DEVELOPMENT OF A WEB-BASED LOST AND FOUND REPORTING SYSTEM FOR CAMPUS ENVIRONMENTS

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A PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE,

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CERTIFICATION

This is to certify that this project work was carried out by AIGBE-GEORGE GREAT OSAKPOLOR with Matriculation Number PSC2105295 under my supervision. It is adequate and satisfactory, both in scope and content, for the award of Bachelor of Science (B.sc) Degree in computer science of the University of Benin.

Mr. E.E OBASOHAN **DATE**

Project Supervisor

APPROVAL

This project is hereby approved in partial fulfillment of the requirements for the award of Bachelor of Science (B.Sc.) Degree in Computer Science from the University of Benin.

_____ _____

DR. (MRS.) ROSEMARY USIOBAIFO **DATE**

Head of Department

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ABSTRACT

This project focuses on the design and development of a web-based lost and found reporting system intended to improve the management of misplaced items within a campus environment. The system is built using Softr for the front-end and Airtable as the backend database, providing a lightweight and accessible platform for users to report, search, and view lost or found items. The project adopts the Rapid Application Development (RAD) model, emphasizing quick prototyping and iterative improvement. The resulting application eliminates the inefficiencies of manual lost and found processes by enabling instant reporting and retrieval through any web-enabled device. System evaluation, based on real user interaction, reveals that the platform is easy to use, efficient, and reliable.

CHAPTER 1

INTRODUCTION

1.0 Background of Study

Lost and found items are a common challenge in campus environments, affecting students, staff, and visitors alike. Personal belongings such as books, electronic devices, ID cards, wallets, often get misplaced within large campus facilities. Searching for these lost items can be time-consuming and frustrating, interrupting academic and administrative activities.

Traditional lost and found management on campuses commonly involves physical offices or bulletin boards where found items are stored or listed. However, these manual methods are inefficient, lack real-time updates, and often fail to connect the rightful owners with their lost possessions effectively. Additionally, some campuses rely on social media groups or informal communication channels, which pose privacy concerns and may disseminate inaccurate information.

With the widespread adoption of internet technology and the availability of web applications, developing a dedicated web-based lost and found reporting system tailored for campus environments presents an opportunity to modernize and streamline this process. Such a system allows users to report lost or found items conveniently online, search registered items, and facilitates secure communication between finders and owners, ultimately increasing the chances of item recovery and reducing administrative overhead.

1.1 Problem Statement

Currently, there is no dedicated web-based application available for managing lost and found items within the campus environment. The existing processes for reporting and recovering lost items mainly rely on traditional methods such as physical lost and found offices, bulletin boards, and informal social media postings. These methods are inefficient, not centralized, and limit accessibility for students and staff, leading to prolonged delays in recovering lost belongings.

Furthermore, the prevalent use of social media platforms like WhatsApp, Facebook, and Twitter to announce lost items exposes personal information publicly, raising concerns about privacy and security. There is also a lack of reliable communication systems between the finder and the owner, resulting in several lost items remaining unclaimed or owners being uninformed of their belongings' whereabouts.

Campus communities frequently lack a centralized and efficient platform for managing lost and found items, leading to lost possessions going unclaimed and users experiencing delays and inconvenience in reclaiming their belongings. Manual record-keeping is prone to errors and

limited accessibility, while social media usage for this purpose exposes users' personal information to the public and lacks formal tracking and accountability.

There is an evident need for a web-based system that can serve as a secure, accessible, and user-friendly platform where campus users can report, view, and search lost and found items. This system should provide timely notifications and maintain privacy while improving the overall lost and found management experience within campus environments.

1.2 Research Objectives

The objectives of this project are:

1. To design and develop a web-based lost and found reporting system specific for campus use that is easy to access and navigate.
2. To enable users to report lost items and found items with detailed descriptions and photos via the web platform.
3. To implement a searchable database that allows users to find information about lost or found items effectively.
4. To provide communication features to facilitate contact between owners and finders securely.
5. To evaluate the usability and effectiveness of the system through user testing and feedback in a campus environment.

1.3 Research Scope

This project focuses on developing a web-based application tailored to the needs of campus environments. The system will support user registration and login, item reporting (lost and found), item listing with search functionality, and a messaging feature for owner-finder communication.

The system will be designed to operate via web browsers on desktop and mobile devices. It will use a relational database to securely manage user, item, and communication data. The scope excludes hardware integration such as RFID or GPS tracking and instead focuses solely on software development and user interaction within the campus context.

Target users include students, faculty, administrative staff, and campus visitors who wish to report or search for lost items within the campus premises.

1.4 Research Significance

The development of a dedicated web-based lost and found system for campus environments holds significant benefits. It addresses the inefficiencies of manual processes by providing a centralized, accessible, and secure platform to manage lost and found items. This enhances the chances of timely item recovery, improves user satisfaction, and reduces administrative workload.

Moreover, the system promotes safer communication and privacy protection compared to open social media posts, while offering a user-friendly interface tailored for campus community needs. The findings and system developed in this research can serve as a model for other educational institutions aiming to modernize their lost and found management.

1.5. Limitations of The System

There are several limitations in the system that needs to be improved.

- There is no automated notification. Users are required to manually check the platform to know whether a matching item has been submitted.
- The system depends on continuous internet access and service providers of softr and airtable. Any disruption from these providers will result in temporary inaccessibility of the platform. This reliance on third-party services means that full offline access or local hosting is not currently supported.
- No admin verification yet.
- No user authentication mechanism for easy accessibility.
- No mobile app version.

1.6 Summary

This chapter outlined the background and importance of an efficient lost and found management system within campus environments. It identified existing challenges with current methods and framed the development of a web-based reporting system as a solution.

CHAPTER TWO

LITERATURE REVIEW

This chapter presents an extensive review of the literature relevant to the development of a web-based lost and found reporting system for the campus environment. It explores the challenges associated with lost items, surveys existing lost and found systems and technologies, discusses the rationale and advantages of adopting web-based platforms, evaluates user interaction principles pertinent to such systems, and reviews database technologies essential for efficient data handling. Additionally, it includes an analysis of related projects and systems to position the current research within the broader field of lost and found management technology.

2.1 Conceptual Review

2.1.1 Magnitude of Lost Property Problem

Lost property management is a widespread issue faced by public spaces, institutions, transport systems, and campuses worldwide. Studies reveal that a significant proportion of personal belongings including wallets, mobile phones, clothing, books, and identification cards are lost daily, causing inconvenience and financial loss to owners and administrative overheads for institutions tasked with handling found items [CampusTrace (2024) — Centralized university system].

Within university campuses, the high density and mobility of students, faculty, and visitors increase the likelihood of lost items. Items tend to be left in classrooms, libraries, lounges, cafeterias, and transit points, complicating recovery efforts. Research indicates that many lost items remain unclaimed due to inefficient reporting, poor awareness of lost and found protocols, and the lack of centralized tracking [IJFANS (2024) — Web-based platform in college campuses].

