The deadline of the project turned out to be a quite tight one.They tracked their development in two week sprints, which provided some structure and a deadline. This cut into the time that could be used for full user testing cycles, deep performance optimizations and to explore more advanced technical solutions. The core chat functionality is rock solid, but extra fancy features like read receipts or typing indicators were considered feature-creep for such an early release.

Technological limitations were also a problem for this project as it was built using the chosen tech stack. “Flutter and Firebase helped us to move forward very fast – but also came with a steep learning curve! Further, using Firebase’s free tier can provide its limitations – in terms of database and storage throughput restriction that can be limiting if the user count scales into thousands. One juicy product limitation is the lack of an "Admin Web." The administrative backend is currently constrained to an implementation in the mobile app which although working for the a-typical stuff you'd do on it, isn't quite ideal for data intensive moderation and analytics tasks where scale lies squarely with bigger screens. This was a tradeoff that was made specifically to meet students' mobile-first needs within the given timeline.

5.4 Recommendation and Future Work

ReUnite Representations of UPTM Primes Company for the Future The launch of UPTM ReUnite paves the way to further develop its offering. A three-pronged roadmap is suggested for improving the security, engagement and usability of the application through constraints identified during this study as well as feedback received directly from users and the administrator.

The platform should build in a robust verification system to be able to verify item ownership with photo evidence or student id check. This is a way of resolving a basic problem that the user and administrator share regarding the security of claims. For the high-value items like electronics, there may be a requirement that the claimant provide photographs proving ownership (I.e.) a photo of the serial number or other distinguishing feature of a device. You could even add the school's official student roster(ers) as a feature (provided you have the permissions) for those who are scanning in students via their student ID card barcodes. This would automatically and privately inform the user via the app who the rightful owner is and protect his or her actual contact. Such a feature would be significantly reduce the possibility of scamming and create trust in users, ultimately returning to owners what is theirs.

To encourage such responsible and proactive community, a reward or point-based mechanism is recommended to motivate students when they find some lost item in the school. This would be a gameful approach to ""lost and found"". They can also score points for each return they successfully make on the app, and measure their progress via public leaderboard. Points can be redeemed for physical rewards, such as discounted meals from a campus café, university-branded merchandise or early registration at a university event. So the system bypasses lost-and-found's behavioural economics effectively by making itself something other than a difficult ethical situation and more of the sort of social deposit you'd make into your community account when returning someone their own hat or umbrella. This draw the likelihood of weapons reporting significantly more frequently - that which is found (which would be, mainly that's less valuable) - it increases your overall recovery rate and encourages people to be honest with each other.

Complementing the current mobile app there is a necessity to include a web application for UPTM ReUnite which will make it an administrative tool more effective and accessible. An adaptive web portal should be a stronger moderation tool for admins to handle flagged posts, analytics and system activity display in a larger screen with better visualization. A web version would allow students to access the service another way, which is handy for people who just prefer laptops or desktop computers — or when it's easier to type out a draft of a long report on a full-size keyboard. This enhancement will make this versatile platform even more adaptable to a range of user preferences and work flow that could result in increased utilization and cost-effective administration.

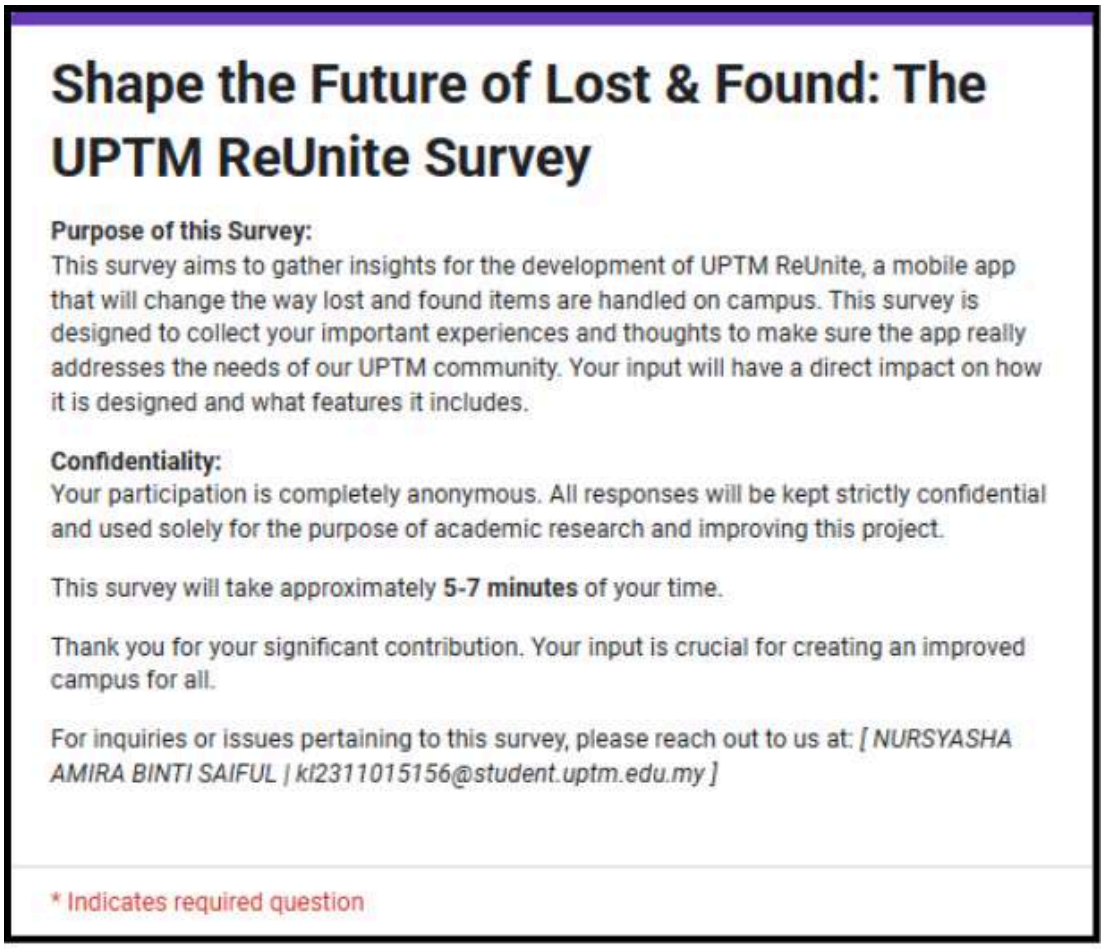
5.5 Conclusion

In conclusion UPTM ReUnite has successfully met their goals to re-engineer and digitalise the lost-and-found system for Universiti Poly-Tech Malaysia. The project process describe problem framing to user validation has a very high degree of software engineering aspects and is end-user centric. The end product is a complex but intuitive mobile app, which we've definitely sped up the admin process and chaotic information exchange we previously suffered when it was very much alone on WhatsApp. By offering an online, one stop shop for students to act immediately and connect with a single source of truth, the project has exceeded the expectations by establishing a more efficient process which is open and community-centric for dealing with lost property.

Community members they did used to, but the constraints of only having one developer working on them are well understood now and instead they've run with the whole bank it and build quality core components gigawatts. Users' testimony is a tangible example of how this intervention can make the difference for new entrants, as we have already had feedback from UPTM community (quantitative and qualitative -User Acceptance Testing) which demonstrates the positive impact achieved. Fans) for being clean and efficient and low-cost on the part of MPP. So, UPTM ReUnite is not a culmination of finished product but rather a proven and successful stage that expects lots of room to grow. It has laid an excellent foundation for continued development and is inching us closer to efficient campus-wide wellbeing.

