**DESIGN AND IMPLEMENTATION OF A WEB BASED LOST ITEM RECOVERY SYSTEM: CASE STUDY OF FEDERAL UNIVERSITY OF WUKARI.**

**BY**

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**(PAS/CSC/19/007)**

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**FACULTY OF COMPUTING AND INFORMATION SCIENCES,**

**FEDERAL UNIVERSITY WUKARI**

**MARCH, 2024**

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**A PROJECT TO BE SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE, FACULTY OF COMPUTING AND INFORMATION SCIENCE, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR OF SCIENCE DEGREE IN COMPUTER SCIENCE, FEDERAL UNIVERSITY WUKARI TARABA STATE**

**MARCH, 2024**

# CERTIFICATION

This is to certify that this work titled The Design and Implementation of a Web-Based Lost Item Recovery System: Case Study of Federal University Wukari was carried out by **JOHN GODWIN ADAKONYE, (PAS/CSC/19/007)** in the Department of Computer Science, Faculty Computing and Information Sciences under supervision. This project meets the requirements and regulations governing the Award of Bachelor of Science (Hon) Degree in Computer Science, Federal University Wukari.

**Mr Philemon Uten Emmoh**

**Supervisor**  **SIGN/DATE**

**DR. Oladunjoye J.A**

**HOD SIGN/DATE**

# DECLARATION

I**,** John Godwin Adakonye, hereby declare that the project entitled "Design and Implementation of a Web-Based Lost Item Recovery System: Case Study of Federal University of Wukari" is my original work and has been carried out under the supervision of Mr. Philemon Uten Emmoh, at Federal University Wukari, Faculty of Computing and Information Science, Department of Computer Science, pursuing a Bachelor of Science degree. The information derived from the literature has been duly acknowledged in the text and list of references provided. No part of this dissertation was previously presented for another degree or diploma at this or any other Institution

**John Godwin Adakonye**

**Student SIGN/DATE**

# DEDICATION

I would like to dedicate this work to God almighty for his guidance and protection. And also to my parents Mr and Mrs John Adakonye and also to my brother who contributed and looked forward to the success of the work. I am much grateful for the support, love and care you have shown towards me.

# ACKNOWLEDGEMENT

I want to thank God almighty for his protection and guidance towards me during the duration of my project work.

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# ABSTRACT

*The Lost Item Recovery System project aimed to modernize the process of recovering lost items by developing a comprehensive web-based platform. Following a structured waterfall approach, the project meticulously incorporated key functionalities such as user registration, lost item reporting, search capabilities, and communication tools to effectively address the diverse needs of users. Thorough testing procedures were implemented to validate the system's functionality, usability, and security. Any identified issues were promptly addressed to ensure the system met the required standards of quality and reliability. Further testing affirmed the system's robustness, demonstrating its efficiency and responsiveness across various usage scenarios. This project underscores the importance of collaboration, innovation, and user-centric design in software development. By actively involving stakeholders throughout the development process, the project team ensured that the final solution resonated with its intended users. In conclusion, the Lost Item Recovery System represents a significant milestone in lost item management systems, showcasing technology's capacity to tackle real-world challenges effectively. Recommendations for future endeavors include expanding the system's application areas and exploring further research opportunities. Ultimately, this project serves as a testament to the transformative power of technology in addressing everyday problems.*

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# CHAPTER ONE

# 1.0 INTRODUCTION

## 1.1 Background of the study

Modern educational institutions are emerging, where knowledge and people flow freely through corridors and lecture halls. Within these lively environments, an often-overlooked challenge arises; the loss of personal belongings. It is a challenge that might not always command the spotlight but is an ever-present concern. Students, staff and visitors frequently lose their personal belongings, making it challenging for those who find these items to return them to their owners. Often, individuals resort to posting notices on faculty and departmental notice boards, but these notices tend to disappear quickly due to updates or students not taking them seriously. However, in today's digital age, students can conveniently search for lost items using any internet-enabled device. Additionally, those who find lost items can assist by uploading details about the found items on the internet (Sadiku *et al.*, 2019). The experience of misplacing one's cherished possessions can be unexpectedly distressing Al-bataineh & Bataineh (2017).