The problem of missing or misplaced things often rises day by day. People who lost the items will difficult to find their items back. Previous studies revealed that owner would waste their time to search the items around 16 to 55 minutes per day (Ahmad et al., 2015). Therefore, several surveys are conducted by various organizations and research to highlight the problem of lost and misplaced item's objectives. The question of these issues is the people difficult to find their items when they are losing it. Some of the lost items are valuable items like a wallet, handbag, clothes, phone, and an umbrella. Frequently, these issues happened at schools, universities, hotels, transportation, and so on. But typically, at school, they introduce a method where every student needs to remark their valuable items like to put a phone number, name, or address, and they also provide a box if someone found something useful. Therefore, a lot of solutions are being proposed in the market to solve these issues. Some of the solutions use GPS,

and an RFID to detect the owner of the details and also used communication technology like SMS and an email notification to send information.[MUHAMAD ILIAS et Al, 2020]

2.1.2 Challenges in Lost and Found Management.

Lost and found systems, whether traditional or digital, face persistent challenges that limit their effectiveness. These challenges broadly involve inefficiencies of manual processes, user participation, privacy and security risks, verification and fraud issues, technological limitations, and long-term maintenance and scalability.

1. Inefficiencies in Manual Systems

Traditional lost and found approaches such as notice boards, paper registers, and physical collection points are slow, fragmented, and error-prone. Sadiku, Ogundokun, and Abikoye (2019) emphasized that manual records often contain incomplete descriptions, duplicate entries, or vague information, which complicates item recovery. Similarly, Jiang, Mao, and Kang (2019) showed that traditional campus-based platforms lacked real-time updates and effective item categorization, making retrieval cumbersome. These inefficiencies highlight the necessity of digital transformation to enhance accuracy and accessibility.

2. Low User Participation and Engagement

A major challenge for both manual and digital lost and found systems is motivating users to report lost or found items. Harburg et al. (2015) found that mobile crowdsourcing systems such as CrowdFound were only effective when a critical mass of users actively participated. Without sustained reporting, system databases become sparse and ineffective. Zhou et al. (2024) similarly noted that the success of smart systems like LostNet depends heavily on consistent user engagement, as limited participation undermines algorithmic matching and notification features.

3. Privacy and Security Concerns

Digitization of lost and found records raises privacy risks, especially when sensitive personal data such as contact details, ID cards, or images are shared. Sun, Zhang, Jin, and Zhang (2016) demonstrated in SecureFind that privacy-preserving techniques are crucial to prevent data leakage in crowdsourced item recovery. Likewise, Ho, Ho-Dac, and Huang (2023) highlighted that concerns about data breaches directly affect users' willingness to share personal information online. Primault, Boutet, Ben Mokhtar, and Brunie (2018) further stressed that location data used in item recovery applications must be carefully anonymized to protect users. Without robust privacy safeguards, users may avoid these platforms altogether.

4. Verification, Fraud, and Trust Issues

Another critical challenge is verifying ownership and preventing false claims. Tan and Chong (2023) observed that campus-based systems often require administrative oversight to confirm legitimate ownership, but this process increases workload and delays. Pede et al. (2025) also

stressed that without reliable verification, systems are vulnerable to fraudulent claims, undermining user trust. Effective verification must balance ease of access for legitimate users with adequate security controls.

5. Data Quality and Matching Problems

Accurate item descriptions are essential for effective recovery. Zhou et al. (2024) demonstrated that smart systems like LostNet, which use image-based matching, significantly outperform text-only records in recovering items. However, data quality remains a recurring problem: poorly described or incomplete records reduce the system's ability to generate matches (Sadiku et al., 2019). Gavoni (2021) also warned that RFID-based solutions can be undermined by data collisions or signal interference, leading to incomplete tracking data.

6. Technological and Accessibility Limitations

Not all users have equal access to reliable internet or advanced devices. Yu, Chen, and Wang (2015) pointed out that large-scale RFID deployments for item tracking face technical constraints such as missing tags and system latency. Yagi, Nishiyasu, Kawasaki, Matsuki, and Sato (2021) introduced GO-Finder, a wearable solution for finding objects, but also acknowledged that such systems may not be affordable or accessible to all campus users. These technological gaps can exclude sections of the community, limiting inclusivity.

7. Scalability, Maintenance, and Cost

Long-term sustainability of lost and found systems is another challenge. Profetto, Gherardelli, and Iadanza (2022) identified cost, scalability, and security concerns as recurring barriers in RFID adoption within healthcare, challenges that also apply to lost and found contexts. Tan and Chong (2023) noted that digital campus systems require continuous updates, administrator involvement, and server maintenance to remain effective. Without clear institutional commitment to funding and managing these systems, they risk becoming obsolete.

2.1.3 Web-Based Systems in Campus Environment

Web-based systems have become central to how modern universities deliver services, manage information, support learning, and engage campus communities. These systems include learning management systems (LMS), student portals and mobile student apps, health and wellbeing platforms, campus information systems, and the broader "smart campus" integrations that connect sensors, networks, and cloud services. Across disciplines, research shows that web-based campus systems can increase accessibility, centralize services, and support data-driven decision making — but they also introduce challenges in privacy, interoperability, digital equity, and long-term governance (Guidance in Designing a Smart Campus, 2023; Smart Campuses review, 2020).

Typology of Web-Based Campus Systems

Researchers categorize campus web systems into several functional types. Learning technologies (LMS) support course delivery, assessment, and communication (overview studies of LMS features and policies), while student portals and mobile human-centered portals aggregate administrative services such as registration, timetables, and personal records (Rodafinos et al., 2018; The Intention to Use Mobile Student Portal, 2018). Other targeted systems manage health services, research portals, campus safety alerts, and facilities (e.g., parking, wayfinding) — many of which are increasingly accessed via responsive web apps or hybrid mobile/web platforms (Research Portal for Students; campus health management). The "smart campus" concept extends these categories by adding IoT, location services, and analytics for operations and sustainability (Rodafinos et al., 2018; Guidance in Designing a Smart Campus, 2023).

Benefits and Value Propositions

A robust body of literature documents the benefits web-based campus systems bring to institutions: centralized access to services reduces friction for students and staff; LMS platforms increase the flexibility of course delivery and provide analytics for instructors; student portals improve administrative efficiency; and smart campus solutions can optimize resource usage (energy, space) while enabling location-aware services (Guidance in Designing a Smart Campus, 2023; Smart Campus Applications review, 2024). Studies evaluating specific interventions (e.g., wellbeing websites or campus health apps) have shown measurable gains in student self-efficacy and service uptake when platforms are well designed and promoted (Well-Being on Campus study; campus health management evaluations).

Design and Usability Considerations

Successful campus web systems emphasize user-centered design, intuitive navigation, and mobile responsiveness. The literature on mobile student portals highlights that perceived usefulness, ease of use, and trust are key predictors of adoption — echoing classic information systems acceptance models — and that poor usability directly reduces engagement (The Intention to Use Mobile Student Portal, 2018). Similarly, LMS policy reviews recommend clear governance, consistent UI patterns, and documented feature sets so users and administrators share expectations about functionality and support (LMS policy overview). These studies consistently recommend iterative testing with representative student and staff cohorts before full roll-out.