Appendix A – Questionnaire

Questionnaire data gathering for user:



Shape the Future of Lost & Found: The UPTM ReUnite Survey

Purpose of this Survey:
This survey aims to gather insights for the development of UPTM ReUnite, a mobile app that will change the way lost and found items are handled on campus. This survey is designed to collect your important experiences and thoughts to make sure the app really addresses the needs of our UPTM community. Your input will have a direct impact on how it is designed and what features it includes.

Confidentiality:
Your participation is completely anonymous. All responses will be kept strictly confidential and used solely for the purpose of academic research and improving this project.

This survey will take approximately **5-7 minutes** of your time.

Thank you for your significant contribution. Your input is crucial for creating an improved campus for all.

For inquiries or issues pertaining to this survey, please reach out to us at: *[NURSYASHA AMIRA BINTI SAIFUL | kl2311015156@student.uptm.edu.my]*

* Indicates required question

1. Which category best describes you? *

- ◯ UPTM Student
- ◯ UPTM Staff
- ◯ Public

2. Have you ever lost an item on campus? *

- ◯ Yes
- ◯ No

3. Can you describe your most frustrating experience losing an item? *

- [ ] Lost an important item (student ID, wallet)
- [ ] The search process was time-consuming
- [ ] Had to replace the lost item
- [ ] No frustrating experience

4. Which item would you be most worried about losing? *

- [ ] Student ID
- [ ] Wallet/Money
- [ ] Keys
- [ ] Electronic devices (phone, laptop)
- [ ] Other: _____

5. Why does that item worry you the most? *

- [ ] Difficult to replace
- [ ] Contains personal information
- [ ] Needed for campus access
- [ ] High sentimental value
- [ ] High financial value

6. Have you ever found someone else's lost item on campus? *

- ( ) Yes
- ( ) No

7. What challenges did you face when trying to return the found item? *

- [ ] Didn't know who the owner was
- [ ] Didn't know where to hand it in
- [ ] Didn't have time for the return process
- [ ] The return process was complicated
- [ ] No challenges faced

8. What is the first thing you do now when you lose an item? *

- ◯ Ask friends
- ◯ Go to the security office
- ◯ Check WhatsApp groups
- ◯ Hope someone finds it
- ◯ Do nothing

9. What factors make the process of finding lost items difficult? *

- [ ] No organized system
- [ ] Lack of student awareness
- [ ] Unclear handover process
- [ ] Limited communication
- [ ] No record of lost items

10. How honest are students about returning found items? (Scale of 1-5) *

- ◯ 1 (Very Low)
- ◯ 2
- ◯ 3 (Moderate)
- ◯ 4
- ◯ 5 (Very High)

11. What would encourage more students to return found items? *

- [ ] An easier process
- [ ] Recognition
- [ ] An efficient system
- [ ] Moral awareness
- [ ] Incentives

12. Is there a need for a dedicated lost and found app? *

- ( ) Yes
- ( ) No

13. What is the main factor that would determine your use of the app? *

- [ ] Ease of use
- [ ] Speed
- [ ] Security
- [ ] Effectiveness
- [ ] University endorsement

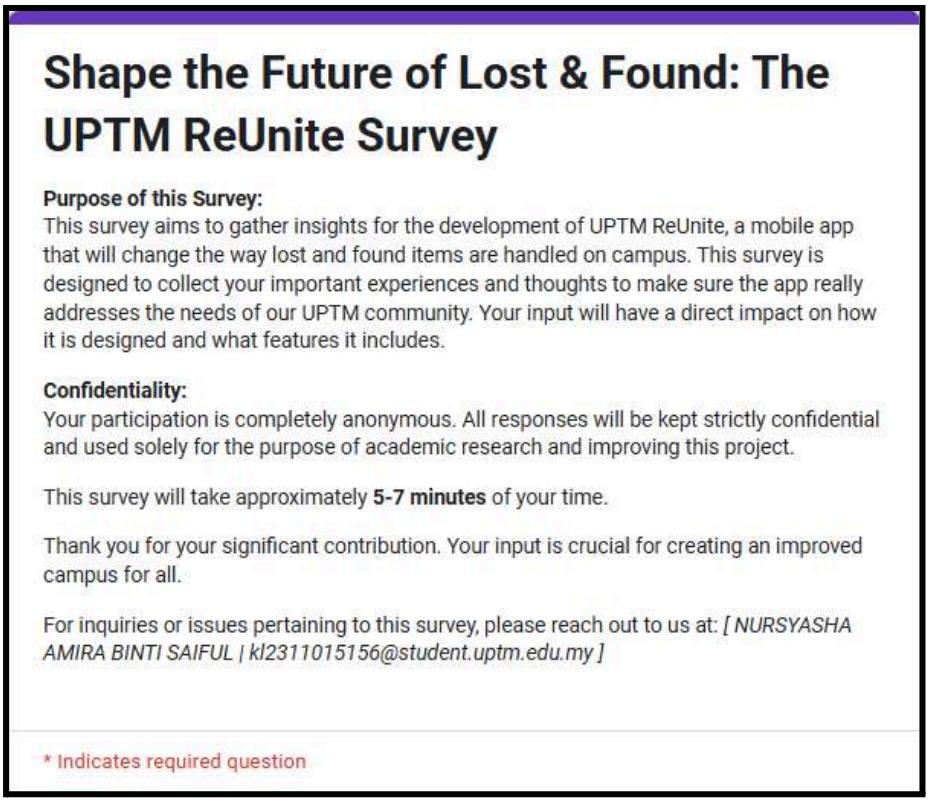
14. Do you agree that a centralized mobile app would be a more systematic and efficient way to manage lost and found items at UPTM? *

- ( ) Strongly Agree
- ( ) Agree
- ( ) Disagree
- ( ) Strongly Disagree

15. Please briefly explain the main reason for your answer above. *

Your answer

Questionnaire user acceptance testing for User:



Shape the Future of Lost & Found: The UPTM ReUnite Survey

Purpose of this Survey:
This survey aims to gather insights for the development of UPTM ReUnite, a mobile app that will change the way lost and found items are handled on campus. This survey is designed to collect your important experiences and thoughts to make sure the app really addresses the needs of our UPTM community. Your input will have a direct impact on how it is designed and what features it includes.

Confidentiality:
Your participation is completely anonymous. All responses will be kept strictly confidential and used solely for the purpose of academic research and improving this project.

This survey will take approximately **5-7 minutes** of your time.

Thank you for your significant contribution. Your input is crucial for creating an improved campus for all.

For inquiries or issues pertaining to this survey, please reach out to us at: *[NURSYASHA AMIRA BINTI SAIFUL | kl2311015156@student.uptm.edu.my]*

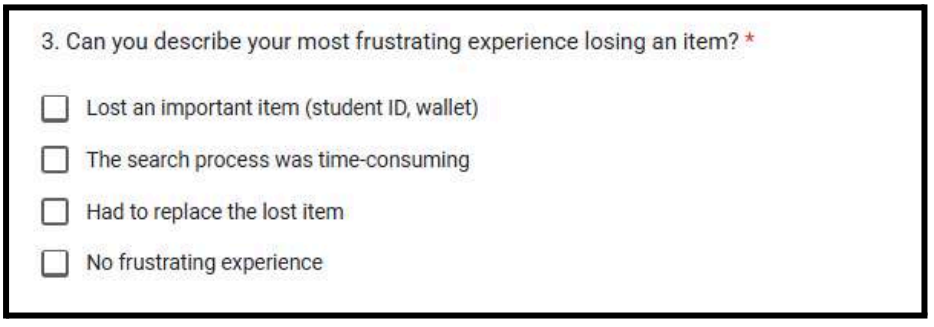
* Indicates required question

1. Which category best describes you? *

- ◯ UPTM Student
- ◯ UPTM Staff
- ◯ Public

2. Have you ever lost an item on campus? *

- ◯ Yes
- ◯ No



3. Can you describe your most frustrating experience losing an item? *

- ☐ Lost an important item (student ID, wallet)
- ☐ The search process was time-consuming
- ☐ Had to replace the lost item
- ☐ No frustrating experience