Picture this scenario: a hurried student rushing to their next class, unintentionally leaving behind their school bag with all its contents, or perhaps, a diligent staff member, engrossed in their duties, inadvertently leaving their valuable laptop in a common area. It is against this issue that this study emerges, proposing a solution - the development of a Web-based Lost Item Recovery System. This system is tailored to cater to the distinctive context of the Federal University of Wukari. The aim is simple but impactful: to revolutionize how lost items are managed and recovered within the close-knit campus community.

In contemplating the significance of lost and found systems, it becomes evident that they play a pivotal role not only in educational institutions but also in public spaces. This system is not a repository for forgotten items; it embodies trust and security. It empowers individuals to reclaim their personal belongings, cultivating a sense of confidence and belonging within the community.

Loss of items can affect individuals, affecting their well-being and daily routines. The significance of this study is that the website developed will help foster integrity amongst students and staff at the university, it can also help users know the usefulness of search engines in solving problems related to recovering a lost item.

## 1.2 Statement of the Problem

The Federal University of Wukari (FUW), an institution committed to academic excellence and community enrichment, encounters an often overlooked yet significant issue – lost items within its campus. This section delves into the intricate details of the problems associated with lost items at FUW, emphasizing the compelling reasons for developing a web-based Lost Item Recovery System tailored to the university's context.

The challenge of lost item management at the Federal University of Wukari (FUW) is a complex issue that affects various aspects of campus life. Lost items are a common occurrence on the FUW campus, with students frequently misplacing study materials, staff leaving behind valuable research notes, and even visitors forgetting their personal belongings. While these incidents may seem minor, they have far-reaching consequences. Sadiku *et al.* (2019), highlighted the challenges individuals face in finding lost items, conceptualizing the need for a comprehensive lost item recovery system to address these challenges.

Zipate (2014), developed a web application integrated with Facebook to address lost and found items but lacked a mechanism for users to claim items. This points to the conceptual necessity of incorporating a secure and user-friendly claiming mechanism to ensure the authenticity of the retrieval process. The proposed system aims to solve this problem.

At Federal University of Wukari (FUW), verifying ownership of lost items is a subjective process lacking stringent protocols, leading to prolonged delays and eroding confidence in the recovery system. Communication gaps between individuals who lost items and those who found them worsen delays and privacy concerns deter reporting. The inability to recover lost items promptly undermines campus security and trust in the university's efficacy. These incidents, affecting various items and causing inconvenience and emotional tolls, collectively impact the well-being of the campus communityTop of Form

## 1.3 Aim and Objectives of the Study

**Aim**

The primary aim of this study is to design and implement a web-based Lost Item Recovery System with Federal University of Wukari as a case study, to revolutionize the management and recovery of lost items within the campus community.

**Objectives**

To achieve the aim of this study, the following specific objectives have been defined:

1. Design and Develop a Web-Based Lost Item Recovery System.
2. To integrate Lost Item Reporting and Searching.
3. To integrate Possession Transfer and Identity Verification.

## 1.3 Significance of the Study

The Lost Item Recovery System at Federal University of Wukari (FUW) promises to address complex challenges in lost item management on campus, offering significant benefits. It aims to enhance efficiency by providing a centralized platform for reporting and recovering items, reducing time and minimizing inconvenience for the campus community.

Al-bataineh & Bataineh, (2017) researched to address the issue of losing items by automating all the manual steps involved in the current practice and procedures at educational institutions by developing an online web-based lost and found system. In addition, an eye-tracking-based usability study was developed on the new system to assess its effectiveness, efficiency, usefulness, and usability. The eye-tracking data were recorded, collected, and analyzed. The findings from the usability study indicated that students were very satisfied with the functionality, effectiveness, and efficiency of the system as well as pleased with the quality of its user experience and proved that having such a new system deployed on campus will be of great beneficiary for students at higher educational institutions.