Privacy, Data Protection, and Ethics

As campuses adopt web-based and sensor-driven services, privacy and data governance become critical. Reviews of smart campus literature caution that location tracking, attendance monitoring,

and centralized student records raise ethical concerns and regulatory obligations; transparency, data minimization, and clear retention policies are repeatedly recommended (Smart Campuses review, 2020; Guidance in Designing a Smart Campus, 2023). High-profile case studies of attendance-tracking systems show how inadequate communication or opt-out mechanisms can provoke student backlash and reputational risk (news reports and evaluative studies). Researchers therefore urge privacy-by-design, informed consent, and institutional oversight to preserve trust.

2.2 Theoretical Framework

2.2.1 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM): Foundations and Challenges

1. **Origin and Core Constructs**

The Technology Acceptance Model (TAM), proposed by Davis (1989), posits that two key factors—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—directly influence users' attitude toward use, which in turn shapes behavioral intention to adopt a technology. TAM assumes that if a technology is easy to use and offers clear benefits, users are more likely to accept and use it positively (Davis, 1989).

2. **Meta-Analytic Evidence**

Extensive meta-analytic research supports TAM's validity. King and He's (2006) analysis of 88 studies (over 12,000 observations) confirmed strong and reliable relationships between PU, PEOU, and behavioral intention, though the influence of moderating factors (like user type) was notable . Similarly, Scherer, Siddiq, and Tondeur (2019) synthesized 124 data matrices from over 34,000 educators and found TAM explanatory in the education sector; however, they highlighted variability in key construct roles and the occasional omission ofattitude in model tests .

3. TAM in Higher Education & Emerging Contexts

Ritter's (2017) meta-analytic structural equation modeling of TAM in online Learning Management Systems found mixed fit across various path models, suggesting context greatly influences TAM's predictive strength . A systematic review by Ali et al. (2024) examined TAM's application in mobile and digital library contexts, demonstrating strong ties between PU, PEOU, behavioral intention, and attitudes; they also found that system quality and information quality influence these constructs meaningfully .

Moreover, Ali et al.'s (2022) review of TAM in the context of higher education during COVID-19 identified gaps in qualitative and mixed-method approaches and suggested expanded frameworks incorporating emerging technologies (AI, cloud computing, VR, AR) .

4. **TAM Extensions and Integration**

Huang and Yang's (2025) critical review across TAM, TAM2, and TAM3 explores their theoretical underpinnings, educational uses, strengths, and limitations—providing clarity on where each variant fits best . Liao, Wu, Le, and Phung (2022) proposed integrating TAM with the Value-Based Adoption Model (VAM) in e-learning environments, highlighting the moderating role of electronic word-of-mouth (e-WOM) to enrich understanding of technology usage dynamics .

5. Cultural and Contextual Influences

Panicker (2020) emphasized that TAM's assumptions are often culturally neutral, yet cultural factors and individual traits like grit significantly affect educational technology adoption—thus suggesting that models must accommodate cultural context for accuracy . Ahmed et al. (2021), studying Somali students, similarly found that computer self-efficacy, autonomy, optimism, and ICT infrastructure significantly predict TAM constructs, while factors like internet affordability and insecurity had less impact—underscoring the importance of localized factors .

6. **Broader Reviews and Comparative Models**

A broader systematic review by Liao et al. (2022) recommended expanding TAM to include elements like subjective norms and self-efficacy—especially relevant in teacher use and emerging technologies . The development of UTAUT (Unified Theory of Acceptance and Use of Technology) was acknowledged as an evolution that integrates multiple models including TAM, adding constructs like social influence and facilitating conditions plus moderators like age, gender, and voluntariness .

2.2.2 **Information Systems Success Model**

The DeLone & McLean IS Success Model: Evolution, Application, and Insights

1. Overview and Evolution of the Model

The IS Success Model, initially proposed by DeLone and McLean in 1992, provided a structured framework to evaluate information system performance across multiple dimensions—namely system quality, information quality, use, user satisfaction, individual impact, and organizational impact. A decade later, they revised the model to add service quality, refine success dimensions, and better capture e-commerce contexts (DeLone & McLean, 2003) .

2. Meta-Reviews & Critical Evaluations

A major meta-review covering 53 studies between 1992 and 2019 highlighted that while the D&M model is influential, its components are often inconsistently applied. The interrelationships between dimensions varied and findings were fragmented, prompting calls for deeper exploration of reciprocal relationships and theoretical coherence (Jeyaraj et al., 2020) .

Mahmoud Al-Kofahi et al. (2025) conducted a literature review analyzing 102 studies (2012–2021), emphasizing that information quality and user satisfaction are the strongest predictors among internal variables, while perceived usefulness and trust often act as external influencers. They also noted a research gap in the use of mediating and moderating variables in the model's application .

3. Empirical Validation in Real-World Contexts

In a Nigerian study of hospital information systems, empirical data from 442 healthcare professionals confirmed that system, information, and service quality significantly impacted actual system usage and user satisfaction. Notably, usage had a stronger predictive effect on net benefits than satisfaction in this context, offering valuable insights for system designers in similar high-stakes environments (Adebowale Ojo, 2017) .

2.3 Empirical Review

2.3.1 Traditional Lost and Found Approaches

Manual lost-and-found systems—such as static notice boards, paper-based registers, or relying on staff memory—are common in many campus and institutional settings. These approaches often result in inefficient retrieval, fragmented records, and delays in returning items, since data is not centrally managed, updates are asynchronous, and accountability is low (Pixit, 2024)

2.3.2 Digital Lost & Found Solutions

Digital lost-and-found solutions typically employ technologies such as RFID tags, mobile applications, or hybrid web/mobile systems to improve item tracking, reporting, and owner recovery. These solutions aim to address limitations of manual systems (e.g., delays, miscommunication, lack of real-time visibility).

One example is a university thesis project where a web-based system uses RFID along with an email notification mechanism. In this system, owners register to receive RFID tags/cards which are attached to their belongings; when an item is found, the tag is scanned to retrieve owner information and email notifications are sent. This setup reduces reliance on manual reporting and speeds up owner notification (Muhamad Ilias, 2020/2021).

Another example is a smartphone app developed to manage "missed and found" items. The app provides users a way to record lost belongings and with contact features so that finders and owners can communicate. This approach demonstrates how mobile apps increase accessibility and immediacy in reporting and locating lost items (Salman & Athab, 2021).

A third concrete project is An Effective Lost and Found System in University Campus (Tan & Chong, 2023), which developed a combined web & mobile application for The National University of Malaysia (UKM). Users (students, staff, visitors) can log in, report lost/found items,

view listings, and interact with the system via web or mobile platforms. This shows how hybrid solutions integrate different channels to cover more user scenarios.

2.4 Technological Foundations

2.4.1 Web Development Tools & Frameworks

Web development frameworks play a critical role in determining the performance, maintainability, and scalability of applications. Studies comparing frontend and backend frameworks reveal trade-offs in rendering speed, bundle size, memory usage, and developer productivity.