4. Which item would you be most worried about losing? *

- [ ] Student ID
- [ ] Wallet/Money
- [ ] Keys
- [ ] Electronic devices (phone, laptop)
- [ ] Other:

5. Why does that item worry you the most? *

- [ ] Difficult to replace
- [ ] Contains personal information
- [ ] Needed for campus access
- [ ] High sentimental value
- [ ] High financial value

6. Have you ever found someone else's lost item on campus? *

- ◯ Yes
- ◯ No

7. What challenges did you face when trying to return the found item? *

- [ ] Didn't know who the owner was
- [ ] Didn't know where to hand it in
- [ ] Didn't have time for the return process
- [ ] The return process was complicated
- [ ] No challenges faced

8. What is the first thing you do now when you lose an item? *

- ◯ Ask friends
- ◯ Go to the security office
- ◯ Check WhatsApp groups
- ◯ Hope someone finds it
- ◯ Do nothing

9. What factors make the process of finding lost items difficult? *

- [ ] No organized system
- [ ] Lack of student awareness
- [ ] Unclear handover process
- [ ] Limited communication
- [ ] No record of lost items

10. How honest are students about returning found items? (Scale of 1-5) *

- ◯ 1 (Very Low)
- ◯ 2
- ◯ 3 (Moderate)
- ◯ 4
- ◯ 5 (Very High)

11. What would encourage more students to return found items? *

- [ ] An easier process
- [ ] Recognition
- [ ] An efficient system
- [ ] Moral awareness
- [ ] Incentives

12. Is there a need for a dedicated lost and found app? *

- ◯ Yes
- ◯ No

13. What is the main factor that would determine your use of the app? *

- [ ] Ease of use
- [ ] Speed
- [ ] Security
- [ ] Effectiveness
- [ ] University endorsement

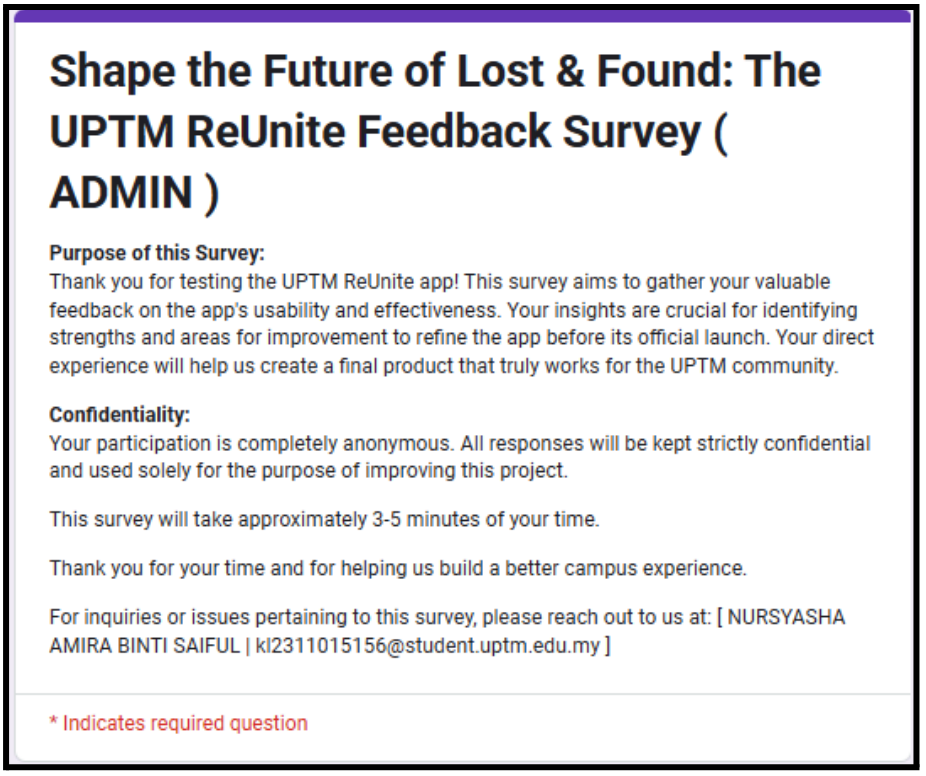
14. Do you agree that a centralized mobile app would be a more systematic and efficient way to manage lost and found items at UPTM? *

- ( ) Strongly Agree
- ( ) Agree
- ( ) Disagree
- ( ) Strongly Disagree

15. Please briefly explain the main reason for your answer above. *

Your answer

Questionnaire user acceptance testing for Admin:



Shape the Future of Lost & Found: The UPTM ReUnite Feedback Survey (ADMIN)

Purpose of this Survey:
Thank you for testing the UPTM ReUnite app! This survey aims to gather your valuable feedback on the app's usability and effectiveness. Your insights are crucial for identifying strengths and areas for improvement to refine the app before its official launch. Your direct experience will help us create a final product that truly works for the UPTM community.

Confidentiality:
Your participation is completely anonymous. All responses will be kept strictly confidential and used solely for the purpose of improving this project.

This survey will take approximately 3-5 minutes of your time.

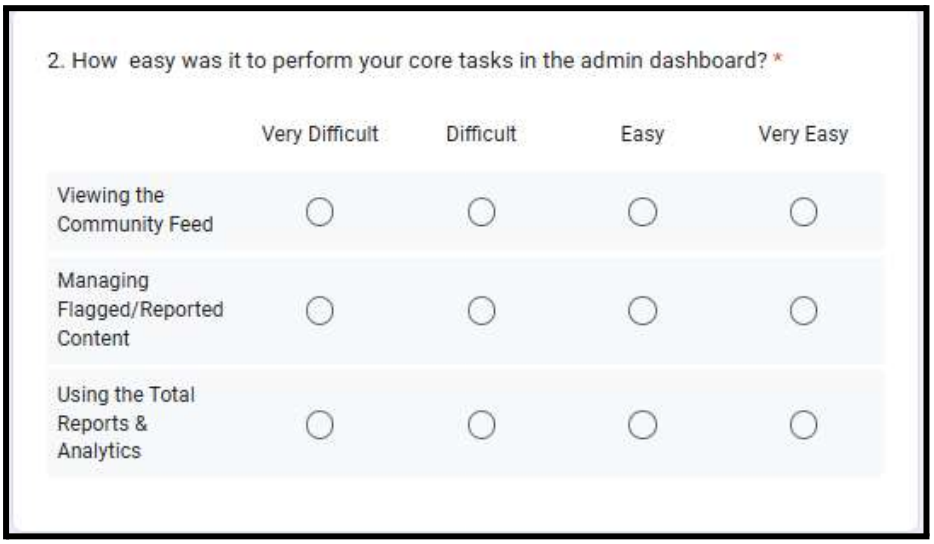
Thank you for your time and for helping us build a better campus experience.