Efficient lost item recovery enhances campus security by ensuring only authorized individuals can claim items, fostering a sense of security. The system promotes transparency and trust through secure ownership verification, enhancing accountability. It expedites recovery, reducing stress and improving the campus experience, creating a conducive learning environment. Centralized management streamlines administrative processes, benefiting both staff and students. Additionally, the system promotes community engagement, facilitating accurate recovery and unity. Its successful implementation at FUW serves as a model for other institutions, enhancing campus security, efficiency, and overall experience.

## 1.4 Scope of the Study

1. Design and Development.
2. System Customization for FUW
3. User Access and Authentication
4. Lost Item Reporting.
5. Ownership Verification.
6. Possession Transfer Mechanisms.

## 1.5 Limitations of the Study

1. **Technological Constraints:** The successful implementation of the Lost Item Recovery System heavily depends on the availability of appropriate technology infrastructure. If the university's technological resources are limited, it might affect the system's performance, accessibility, and user experience.
2. **User Adoption and Engagement:** While the system is designed to be user-friendly, there might be challenges in getting all members of the university community to actively adopt and engage with it. Resistance to change, lack of awareness, or reluctance to use technology could limit the system's effectiveness.
3. **Data Privacy and Security Concerns:** Implementing a system that collects and stores personal information raises concerns about data privacy and security. Despite efforts to ensure robust security measures, there is always a risk of data breaches or unauthorized access, which might undermine user trust.
4. **Network Connectivity Issues:** The system's functionality relies on stable and reliable internet connectivity. Any disruptions in network access could impact users' ability to report lost items, communicate, and access the system's features.
5. **Administrative Workload:** While the system aims to streamline administrative processes, its implementation might initially require additional administrative efforts. Training staff, managing the system's database, and addressing user inquiries could temporarily increase the workload.
6. **External Factors:** External factors such as changes in university policies, budget constraints, or unforeseen events might impact the study's implementation timeline and the system's sustainability.
7. **Limited Use by Visitors:** While the system primarily targets the university community, its effectiveness might be limited when it comes to visitors who are not part of the university's user database. This could impact the recovery of items lost by non-affiliated individuals.
8. **Cultural and Behavioral Differences:** User engagement and adoption might be influenced by cultural norms, behaviors, and attitudes toward technology. Customizing the system to suit the preferences of diverse user groups could pose challenges.
9. **Technical Challenges and Bugs:** The development of software systems often encounters technical challenges and potential bugs. Addressing these issues might require additional time and resources for troubleshooting and debugging.