For instance, a study by Putra et al. (2023) compared Svelte, React, and Vue in terms of rendering time, bundle size, memory usage during idle state, and DOM operation efficiency. The findings showed that Svelte outperformed React and Vue across most metrics, particularly in rendering speed and bundle size.

Another comparative study involving backend frameworks analyzed the performance of REST API frameworks — ASP.NET, Spring Boot, Express.js, Laravel, and Django REST. The study measured factors such as response times, resource consumption, Docker image sizes, and code complexity. ASP.NET had the shortest response times and smallest Docker image sizes, while frameworks like Django and Laravel were less performant but offered more compact code.

PHP frameworks have also been intensely compared. Ahmed, Bello, Jauro, and Dawaki (2024) benchmarked Laravel and CodeIgniter, finding that while CodeIgniter generally achieved lower response time for lighter applications, Laravel provided richer features and tools better suited for complex or scalable applications.

Frontend rendering performance more broadly was examined by Ollila, Mäkitalo, and Mikkonen (2022), who compared modern web frontend frameworks like React, Vue, Angular, Svelte, and others. They evaluated the frameworks on rendering performance metrics and found notable differences in how each handles virtual DOM, reactivity.

2.4.2 Database

Databases are foundational to modern information systems because they enable centralized, structured storage and efficient retrieval of interrelated data. Relational database management systems (RDBMS) are particularly strong for transactional applications that require strict consistency and well-defined schema, offering mature tooling for ACID transactions, complex querying (SQL), and data integrity enforcement (Patel et al., 2023). At the same time, newer database classes (NoSQL, NewSQL, cloud/DBaaS, and serverless databases) were developed to address large-scale, flexible, and heterogeneous data needs: they offer horizontal scalability, flexible schemas for semi- or unstructured data, and improved write/read performance for certain workloads (Khan et al., 2023; Božić, 2022).

2.4.3 Security and Privacy Concerns in Web Applications

Web applications have become ubiquitous for delivering services and managing data in campus environments, but with this utility come significant security and privacy risks. Several studies analyze common vulnerabilities in web apps, privacy perceptions by users, and measures for improving security posture.

One major issue is security misconfiguration. Luna Martins, da Cruz, Pontes de Araújo, and Silva (2024) conducted a systematic literature review showing that misconfigurations—such as default security settings, unnecessary open permissions, and weak encryption settings—continue to be a dominant category of web application vulnerabilities. These lead to exposure of sensitive data and provide attackers an entry point.

Another study by Tarig Ali Elshheibia, Mohamed, and Almahdi (2024) analyzed vulnerabilities in popular open-source web applications and forums (e.g. W-Agora, WordPress). They used web vulnerability scanners (like AWVS and Netsparker) to discover threats like exposed database credentials, insecure password storage, and risk of root access. The study highlights how widespread and accessible web vulnerabilities are when security is not a priority during development and deployment.

2.5 Research Gaps Identified for Web-Based Lost And Found Reporting Systems

From reviewing existing papers, the following gaps emerge as under-explored or insufficiently addressed in the literature:

1. Limited empirical evaluation in real campus settings

While many systems are prototyped or tested with small user groups (e.g., authors often use surveys or limited deployment), there are few long-term studies that assess performance, adoption, and user satisfaction of web-based lost-and-found systems deployed in large, real campus contexts. For instance, Lost and Found Web Application by Pede et al. (2025) describes the system build and proposes benefits, but lacks longitudinal data on actual usage, maintenance, or user retention.

2. Scalability and database performance under load

Most studies do not deeply analyze how systems behave when many users post/search items, upload images, or when large volumes of records accumulate. For instance, in An Effective Lost and Found System in University Campus (Tan & Chong, 2024), features like automatic deletion of old items are implemented, but there's limited discussion of how system performance holds up with high traffic or data volume.

3. User engagement and adoption over time

Several systems report good initial usability or acceptance (via surveys), but few address strategies for sustained engagement, especially during periods when users do not have lost/found items. Without continual engagement, systems risk being underused. For example, the RFID/email notification system (Muhamad Ilias, 2020/2021) shows users find the system suitable, but the scope is narrow and doesn't measure ongoing usage or behavior change.

4. Privacy, trust, and security concerns in depth

Although many systems include basic authentication or security questions (Tan & Chong, 2024), or mention admin verification (CampusTrace, 2024), in-depth treatment of privacy, trust, and prevention of misuse (e.g., false claims, spam) is often superficial. More rigorous studies are needed to assess how privacy preservation, referential integrity, and user trust influence system adoption.

5. Accessibility and inclusivity

Few studies examine how web-based lost-and-found systems serve users with low digital literacy, poor internet connectivity, or different language backgrounds. This is a gap especially relevant in diverse campus populations, but explicit empirical work on this aspect is scarce. None of the reviewed sources offer comparative data for these user segments. (This gap is inferred from absence rather than explicit statement.

6. Integration with physical campus workflows

Digital solutions are often developed independently of existing physical handling processes (security offices, lost property rooms). For example, how staff handle physical items, how claims are validated physically, and how the digital record syncs with physical storage are not widely studied or documented. Systems like those in Tan & Chong (2024) mention administrative panels, but not the broader institutional workflow integration.

7. Quality of metadata and matching algorithms

As seen in "LostNet: A smart way for lost and find" (Zhou et al., 2023) which develops image-based matching for item identification, there's still a need for more work on how item metadata (photos, descriptive fields, location/time) can be standardized, how matching accuracy degrades with poor input, and how to mitigate false positives/negatives.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the methodology used to develop a web-based lost and found reporting system for campus environment. The methodology covers the research design, development model, tools, techniques, and processes used throughout the project. Since this study involves creating and implementing a software solution with limited time, I chose the Rapid Application Development (RAD) model of the Software Development Life Cycle (SDLC). RAD was selected for its focus on quick prototyping, iterative development, user feedback, and flexibility, making it ideal for small web projects.

3.2 Research Design

The research used an applied design aimed at addressing a real-life issue: the challenge of reporting and recovering lost items on a university campus. The design combines both technical and analytical methods. It starts with identifying user needs, moves through system design and building, and ends with testing and evaluation. The research focuses not only on creating a functional system but also on making sure it meets the needs of its users.

3.3 Software Development Life Cycle (SDLC)

The Software Development Life Cycle (SDLC) is a procedural framework that outlines how software projects are conceived, built, and delivered. It divides development activities into organized stages that help maintain focus, quality, and alignment with project goals. By following this structured path, developers can manage complexity and ensure that the finished product performs effectively and reliably.

There are multiple models used within the SDLC framework, such as the Waterfall, Spiral, Agile, and Rapid Application Development (RAD) approaches. Each offers a different method for handling project timelines and user requirements.

In this study, the Rapid Application Development model is applied. This approach is selected because it allows faster system creation through repeated design and testing cycles. It encourages early prototyping and quick adjustments based on feedback. The model is especially practical for projects managed by an individual developer, as it supports flexibility and short development timelines without compromising functionality.