For inquiries or issues pertaining to this survey, please reach out to us at: [NURSYASHA AMIRA BINTI SAIFUL | kl2311015156@student.uptm.edu.my]

* Indicates required question

1. How well does the app integrate into MPP office's current lost-and-found process? *

- ◯ It disrupts the workflow
- ◯ It requires significant changes to process
- ◯ It fits with minor adjustments
- ◯ It integrates seamlessly



2. How easy was it to perform your core tasks in the admin dashboard? *

	Very Difficult	Difficult	Easy	Very Easy
Viewing the Community Feed	◯	◯	◯	◯
Managing Flagged/Reported Content	◯	◯	◯	◯
Using the Total Reports & Analytics	◯	◯	◯	◯

4. To what extent do you believe the app will reduce the number of students physically visiting or messages for lost-and-found inquiries? *

- ◯ Not at all
- ◯ A small amount
- ◯ A moderate amount
- ◯ A significant amount

5. Which part of the admin dashboard did you find most useful for your daily duties? *

- ☐ The Total Reports & Analytics overview
- ☐ The ability to view and monitor the public Community Feed
- ☐ The tools to manage and settle Flagged Content
- ☐ The ability to mark items as claimed

6. After using the app, how do you expect it will impact the staff time dedicated to managing lost and found? *

- ☐ It will require more time
- ☐ It will require about the same time
- ☐ It will save a little time
- ☐ It will save a significant amount of time

7. From your perspective, how well does the app's workflow align with official university policies for handling lost property? *

- ◯ It conflicts with policies
- ◯ It requires major adjustments to align
- ◯ It aligns well with minor tweaks
- ◯ It aligns perfectly with current policies

8. How useful is the app for managing and tracking items that remain unclaimed after a set period? *

- ◯ Not useful
- ◯ Slightly useful
- ◯ Useful
- ◯ Very useful

9. Based on your experience with the app, how strongly would you recommend its implementation to university decision-makers? *

- ◯ Do not recommend
- ◯ Recommend with major reservations
- ◯ Recommend with minor suggestions
- ◯ Strongly recommend

10. What is the most important improvement we could make to better support your administrative duties? *

Your answer

Appendix B – User Manual

Table Of Content

1.0 Introduction

The UPTM ReUnite mobile application centralizes the lost-and-found process by enabling students to instantly report and search for items via a structured digital platform.

The app provides real-time reporting, smart push notifications, secure in-app chat for coordination, and an organized database with categories, all managed through an admin dashboard for smooth operation.

2.0 User Role

2.1 User

The end-user of the application. This includes a UPTM client who has lost an object or found an object that does not belong to him/her.

2.1 Administrator

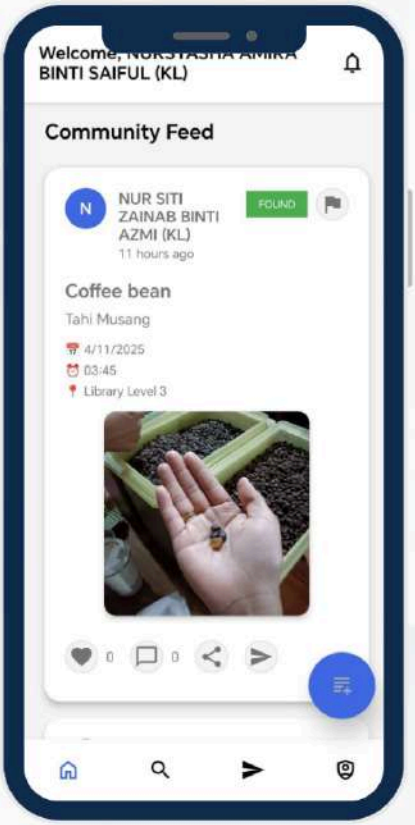
The system moderator, who is in charge of maintaining some degree of the platform's integrity and mediating solutions.

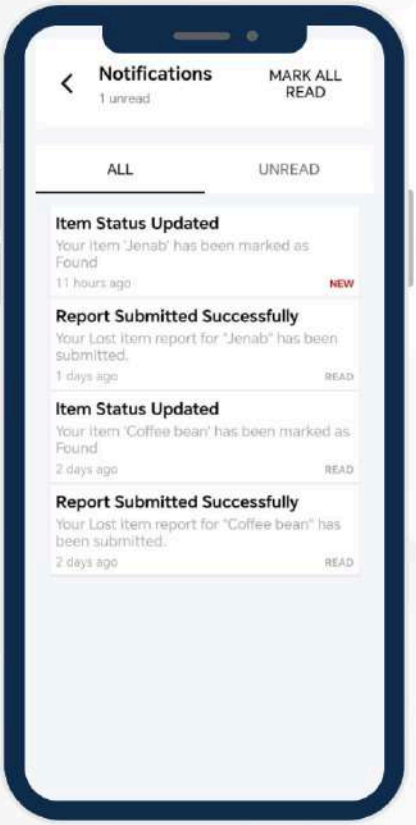
3.0 Accessing General User

- User must sign in with google
- User must use official UPTM Student google account only
- For Admin, use UPTM Admin google account

All user able to :

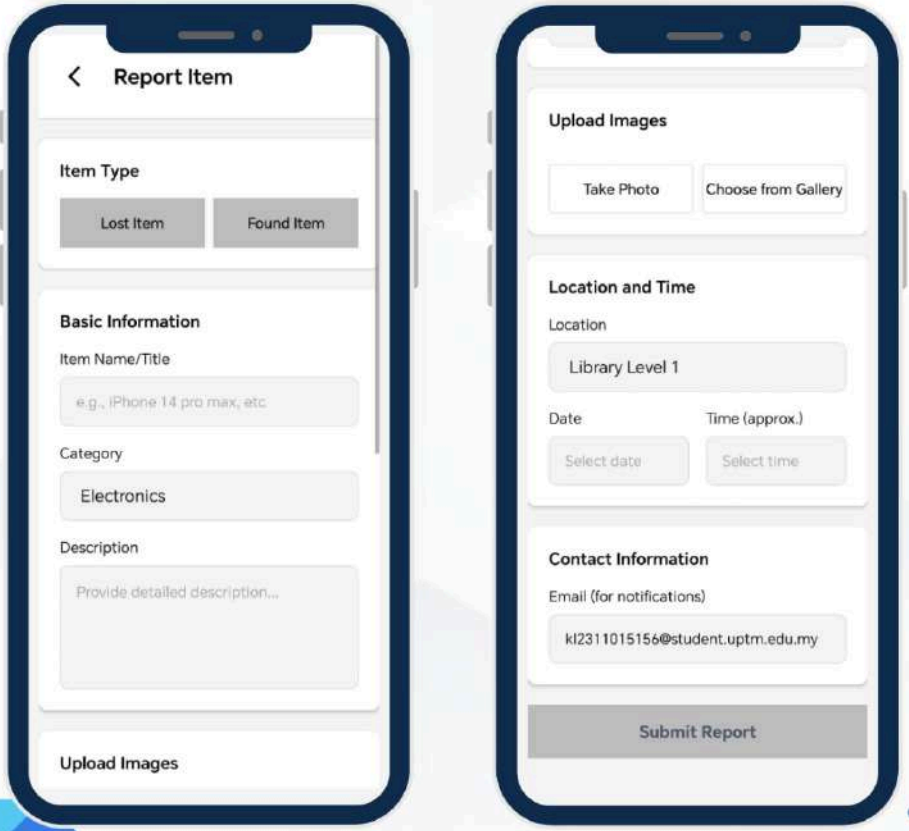
- Scroll to browse recent activity.
- Each Post shows key details: item name, location, and status (like "REUNITED").
- **Get alerts/notifications for:** Successful report submission, Potential matches for your lost item, When someone messages you.