## 1.6 Definition of Terms

1. **Lost Item:** A personal belonging or possession that has been unintentionally misplaced or left behind by an individual.
2. **Lost Item Recovery:** The process or set of procedures aimed at locating, identifying, and returning lost items to their rightful owners.
3. **Lost Item Recovery System:** A system designed to support the reporting, matching, and recovery of lost items within a specific community or institution with features such as reporting, ownership verification, possession transfer, etc.
4. **Web-Based:** Relating to or conducted on the internet, accessible through a web browser or online platform.
5. **Web-based** **Lost Item Recovery System:** A comprehensive web-based platform designed to streamline the reporting, matching, and recovery of lost items within a specific community or institution. It involves features such as standardized reporting, ownership verification, possession transfer, and direct communication channels.
6. **Intuitive Interface:** A user interface design that is easy to understand and navigate without the need for extensive instructions, promoting user-friendly interactions.
7. **Ownership Verification:** The process by which the Lost Item Recovery System validates the rightful ownership of claimed lost items. This process includes mechanisms such as identification verification, user authentication, and supporting documentation to prevent false claims.
8. **Possession Transfer:** The secure transition of found items from individuals who have found them to a designated security unit or person within the university. Proper record-keeping procedures are employed during possession transfer to maintain accountability.
9. **User Authentication:** The process of verifying the identity of users accessing the Lost Item Recovery System, ensuring that only authorized individuals can interact with the system's features and functionality.
10. **Identity Verification:** The process by which the Lost Item Recovery System validates the rightful ownership of claimed lost items, often utilizing methods such as identification verification, user authentication, and supporting documentation.
11. **Direct Communication Channels:** Integrated chat functionality within the Lost Item Recovery System that enables direct, real-time communication between individuals who have lost items and those who have found them. This feature facilitates item recovery and clarification.
12. **User Engagement:** The level of active involvement and interaction of members of the Federal University of Wukari's community with the Lost Item Recovery System. High user engagement indicates the system's successful adoption and utilization.
13. **Privacy Concerns:** Apprehensions related to the security and confidentiality of personal information shared on the Lost Item Recovery System. Measures are implemented to protect user data from unauthorized access and misuse.
14. **Campus Security:** The overall measures, practices, and initiatives aimed at ensuring the safety and well-being of individuals within the campus environment. The Lost Item Recovery System contributes to campus security by preventing unauthorized access to lost items.
15. **User-Friendly Interface:** The design of the Lost Item Recovery System's user interface with a focus on intuitive navigation, clear communication, and ease of use, promoting higher user engagement and adoption.
16. **System Customization:** The process of tailoring the features, functionalities, and design of the Lost Item Recovery System to meet the specific needs and context of the Federal University of Wukari, considering factors such as organizational structure, user demographics, and existing administrative processes.
17. **Misreporting:** Providing inaccurate or misleading information during the reporting of lost items, which can impact the accuracy of item matching and hinder the overall effectiveness of the Lost Item Recovery System.
18. **False Claims:** Untruthful statements or assertions made by individuals attempting to claim ownership of found items, emphasizing the importance of robust ownership verification mechanisms in preventing false claims.
19. **Network Connectivity Issues:** Challenges or disruptions in stable and reliable internet connectivity, which can affect users' ability to report lost items, communicate, and access various features of the Lost Item Recovery System.

# CHAPTER 2

# 2.0 LITERATURE REVIEW



## 2.1 Theoretical Framework

The theoretical framework for the development of the web-based Lost Item Recovery System at the Federal University of Wukari incorporates several key theories and concepts that guide the design and implementation of the system. These theories provide a foundation for understanding and addressing the challenges related to lost item management and recovery within the university community.

## 2.1.1 Information Retrieval Theory:

Drawing from the insights of Onwuchekwa and Jegede (2011), the Information Retrieval Theory underpins the system's capacity to effectively match lost and found items. The theoretical framework incorporates principles of efficient information retrieval methods to ensure accurate matching based on item descriptions and attributes.

## 2.1.2 Technology Adoption Model:

Aligned with the insights from Ahmad, Muhammad, Rauniyar, Su, and Zhang (2015), the Technology Adoption Model guides the integration of Bluetooth-based devices for tracking lost items. This theory supports the idea that leveraging widely adopted technologies enhances user trust and attention, contributing to the effectiveness of the Lost Item Recovery System.

## 2.1.3 User-Centered Design Principles:

In line with Al-bataineh and Bataineh's (2017), emphasis on user satisfaction, the theoretical framework incorporates User-Centered Design Principles. This involves considering the needs, behaviors, and preferences of the Federal University of Wukari community during the design and implementation phases, ensuring a user-friendly and efficient system.

## 2.1.4 System Development Theories:

Githinji's (2016), trusted third-party model for information sharing influences the system's development approach. System Development Theories guide the establishment of secure and reliable data-sharing mechanisms, fostering transparency and trust among users and the Lost Item Recovery System.

## 2.1.5 Usability and Human-Computer Interaction Theories:

Taking cues from Maina *et al.* (2018), focus on efficiency and user satisfaction, Usability and Human-Computer Interaction Theories are integrated into the framework. The system prioritizes an intuitive interface, efficient workflows, and a positive user experience to address practical challenges associated with lost item recovery.

## 2.1.6 Community Engagement Theories:

Building on the insights of Brandsen *et al.* (2019), Community Engagement Theories influence the framework to ensure active participation and collaboration. The Lost Item Recovery System incorporates features that engage the Federal University of Wukari community, allowing users who find items to directly communicate with those who have lost them.