3.3.1 Rapid Application Development (RAD) Model

The RAD model is a flexible, user-focused approach that highlights fast development, active user participation, and ongoing improvement. It was created as an alternative to traditional models like Waterfall, which require all requirements to be defined upfront before starting work.

RAD emphasizes creating working prototypes quickly, getting feedback, and refining the product through multiple iterations.

The RAD model typically includes four main phases:

1. Requirements Planning

2. User Design

3. Construction

4. Cutover (Implementation and Testing)

These stages overlap and allow for quick adjustments to meet user needs and technical capabilities.

3.3.2 Justification for Using the RAD Model

Several factors influenced the choice of the RAD model given the project's nature and development setting:

1. Use of Building Tools: The project utilized Softr for the web interface and Airtable for the database. These tools are designed for rapid prototyping and iterative development, which aligns well with RAD principles.

2. Time Constraints: This was a student project that needed to be finished within a limited time. RAD allows for faster delivery of a functional prototype without sacrificing quality.

3. Iterative Refinement: The project went through multiple cycles of design, testing, and revision based on supervisor and trial user feedback. This adaptability is central to RAD.

4. Single-Developer Feasibility: Although RAD is often linked to collaborative teams, its iterative and prototype-based nature fits well for a single developer who can evaluate their work and incorporate feedback as they go.

5. Focus on Functionality over Documentation: The project aimed to create a working and usable system rather than extensive design documents, consistent with RAD principles.

In summary, RAD provided an effective framework that matched the project's technical environment (low-code tools) and practical constraints (time, single developer, and need for flexibility).

3.4 Phases of RAD Applied to the Project

3.4.1 Requirements Planning Phase

This phase included identifying and analyzing system requirements. Information was collected through informal interviews and observations of how lost items are currently managed on campus.

Functional requirements included:

- Users can report lost items.

- Users can report found items.

- Users can search for items by name, description, location, or date.

Non-functional requirements included:

- User-friendly interface.

- Secure access and data protection.

- Reliable database connectivity.

- Fast system response time.

These requirements formed the basis of the initial system design.

3.4.2 User Design Phase

In this phase, system interfaces were created with Softr, and data structures were defined using Airtable. A prototype was developed that included pages for item reporting, and item search. Feedback was collected from peers. Based on their suggestions, several improvements were made, such as:

- Simplifying the reporting form to include only essential fields.

- Adding image upload features to help with identifying items.

- Enhancing search filters for better usability.

This iterative process ensured the user interface and workflows were improved before full construction began.

3.4.3 Construction Phase

The main application was developed during this phase. Using Softr, front-end components (forms, lists,) were connected to the Airtable database, which stored user and item data. The system logic—including submission handling, record filtering,—was built using Softr's built-in features and Airtable automation scripts.

Testing took place alongside development to ensure that new features worked correctly before adding more components. The result was a stable, interactive web-based system accessible from various devices.

3.4.4 Cutover Phase (Testing and Deployment)

This final phase involved integrating all modules, performing system testing, and preparing for deployment.

3.4.4.1 Testing Activities:

- Unit Testing: Verified that individual modules (e.g., “Report Lost Item” form) functioned as expected.

- Integration Testing: Ensured smooth interaction between the Softr front-end and Airtable back-end.

- User Acceptance Testing: Conducted with a small group of users to ensure ease of navigation, accuracy of data handling, and clarity of instructions.

3.4.4.2 Deployment

After successful testing, the system was deployed in Softr’s hosted environment for demonstration.

3.5 Development Tools and Environment

Category	Tool / Platform	Purpose
Front-end	Softr	Interface design, page routing and authentication
Back-end	Airtable	Database management, data storage, and automation
Development Environment	Web browser (Google Chrome), Softr Studio	Development and testing
Hardware	Laptop (Intel i5, 2GB RAM, 500GB HDD)	Development and deployment
Operating System	Windows 10	Local encironment setup
Testing Devices	Smartphone and laptop	Interface responsiveness testing

3.6 Project Timeline

The development process followed an eight-week schedule, consistent with the RAD methodology of rapid iteration and incremental improvement.

Weeks	Activity
Weeks 1-2	Requirements gathering and planning
Weeks 3-4	User interface design and prototyping
Weeks 5-6	Construction and integration of components
Week 7	Testing and bugging
Week 8	Final deployment and documentation

3.7 Summary

This chapter has described the methodology adopted for the web-based lost and found reporting system. The Rapid Application Development (RAD) model was employed due to its suitability for fast prototyping, flexibility and iterative development using building tools. Each phase of the RAD model – requirements planning, user design, construction and cutover – was applied to ensure a user- centered, functional and reliable web application. The next chapter presents the system design and implementation details

CHAPTER FOUR

SYSTEM DESIGN AND IMPLEMENTATION

4.1 Introduction

This chapter focuses on the development and realization of a web-based lost and found reporting application tailored for a campus setting. It discusses the system's requirements, architectural framework, database structure, interface layout, and the overall implementation procedure.

4.2 System Analysis

4.2.1 Functional Requirements

The functional requirements outline the essential activities that the system is expected to carry out in order to achieve its purpose. These requirements are centered on the system's main operations, which include**:**

- Enabling users to create entries for items they have lost or discovered.
- Allowing users to attach photographs when submitting item reports.
- Providing a feature through which all submitted reports can be viewed publicly.
- Supporting item searches using relevant details such as the item's name or descriptive keywords.
- Displaying the contact information provided by the individual who submitted each report, so that communication can be established between parties.

4.2.2 Non- Functional Requirements

The non-functional requirements describe the quality attributes of the system

Requirement Type	Description
Usability	The interface must be easy to use and accessible to the first-time users
Availability	The system should be available online and accessible anytime
Performance	The system should load records and search results quickly
Compatibility	The system should be accessible on both mobile and desktop browsers
Security	Data should be stored securely on the back-end

4.3 System Design

4.3.1 System Architecture

The system adopts a two-tier client–server architectural model composed of two main layers**:**

- Client Layer (Front-End): Developed using the Softr platform, this component provides the user interface where individuals interact with the application through web-based forms and item display pages.
- Server Layer (Back-End): This section utilizes Airtable as the database system responsible for storing all records, including item information, descriptions, and the corresponding contact details of reporters.