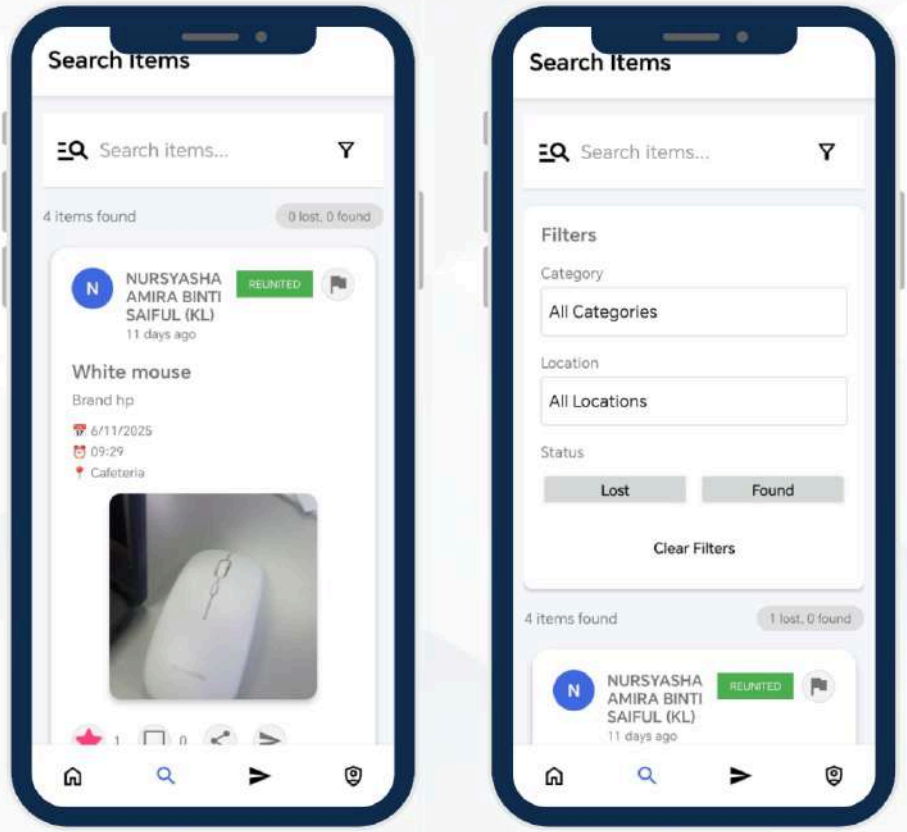
All user able to :

- Fill in the report form step-by-step
- Select the category item (e.g., lost, found)
- It's a must fill in every required detail, like the item name, description, and location, for successful submission.
- Submit the form to instantly publish your report to the community feed.



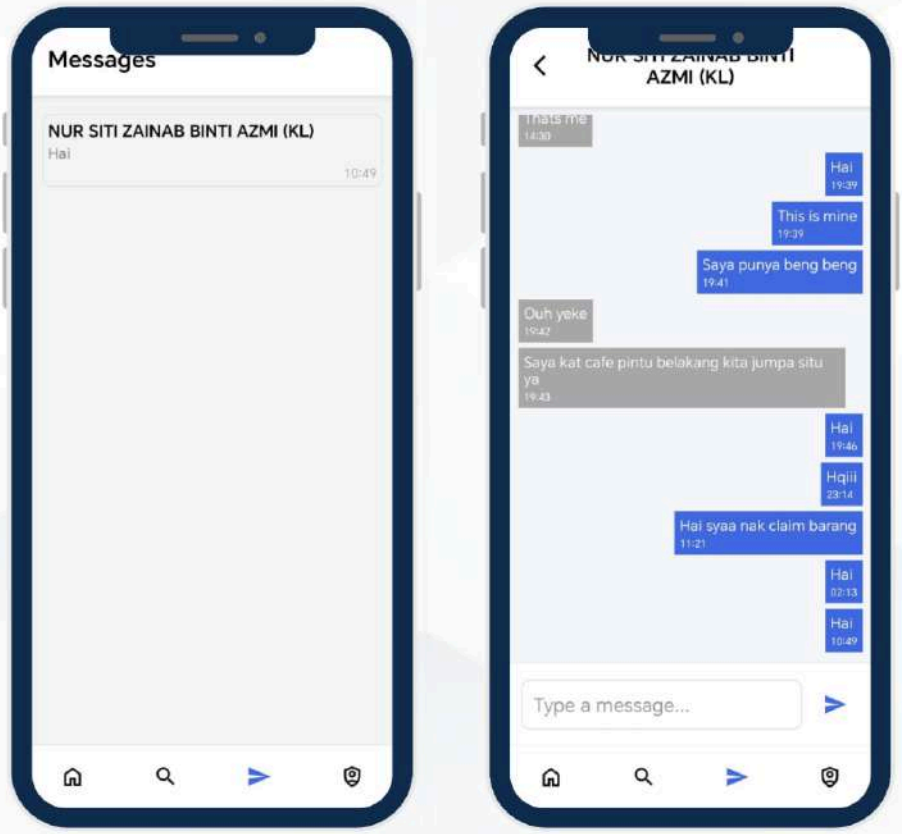
All user able to :

- Scroll to search ideal item or use the search bar at the top to type keywords, like "laptop" or “mouse”.
- Search by using Filters **Narrow down results** by:
  - **Category** (e.g., Electronics, Documents)
  - **Location** (e.g., Library, Cafeteria)
  - **Status** (e.g., Lost , Found)



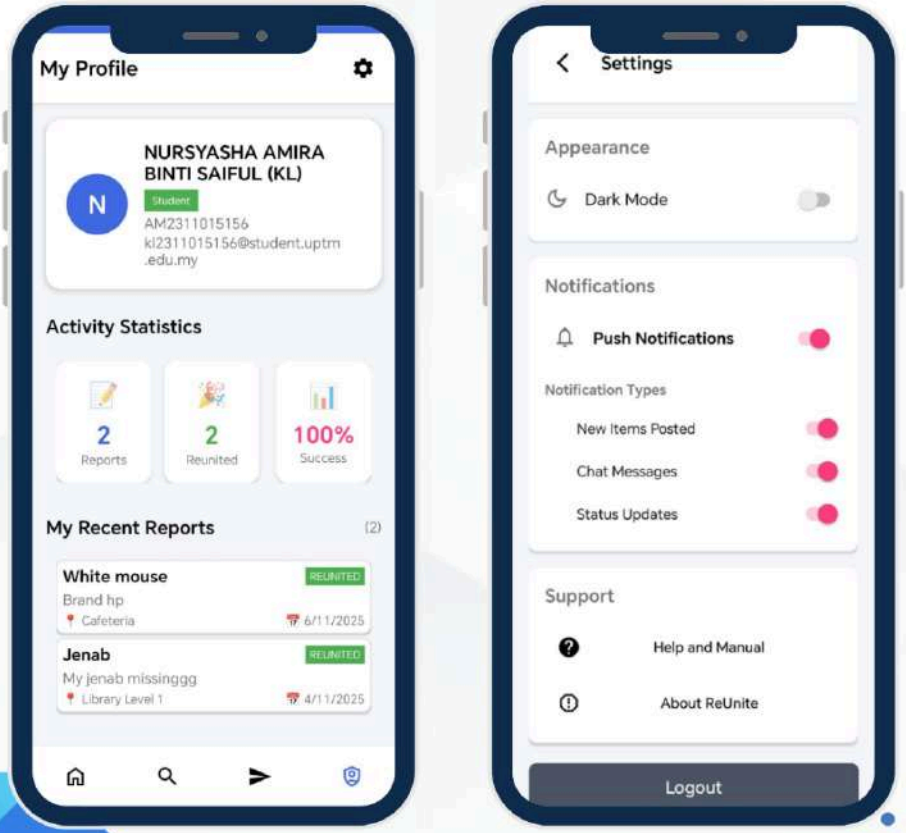
All user able to :

- Go to the Messages Page to see all the conversations.
- To start a chat, go to an item's details and tap "Message Owner/Finder".
- Chat securely within the app to arrange the return



All user able to :