## 2.2 Theoretical Framework Summary:

The theoretical framework integrates Information Retrieval Theory for accurate matching, the Technology Adoption Model for leveraging widely adopted technologies, User-Centered Design Principles for a community-specific approach, System Development Theories for secure data sharing, Usability and Human-Computer Interaction Theories for an efficient user experience, and Community Engagement Theories for active participation.

This comprehensive framework guides the design, development, and implementation of the web-based Lost Item Recovery System, ensuring that it addresses the unique challenges within the Federal University of Wukari community while incorporating best practices and theories from relevant domains.

## 2.3 Related Works

This section consists of some related works on lost item recovery systens based on the research of other authors.

Onwuchekwa and Jegede (2011), conducted a survey on information retrieval methods, emphasizing the need for ongoing evaluation to establish effective and efficient systems. This underscores the importance of continual assessment in the conceptualization of a robust lost item recovery system.

Zipate (2014), developed a web application integrated with Facebook to address lost and found items but lacked a mechanism for users to claim items. This points to the conceptual necessity of incorporating a secure and user-friendly claiming mechanism to ensure the authenticity of the retrieval process.

Walson and Millie (2014), acknowledged the significance of combining different approaches for obtaining information from an archive, emphasizing the conceptual importance of integrating diverse methods for lost item retrieval to enhance system efficiency.

Ahmad *et al*. (2015), highlighted the growing problem of lost items and suggested technological solutions, such as Bluetooth-based tracking devices. This introduces the conceptual idea that technological advancements, particularly collaboration with major manufacturers, can play a pivotal role in improving the lost item recovery process.

Suseela (2015), delved into factors influencing information retrieval and the development of retrieval tools. This conceptualizes the importance of understanding factors that influence the effectiveness of information retrieval tools, guiding the design of a system that considers these factors.

Harburg *et al.* (2015), acknowledged existing systems for tracking and returning lost items. This reinforces the conceptual understanding that advancements in technology contribute to the availability of systems capable of efficiently managing lost items.

Madankar *et al.* (2016), discussed crucial aspects of information retrieval, emphasizing cross-lingual and multi-lingual retrieval. This conceptualizes the need for a lost item recovery system that accommodates diverse languages and retrieval methods to cater to a broader user base.

Githinji (2016), developed a web application for lost and found services, employing a trusted third-party model. This conceptualizes the importance of secure information sharing between users and institutions, contributing to the overall reliability of the lost item recovery system.

Bachchhav (2016), focused on information retrieval processes to aid users in accessing essential materials. This conceptualizes the need for user-friendly methods in the lost item recovery system, ensuring ease of use and minimizing the time required for retrieval.

Al-bataineh and Bataineh (2017), automated manual steps in the current lost and found procedures, emphasizing the conceptual shift towards technology-driven solutions. The eye-tracking usability study further underlines the importance of user satisfaction and efficiency in the conceptualization of the system. The findings from the study indicated that students were very satisfied with the functionality, effectiveness, and efficiency of the system as well as pleased with the quality of its user experience and proved that having such a new system deployed on campus will be of great beneficiary for students at higher educational institutions.

Maina *et al.* (2018), identified inefficiencies in the system for recovering lost items in Kenya, prompting the conceptualization of a web and mobile system to streamline the process and enhance efficiency.

Njuguna (2018), established an online capability for the simple recovery of misplaced credentials, introducing the conceptual idea of a collaborative approach to facilitate the recovery process without unnecessary expenses and delays.

Agboola and Shaibu (2019), explored how ICT affects information retrieval in educational archives, conceptualizing the positive impact of technology on accurate information access.

Brandsen *et al.* (2019), focused on client requirements for a search system, emphasizing the importance of user-friendly searching experiences and adaptable systems in conceptualizing a lost item recovery platform.

Azad and Deepak (2019), examined query expansion methods in information retrieval, introducing the conceptual idea of enhancing search precision through effective query strategies.