4.3.2 Database Design (ER Diagram)

An Entity–Relationship (ER) model provides a visual illustration of how various entities interact within a database structure. In this project, the database design is kept minimal, consisting of a single primary table used to store all item-related records. Each record includes essential data attributes such as:

Field Name	Description
Item_Name	Name of the item
Photo	Image of the item
Location	Where item was found/lost
Description	Description of the item
Date and time lost	Date and time item was lost/found
Contact	Phone number of reporter
Email	Email of reporter

	Item Name	Photo	Location	Description	Date and time lost
1	Keys		Balcony	Keys with remote	9/11/2025 3:34pm
2	Wallet		Behind 400L classroom	Black wallet with white zip	9/11/2025 3:34pm
3	Glasses		Faculty of education	Black glasses	9/11/2025 3:34pm
4	Backpack		Department of biochemistry	Black backpack with 3 zips	9/11/2025 3:34pm
5	Laptop		Cafeteria	Black hp laptop	9/11/2025 3:34pm
6	Umbrella		Hall 4 entrance	Blue Umbrella	9/11/2025 3:34pm
7	Infinix Hot 10		Library extension entrance	Long black android phone ...	10/3/2025 4:42pm
8	Notebook		Lecture hall 1000LT	Yellow Notebook	10/4/2025 3:07pm
9	Violin		Campus Gate	4/4 violin	10/5/2025 9:37am
10	7 octave Casio electric key...		St. Albert Church	Silver in colour. I found it o...	10/5/2025 12:30pm
11	Adaptor		Hall 3	Black Adaptor	10/5/2025 2:44pm
12	Brown files with documents			A brown file, containing ab...	10/5/2025 7:51pm
13	Flute		NDDC Hostel	Silver Flute	10/6/2025 9:34am
14	Book		Uniben	CSC 427	10/7/2025 9:43am
	ng		MTN Library	Brown bag with a long han...	10/8/2025 3:38pm

+ Add...

18 records

Fig 4.1

Contact	Email
08034567890	tundeajibola@gmail.com
08123456789	graceokoro@gmail.com
08059876543	emekanwosu@yahoo.com
08162345678	fatimabello@gmail.com
08098765432	kelvinadams@outlook.com
07043210987	chiomaeze@gmail.com
(090) 345-6789	michaeludeh@yahoo.com
+2349131967030	anitajohnson@gmail.com
	johnsonuwagboe@gmail.c...
+6285168969627	seyistephens101@gmail.com
+2348075328575	David sule@gmail.com
+2349028505629	sanusiisrael13@gmail.com
	aigbegeorgeosakpolor@g...
	test@gmail.com
	faithofomola@gmail.com

Figure 4.2

4.4 User Interface Design

The user interface was designed to be simple, intuitive and mobile-friendly. The major interfaces are listed below, with screenshots.

- Homepage

Figure 4.3

- About Page

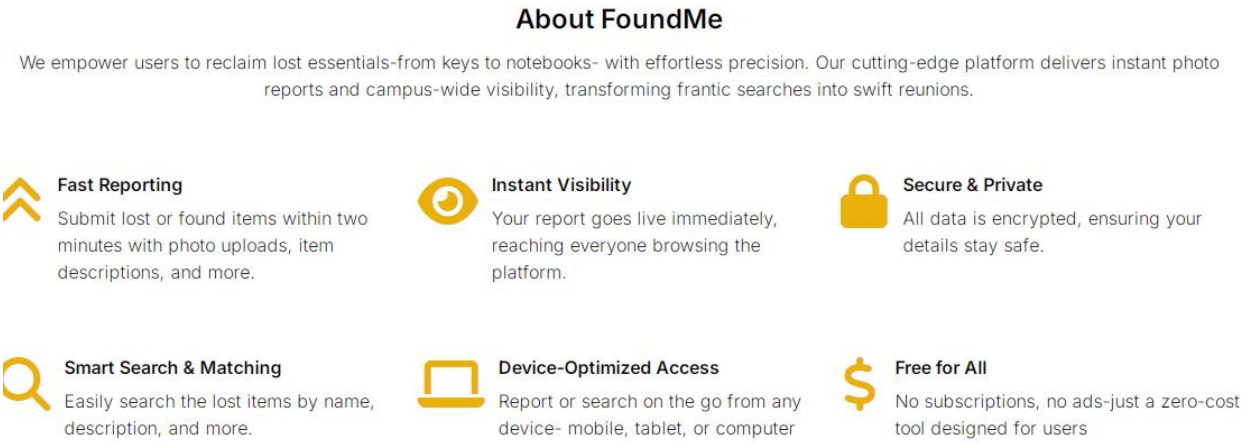
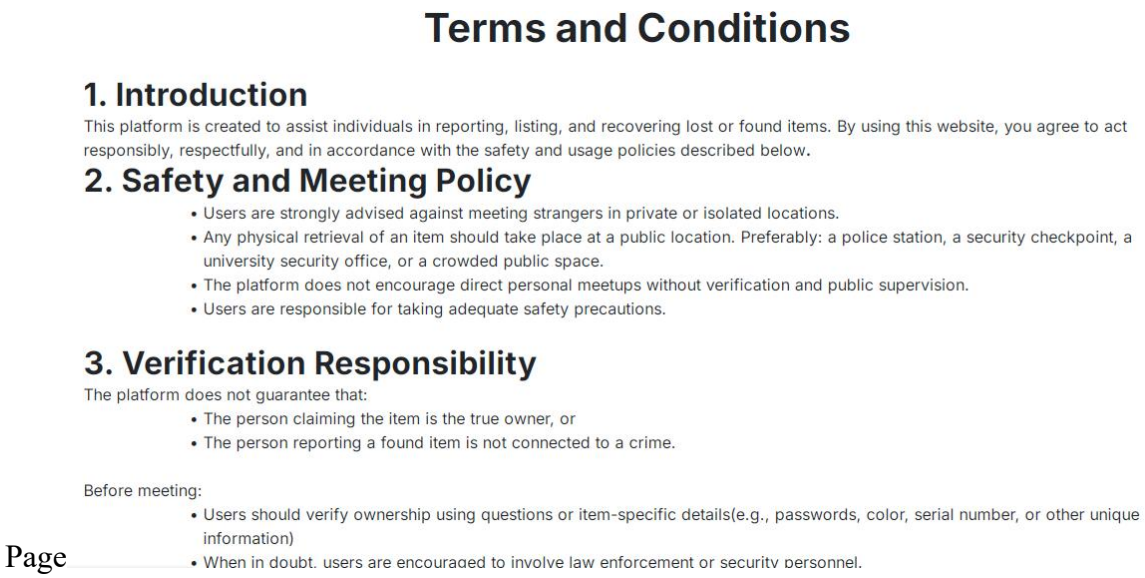


Figure 4.4

- Terms and Conditions



Terms and Conditions

1. Introduction

This platform is created to assist individuals in reporting, listing, and recovering lost or found items. By using this website, you agree to act responsibly, respectfully, and in accordance with the safety and usage policies described below.

2. Safety and Meeting Policy

- Users are strongly advised against meeting strangers in private or isolated locations.
- Any physical retrieval of an item should take place at a public location. Preferably: a police station, a security checkpoint, a university security office, or a crowded public space.
- The platform does not encourage direct personal meetups without verification and public supervision.
- Users are responsible for taking adequate safety precautions.

3. Verification Responsibility

The platform does not guarantee that:

- The person claiming the item is the true owner, or
- The person reporting a found item is not connected to a crime.