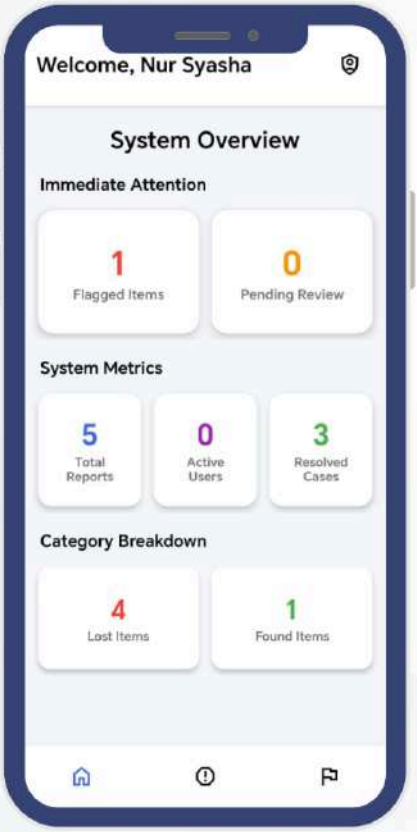
- views activity statistics, like the overall Success Rate and Recent Report Made.
- In Settings,
  - Turn on Dark Mode.
  - Choose which Notifications want to receive (e.g., new posts, new messages).
  - Access the Help and Manual for guidance.



4.0 Features by Role

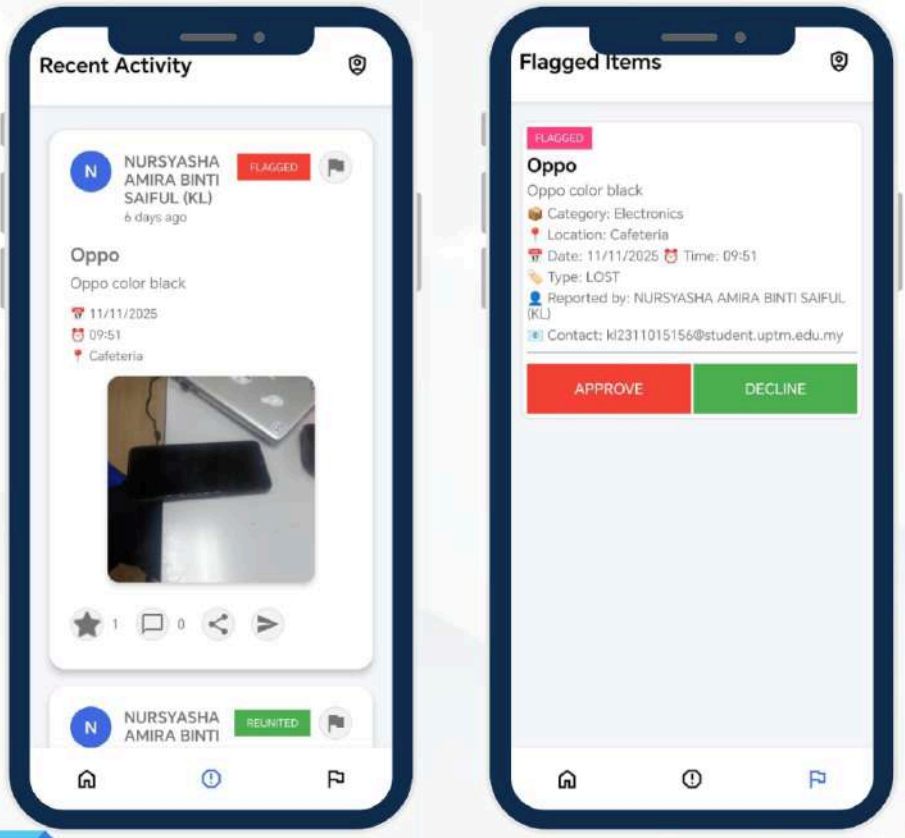
Admin

- View Main dashboard
- Analyse data by category like Immediate Attention needed, System Metrics and Category Breakdown.
- Each category have their function and attention needed.



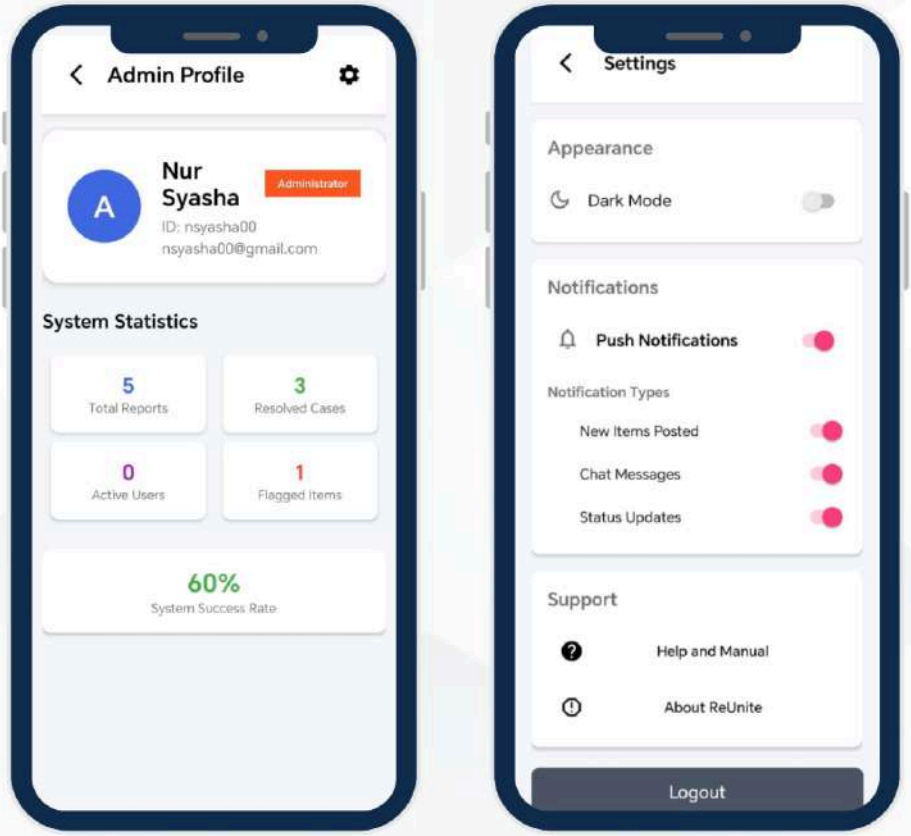
Admin able to :

- **Monitor a live feed** of all user activity.
- **When a post is reported, review the details** on the Flagged Item page.
- **Make a decision and take action:**
  - Tap **APPROVE** to remove the post from the public feed.
  - Tap **DECLINE** to keep the post active and dismiss the flag.



Admin able to :

- **views system-wide statistics,** like the overall Success Rate.
- **In Settings,**
  - Turn on **Dark Mode.**
  - Choose which **Notifications** want to receive (e.g., new posts, new messages).
  - Access the **Help and Manual** for guidance.