Sadiku *et al.* (2019), highlighted the challenges individuals face in finding lost items, conceptualizing the need for a comprehensive lost item recovery system to address these challenges.

Shrirame *et al*. (November 2022), proposed a web app for addressing missing children in India. Citizens upload images, and a robust neural network (MTCNN + EfficientNetB0) achieves a 76.81% testing accuracy, showing promise for successful matches. The model demonstrates an innovative solution for reuniting missing children with their families.

Apoorva *et al* (2023), discussed the difficulty in locating lost items and designed a web application for lost-and-found services. This conceptualizes the importance of providing a service that aids individuals in finding their lost belongings efficiently.

Aziiza Yvelliechia *et al.* (2023), present a solution to the problem of lost items by proposing a prototype user interface and user experience for a lost and found system. Their research, employs the design thinking method to address the challenges of lost item recovery. The positive evaluation results, utilizing the System Usability Scale (SUS) and User Experience Questionnaire (UEQ), affirm the effectiveness of their approach in providing a user-friendly and acceptable solution to enhance the retrieval of lost items in today's technological era.

Tan *et al.* (2023), presented a tailored solution for the challenge of lost items at The National University of Malaysia (UKM). Their web and mobile-based lost and found service includes features like a login system, detailed item listings, and security measures for user authentication. The disposal system efficiently removes items held for over a month. The study, emphasizing usability and sustainability, showcases the successful implementation of an effective lost and found system, underscoring the authors' commitment to addressing practical challenges in university campus environments.

## 2.4 Summary of Literature Review

In summary, the conceptual literature review emphasizes the importance of continuous evaluation, user-friendly interfaces, secure claiming mechanisms, diverse language support, collaboration with technology manufacturers, and efficient search strategies in the development of a robust lost item recovery system. These concepts align with and complement the theoretical frameworks and related works discussed earlier. Theoretical foundations encompass Information Retrieval Theory, Technology Adoption Model, User-Centered Design Principles, System Development Theories, Usability and Human-Computer Interaction Theories, and Community Engagement Theories. Related works provide insights into information retrieval methods, technological solutions, user-friendly interfaces, and the importance of ongoing evaluation.

The proposed web-based Lost Item Recovery System at the Federal University of Wukari integrates these theoretical frameworks and conceptual insights to address identified knowledge gaps effectively. This comprehensive framework guides the design, development, and implementation of the system, ensuring it addresses the unique challenges within the university community. The system prioritizes continuous evaluation to enhance its performance and user satisfaction. It incorporates user-friendly interfaces to ensure a positive and efficient experience for both those finding and those claiming lost items. Secure claiming mechanisms are implemented to protect users' belongings, and diverse language support ensures accessibility for a broader user base. Collaboration with technology manufacturers is considered to leverage the latest advancements, and efficient search strategies are integrated to facilitate accurate matching and retrieval of lost items. The synthesis of these concepts results in an innovative and tailored solution that aims to provide an effective lost item recovery platform for the Federal University of Wukari community.

## 2.5 Knowledge Gap

While existing literature provides valuable insights into various aspects of information retrieval, technology adoption, user-centered design, and community engagement, there remains a noticeable knowledge gap at the intersection of these domains, particularly in the context of developing a comprehensive lost item recovery system. The literature review highlights the importance of continuous evaluation, user-friendly interfaces, secure claiming mechanisms, diverse language support, collaboration with technology manufacturers, and efficient search strategies. However, the existing studies often focus on specific elements, such as individual technologies or particular aspects of the recovery process.

The identified knowledge gap lies in the absence of comprehensive studies that integrate these crucial components into a unified solution for lost item management and recovery. While there is extensive research on technology adoption, there is limited exploration of how various theories and concepts can be synergistically employed to create an efficient and user-centric lost item recovery system. The need for a holistic approach that considers the entire lifecycle of lost items—from reporting to matching and claiming—is evident.