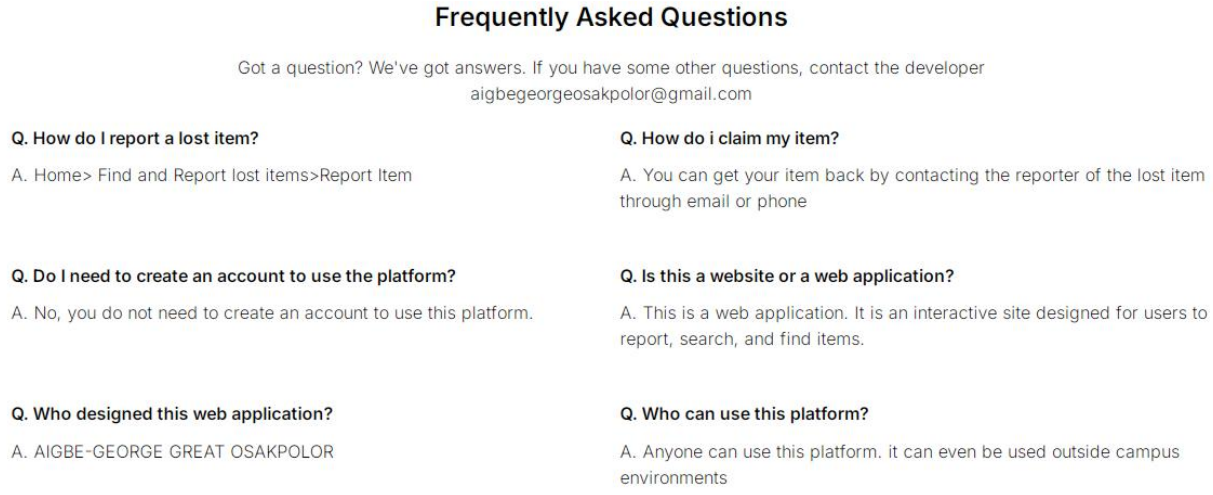
Before meeting:

- Users should verify ownership using questions or item-specific details(e.g., passwords, color, serial number, or other unique information)
- When in doubt, users are encouraged to involve law enforcement or security personnel.

Page

Figure 4.5

- Frequently Asked Questions Page



Frequently Asked Questions

Got a question? We've got answers. If you have some other questions, contact the developer aigbegeorgeosakpolor@gmail.com

Q. How do I report a lost item?

A. Home> Find and Report lost items>Report Item

Q. How do i claim my item?

A. You can get your item back by contacting the reporter of the lost item through email or phone

Q. Do I need to create an account to use the platform?

A. No, you do not need to create an account to use this platform.

Q. Is this a website or a web application?

A. This is a web application. It is an interactive site designed for users to report, search, and find items.

Q. Who designed this web application?

A. AIGBE-GEORGE GREAT OSAKPOLOR

Q. Who can use this platform?

A. Anyone can use this platform. it can even be used outside campus environments

Figure 4.6

- All Items Listing Page (Lost & Found)

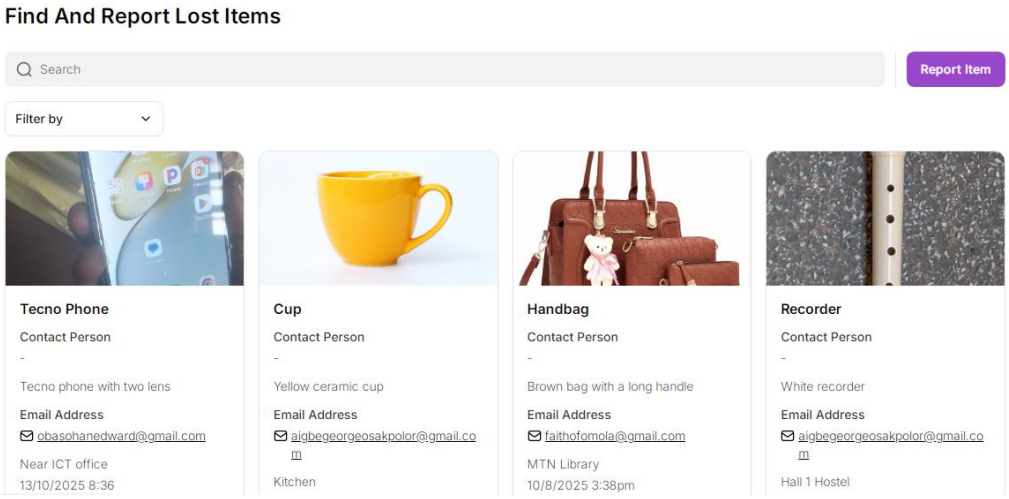


Figure 4.7

- Report Lost/Found Item Page

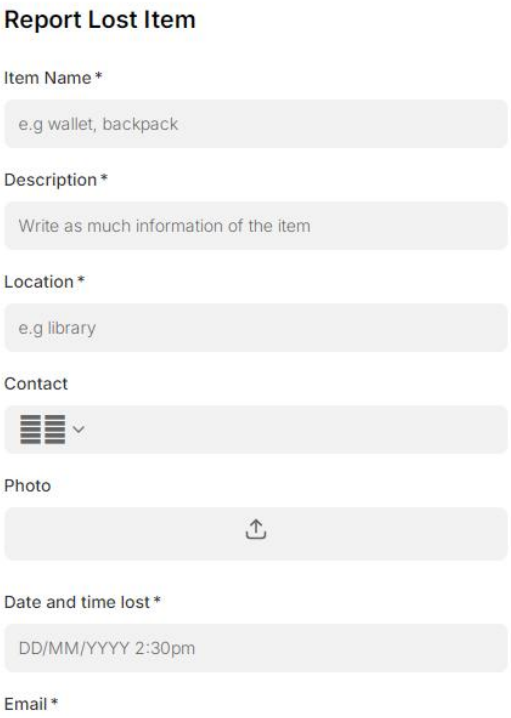


Figure 4.8

4.5 Implementation

4.5.1 Front-End Development

The front end was created using Softr, a building platform that uses HTML and enables rapid design of web interfaces through pre-built components such as forms, lists and filters. Softr was used to implement the frontend. The following HTML is representative of the structure and functions implemented through softr's blocks and custom code blocks.

4.5.2 Back-End Development

The database was implemented using Airtable, which acted as the data repository. Each item submission automatically created a new record.

4.5.3 Integration

Integration between Softr and Airtable was achieved using built-in connectors. Any new record is instantly visible in the item listing pages, enabling real-time updates without manual synchronization.

4.6 System Testing

Testing was carried out to verify core functionality:

Test Case	Action	Expected Result	Outcome
TC1	Submit Lost or Found Item Form	Record stored and visible	Pass
TC2	Search Item	Filter shows matching records	Pass
TC3	Mobile View	Pages responsive on phone	Pass

Testing confirmed that the system was fully functional and met stated requirements.

4.7 Summary

This chapter presented the system design and implementation of the web-based lost and found reporting system. The system was developed using two-tier architecture with Softr as the client interface and Airtable as the database. The design process included requirement specification, architecture definition, interface prototyping and iterative refinement. The next chapter will present the results of testing and system evaluation.

CHAPTER FIVE

SYSTEM EVALUATION, FINDING,

CONCLUSIONS AND RECOMMENDATIONS

System Evaluation

The developed web-based lost and found reporting system is evaluated after successful deployment on the softr platform. The system is designed to facilitate the reporting, searching, and management of lost and found items within the campus environment. The evaluation is carried out to ensure that the system meets its intended objectives, functions correctly, and provides a better alternative to the manual lost and found process that has been common in most campus settings.