References

Firebase. (2019). Firebase. Firebase. https://firebase.google.com/brand-guidelines/

logo-marque. (2022, June 10). Canva Logo : histoire, signification de l'emblème. Logo Marque.com. https://logo-marque.com/canva-logo/

logo-worlds. (2024). GitHub Logo, history, meaning, symbol, PNG. Logos-World.net. https://logos-world.net/github-logo/

roboqta. (2024, June 3). Artificial intelligence supported test framework and Device park. Robotqa.com. https://robotqa.com/blog/5-best-android-studio-plugins/

seeklogo. (2025). Figma Logo PNG Vector (SVG) Free Download. Seeklogo. https://seeklogo.com/vector-logo/332042/figma

Ashvin Patel. (2022, August 24). Agile Methodologies and Principles Tutorial for Beginners| A Complete Guide. LearnoVita. https://www.learnovita.com/agile methodologies-and-principles-complete-tutorial

Aurelio Akeno Adiwijaya, & Ahmad Nugroho. (2024). Perancangan Sistem Lost & Found di Universitas Nasional Karangturi Berbasis Web. Pixel :Jurnal Ilmiah Komputer Grafis, 17(2), 138–148. https://doi.org/10.51903/pixel.v17i2.2169

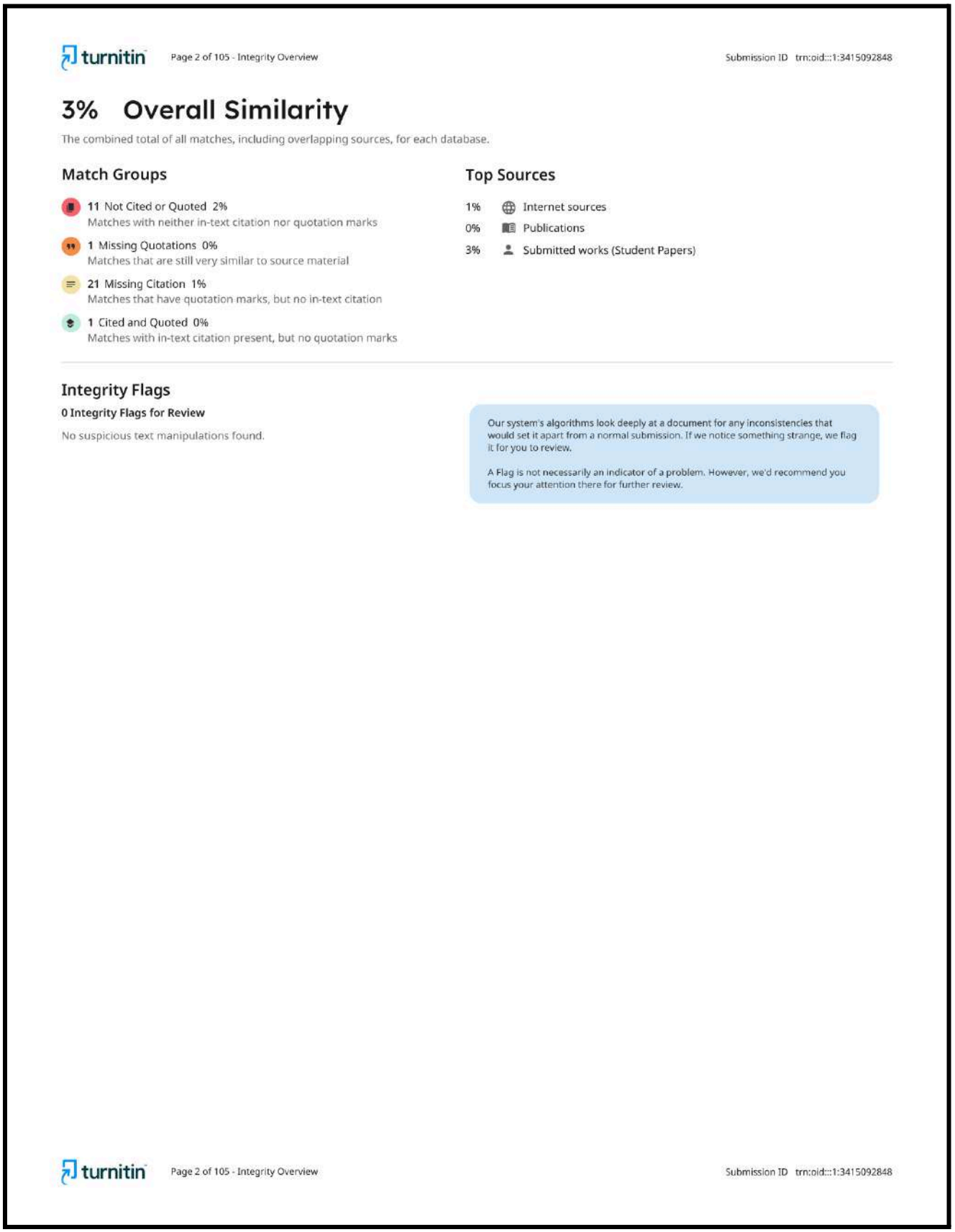
Beck, K., Beedle, M., van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., Grenning, J., Highsmith, J., Hunt, A., Jeffries, R., Kern, J., Marick, B., Martin, R. C., Mellor, S., Schwaber, K., Sutherland, J., & Thomas, D. (2001). Manifesto for agile software development. Agile Manifesto. https://agilemanifesto.org/

Cockburn, A., & Highsmith, J. (2001). Agile software development, the people factor. Computer, 34(11), 131–133. https://doi.org/10.1109/2.963450

Dyba, T., & Dingsoyr, T. (2009). What Do We Know about Agile Software Development? IEEE Software, 26(5), 6–9. https://doi.org/10.1109/ms.2009.145

Kakar, A. (2023). What more can Software Development learn from Agile Manufacturing? Some pointers on the 20th anniversary of the Agile Manifesto. AIS Electronic Library (AISeL). https://doi.org/10.17705/3jsis.00031

Originality Result



turnitin Page 2 of 105 - Integrity Overview Submission ID trn:oid:::1:3415092848

3% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Match Groups

- 11 Not Cited or Quoted 2%
  Matches with neither in-text citation nor quotation marks
- 1 Missing Quotations 0%
  Matches that are still very similar to source material
- 21 Missing Citation 1%
  Matches that have quotation marks, but no in-text citation
- 1 Cited and Quoted 0%
  Matches with in-text citation present, but no quotation marks

Top Sources

1% Internet sources
0% Publications
3% Submitted works (Student Papers)

Integrity Flags

0 Integrity Flags for Review

No suspicious text manipulations found.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

turnitin Page 2 of 105 - Integrity Overview Submission ID trn:oid:::1:3415092848

Match Groups

- 11 Not Cited or Quoted 2%
  Matches with neither in-text citation nor quotation marks
- 1 Missing Quotations 0%
  Matches that are still very similar to source material
- 21 Missing Citation 1%
  Matches that have quotation marks, but no in-text citation
- 1 Cited and Quoted 0%
  Matches with in-text citation present, but no quotation marks

Top Sources

1% Internet sources
0% Publications
3% Submitted works (Student Papers)

Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Student papers	Kolej Universiti Poly-Tech MARA 1%
2	Student papers	NCC Education <1%
3	Student papers	University of Wales Institute, Cardiff <1%
4	Student papers	York St John University <1%
5	Student papers	Al Ain University <1%
6	Student papers	INTI Universal Holdings SDM BHD <1%
7	Publication	Özçiftci, Hafsa Elif. "A New Web-Based Education and Monitoring System for Patie... <1%
8	Student papers	Curtin University of Technology <1%
9	Student papers	University of Western Sydney <1%
10	Internet	scholar.ufs.ac.za <1%

11	Student papers	
University of Portsmouth		<1%
12	Internet	
dspace3.mak.ac.ug		<1%
13	Student papers	
Higher College of Technology		<1%
14	Internet	
etd.uum.edu.my		<1%
15	Internet	
www.andresanimultimediale.com		<1%
16	Internet	
www.lalineadigital.es		<1%
17	Internet	
www.coursehero.com		<1%
18	Internet	
www.ctens.com		<1%
19	Internet	
forums.galciv4.com		<1%
20	Student papers	
Heriot-Watt University		<1%
21	Internet	
journals.telkomuniversity.ac.id		<1%
22	Internet	
www.slideshare.net		<1%
23	Publication	
Iglésias, Pedro. "Otimização das Capacidades de Pesquisa Numa Aplicação Para R...		<1%
24	Internet	
dagda.shef.ac.uk		<1%

25 Publication

Nelson Herrera Herrera, Richard Rivera, Estevan Gómez-Torres, Cecilia Challiol. "... <1%

*% detected as AI

AI detection includes the possibility of false positives. Although some text in this submission is likely AI generated, scores below the 20% threshold are not surfaced because they have a higher likelihood of false positives.

Caution: Review required.

It is essential to understand the limitations of AI detection before making decisions about a student's work. We encourage you to learn more about Turnitin's AI detection capabilities before using the tool.

Disclaimer
Our AI writing assessment is designed to help educators identify text that might be prepared by a generative AI tool. Our AI writing assessment may not always be accurate (it may misidentify writing that is likely AI generated as AI generated and AI paraphrased or likely AI generated and AI paraphrased writing as only AI generated) so it should not be used as the sole basis for adverse actions against a student. It takes further scrutiny and human judgment in conjunction with an organization's application of its specific academic policies to determine whether any academic misconduct has occurred.

Frequently Asked Questions

How should I interpret Turnitin's AI writing percentage and false positives?
The percentage shown in the AI writing report is the amount of qualifying text within the submission that Turnitin's AI writing detection model determines was either likely AI-generated text from a large-language model or likely AI-generated text that was likely revised using an AI paraphrase tool or word spinner.

False positives (incorrectly flagging human-written text as AI-generated) are a possibility in AI models.

AI detection scores under 20%, which we do not surface in new reports, have a higher likelihood of false positives. To reduce the likelihood of misinterpretation, no score or highlights are attributed and are indicated with an asterisk in the report (*%).

The AI writing percentage should not be the sole basis to determine whether misconduct has occurred. The reviewer/instructor should use the percentage as a means to start a formative conversation with their student and/or use it to examine the submitted assignment in accordance with their school's policies.

What does 'qualifying text' mean?
Our model only processes qualifying text in the form of long-form writing. Long-form writing means individual sentences contained in paragraphs that make up a longer piece of written work, such as an essay, a dissertation, or an article, etc. Qualifying text that has been determined to be likely AI-generated will be highlighted in cyan in the submission, and likely AI-generated and then likely AI-paraphrased will be highlighted purple.

Non-qualifying text, such as bullet points, annotated bibliographies, etc., will not be processed and can create disparity between the submission highlights and the percentage shown.

FACULTY OF COMPUTING & MULTIMEDIA (FCOM)

COMPUTING PROJECT

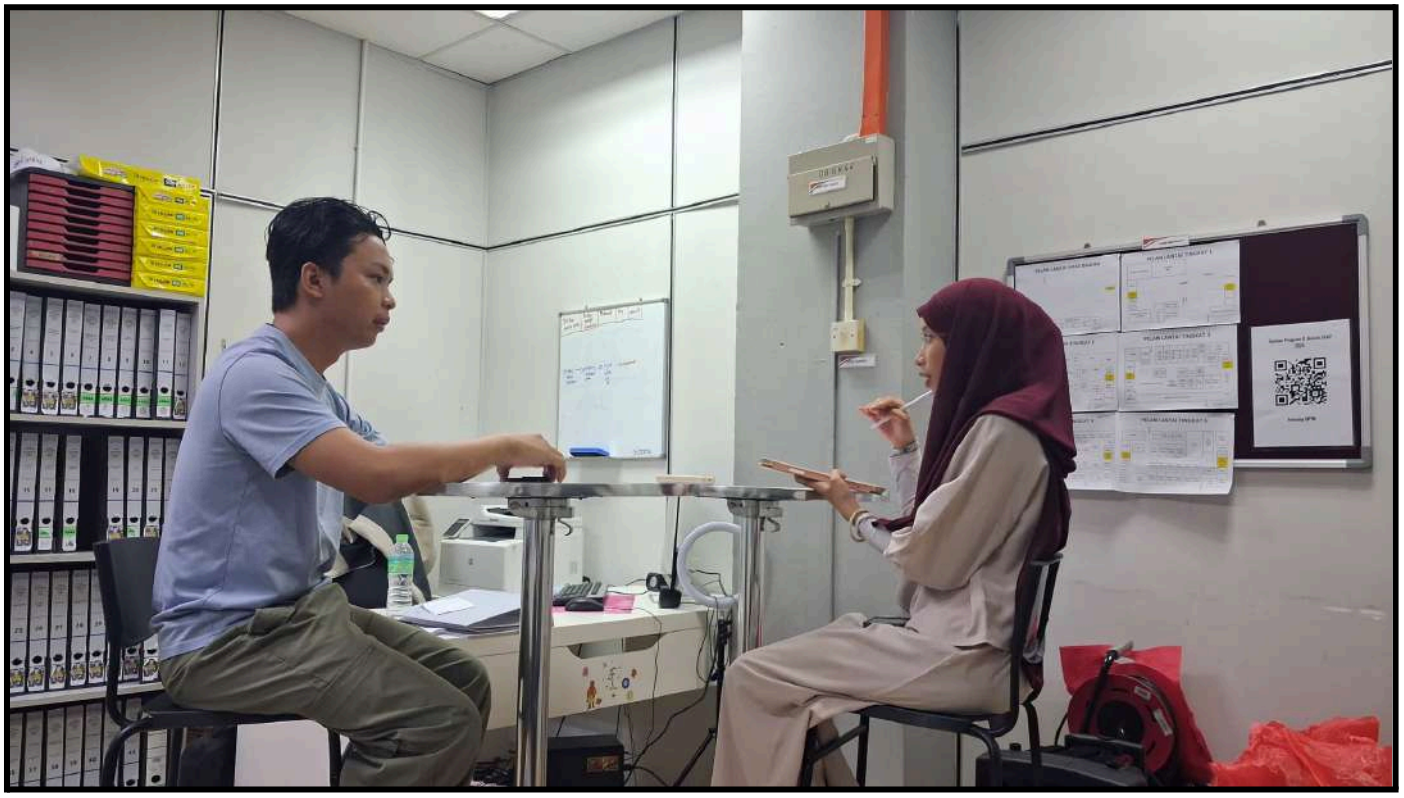
(FYP3024)

LOG BOOK

STUDENT'S NAME	: NURSYASHA AMIRA BINTI SAIFUL
ID NO.	: AM2311015156
SUPERVISOR	: NOR HAFIZA BINTI ABD SAMAD
PROJECT TITLE	: UPTM REUNITE

Date/ Week		Agenda	Next Agenda	Signature (Supervisor)
7/8/2025	1	Find potential supervisor	Finalize the topic and title with supervisor	
12/8/2025	2	Discuss and refine the research topic and title with Supervisor	Begin proposal writing	
22/8/2025	3	Finalize and submit the proposal through FYPMS	Begin background study and literature review	
28/8/25	4	Conduct background study and literature review	Identify system requirements and scope	
1/9/2025	5	Draft and review Chapters 1 & 2 of the report	Develop survey questions and user requirements	
11/9/2025	6	Design survey and interview questions also define user requirements	Set up an appointment with Admin	
16/9/2025	7	Conduct interviews with Administrators	Present initial project progress	
22/9/2025	8	Present project progress and demo	Discuss potential improvements for the application	
6/10/2025	9	Discuss application improvements and new features	Draft and review Chapter 3 of the report	
16/10/2025	10	Draft and review Chapter 3 of the report	Present development progress and updated demo	
21/10/2025	11	Present development progress and updated demo	Conduct final application testing and debugging	
29/10/2025	12	Finalize application development and features	Conduct user acceptance testing (UAT)	

4/11/2025	13	Conduct user testing and gather final feedback	Prepare for the final presentation	
11/11/2025	14	Final Year Project Presentation	Submit final project report	



Github Link

https://github.com/syasha05/UPTM_REUNITE