5.1.1 Evaluation Method

The evaluation of the system is conducted through real-world user interaction and observation. After the deployment of the system, three users were selected to test its functionality and provide feedback on its performance. These users are mainly students who represent the target audience of the application. The evaluation focuses on the system usability, accessibility, responsiveness, and effectiveness in capturing and retrieving lost and found items. The users are asked to interact with various features of the system such as reporting lost/found items and searching for items. Their experience and opinions are recorded to assess whether the system satisfies user needs and supports easy information flow. In addition to user testing, the system performance is also monitored to confirm that all pages load efficiently and that data submitted through the forms are successfully stored and displayed.

5.1.2 Target Users

The target users for the system are students and staff members within the campus environment. However, during the initial evolution phase, three students were involved. These individuals were contacted directly and provided with the web link to access the deployed system. They were chosen because students constitute the majority of individuals who frequently misplace or find items on campus and they can provide relevant feedback based on their daily experiences.

5.1.3 Test Scenarios and Results

During testing, three users performed various activities on the system. They reported sample lost items by filling in the online form and verified that their submissions were correctly displayed in the item list. They also performed searches to confirm that the keyword and description filters returned the expected results. The users reported that all forms submitted

successfully and that the forms appeared in the item list immediately after submission. In terms of responsiveness, the users confirm that the system loads smoothly on both mobile and laptop browsers.

5.1.4 User Feedback

The feedback obtained from the three student users is overwhelmingly positive. They describe the system as easy to use, straightforward, and clear in design. They express satisfaction with how quickly they can report lost or found items without assistance. All users indicated that the interface is simple and well-organized, which makes it easy to locate and interact with different sections such as the report forms and the search area.

5.2 Discussion of Findings

The evaluation results show that the system effectively addressed the limitations of traditional lost and found management methods. In the manual approach, students usually report lost items verbally or through notice boards, which can be time consuming and unreliable. The introduction of a web-based system eliminates these inefficiencies by allowing digital submission and instant visibility of information.

5.2.1 Efficiency Compared to the Traditional Approach

The system demonstrates greater efficiency than manual record keeping. Users can instantly submit a lost or found item from their mobile phones and view existing records without physically visiting an office or board. Unlike traditional systems where information may get lost or ignored, the digital version ensures persistence and transparency.

5.3 Conclusion

The study concludes that the developed web-based lost and found reporting system significantly improves the process of managing lost and found items within a campus setting. The system promotes transparency, reduces search time and encourages users to participate actively in retrieving lost belongings.

5.4 Recommendations

5.4.1 For Deployment

- It is recommended that the system is officially introduced to all students and staff members through institutional communication channels. Posters, whatsapp and QR codes can be used to increase awareness.
- A designated moderator can be assigned to periodically review submissions and ensure that inappropriate reports are removed.
- User authentication should be added for improved security and accountability.
- A notification feature can be added to inform users when an item similar to their report is found.

- A mobile app version could be made for possible offline use.

5.4.2 For Institutions Adopting Similar Systems

Other educational institutions seeking to develop similar platforms can adopt this approach for rapid development. This approach is cost-effective, beginner-friendly and supports fast iteration based on user feedback.

5.5 Limitations

There are several limitations in the system that needs to be improved.

- There is no automated notification. Users are required to manually check the platform to know whether a matching item has been submitted.
- The system depends on continuous internet access and service providers of softr and airtable. Any disruption from these providers will result in temporary inaccessibility of the platform. This reliance on third-party services means that full offline access or local hosting is not currently supported.
- No admin verification yet.
- No user authentication mechanism for easy accessibility.
- No mobile app version.

5.6 Summary

The web-based lost and found reporting system for the campus environment is successfully developed and deployed using softr integrated with airtable. The evaluation confirms that the system achieves its objectives by providing a fast, reliable, and user-friendly platform for managing lost and found items. User feedback is positive, with all three participants affirming that the system is simple to use, efficient, and visually clear.

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APPENDIX

SOURCE CODE

File 1 index.html

(Homepage)

```
<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8" />
  <meta name="viewport" content="width=device-width,initial-scale=1" />
  <title>Campus Lost & Found</title>
  <link rel="stylesheet" href="styles.css" />
</head>
<body>
  <header class="site-header">
    <div class="container">
      <h1>Campus Lost &amp;amp; Found</h1>
      <p class="tagline">Report or search for lost items across the campus — fast and free.</p>
      <nav class="main-nav" aria-label="Main navigation">
        <a href="report-lost.html" class="btn">Report Lost Item</a>
        <a href="report-found.html" class="btn">Report Found Item</a>
        <a href="items.html" class="btn">Browse Items</a>
      </nav>
    </div>
  </header>
```

```
<main class="container">
  <section class="intro">
    <h2>How it works</h2>
    <ol>
      <li>Report a lost or found item using the form.</li>
      <li>Include a photo and as much detail as possible.</li>
      <li>Search the items list — contact the reporter if you find a match.</li>
    </ol>
  </section>

  <section class="cta-cards">
    <article class="card">
      <h3>Quick Report</h3>
      <p>Use the quick forms to post items with photos.</p>
      <a href="report-lost.html" class="btn-outline">Report Now</a>
    </article>
    <article class="card">
      <h3>Search Items</h3>
      <p>Filter items by category, date, or keywords.</p>
      <a href="items.html" class="btn-outline">Search</a>
    </article>
  </section>
</main>
```

```
  <footer class="site-footer">
    <div class="container">
      <p>&copy; 2025 Campus Lost &amp;amp; Found — For demonstration only.</p>
    </div>
  </footer>
</body>
</html>
```

File 2 report-lost/found.html

(Report lost/found item form)

```
<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8" />
  <meta name="viewport" content="width=device-width,initial-scale=1" />
  <title>Report Lost Item — Campus Lost & Found</title>
  <link rel="stylesheet" href="styles.css" />
</head>
<body>
  <main class="container form-page">
    <h1>Report a Lost Item</h1>
    <form id="lostForm" autocomplete="off" aria-labelledby="reportLostHeading">
      <label for="item_name">Item name (short)</label>
      <input id="item_name" name="item_name" type="text" required />
      <label for="description">Description (color, brand, distinguishing marks)</label>
      <textarea id="description" name="description" rows="4" required></textarea>
```

```
    <label for="location">Location (where you think you lost it)</label>
    <input id="location" name="location" type="text" required />

    <label for="date_reported">Date</label>
    <input id="date_reported" name="date_reported" type="date" required />

    <label for="contact_info">Contact info (email or phone)</label>
    <input id="contact_info" name="contact_info" type="text" required />

    <label for="image">Image (optional)</label>
    <input id="image" name="image" type="file" accept="image/*" />

    <div class="form-actions">
      <button type="submit" class="btn">Submit Report</button>
      <a href="index.html" class="btn-outline">Cancel</a>
    </div>

    <div id="formMessage" role="status" aria-live="polite"></div>
  </form>
 </main>

 <script src="script.js"></script>
</body>
</html>
```