The proposed web-based Lost Item Recovery System for the Federal University of Wukari aims to bridge this knowledge gap by synthesizing insights from diverse theoretical frameworks and related works. By combining information retrieval theories, technology adoption models, user-centered design principles, and community engagement theories, the system strives to offer a multifaceted solution that addresses the challenges specific to the university environment. Through this integration, the research seeks to contribute to the existing body of knowledge by offering a comprehensive exploration of lost item recovery systems tailored to the needs of academic communities.

# CHAPTER THREE

# 3.0 SYSTEM ANALYSIS AND DESIGN METHODOLOGY

## 3.1 Introduction

In the realm of software development, conducting a thorough examination or investigation of user requirements and feasibility is crucial. This entails comprehensively grasping the current system's processes, procedures, and key problem areas to precisely define the objectives to be achieved and the means to achieve them. Such an approach enables researchers to maintain focus and gain a deep understanding of the functioning system. This research employs Waterfall methodology throughout the development process.

## 3.2 System Analysis

It is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components (Tutorials point, 2019). System analysis is conducted for the purpose of studying a system or its parts in order to identify its objectives. It is a problem-solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose.

Analysis of the proposed or existing system with the objective of the proposed system usually review the strengths and weaknesses of an existing system or proposed system.

The analysis covers the following:

1. Analyzing Lost Item Recovery and its challenges
2. Identifying the need for a Lost Item Recovery System
3. Identifying the Hardware, Software and Database Requirements

## 3.2.1 Analysis of Lost Item Recovery

A lost item recovery system is a system or technological solution designed to assist individuals in locating and reclaiming items they have misplaced or lost. These systems facilitate the reporting of lost items, verify ownership, and streamline the process of returning lost items to their rightful owners through various mechanisms such as databases, tracking technologies, and user-friendly interfaces. The ultimate goal is to efficiently reunite owners with their belongings. The experience of misplacing one's cherished possessions can be very distressing Al-bataineh & Bataineh (2017). This study highlights the growing problem of lost items and suggests technological solutions, indicating an acknowledgment of the need for dedicated systems to address this issue Ahmad et al. (2015). By designing a web application for lost-and-found services, this study directly addresses the difficulty in locating lost items, emphasizing the necessity of providing a service to aid individuals in finding their lost belongings efficiently Apoorva et al. (2023)**.**

## 3.2.2 Challenges of Lost Item Recovery

Determining the ownership of lost items can pose a challenge, especially when those items do not have unique identifiers or proper documentation. Authenticating the rightful owner often necessitates gathering detailed information and undergoing authentication procedures Onwuchekwa and Jegede (2011).

Effective coordination among various stakeholders, including individuals reporting lost items, authorities overseeing lost and found services, and the owners themselves, is pivotal. When systems are fragmented or collaboration is lacking, inefficiencies and delays in the recovery process may occur.

Furthermore, the limited availability of financial, human, and technological resources can impede the effectiveness of lost item recovery endeavors. Sufficient funding, staffing, and technological infrastructure are indispensable for the development and maintenance of comprehensive recovery systems.

Moreover, a considerable number of individuals may be unaware of existing lost item recovery services or may lack knowledge regarding reporting procedures. Educating the public about the resources available and preventive measures can play a crucial role in reducing the occurrence of lost items and enhancing the efficiency of recovery efforts.

## 3.3 Analysis of Lost Item Recovery System

Lost item recovery systems typically operate by providing a centralized platform where users can report lost items and search for found items. These systems often employ a combination of traditional methods and modern technologies to facilitate the process.

Traditionally, lost item recovery involved physical lost and found offices or repositories where individuals could deposit or claim lost items. These offices would categorize and catalog items, often using manual methods such as handwritten logs or index cards. Users could inquire about lost items through public announcements, newspaper advertisements, or direct communication with the office. In the contemporary era, technological advancements have greatly enhanced the efficiency and effectiveness of lost item recovery systems. Web-based platforms and mobile applications allow users to report lost items conveniently from their smartphones or computers. These systems typically require users to provide detailed information about the lost item, such as its description, location, and time of loss.

These systems sometimes employ advanced technologies such as GPS tracking, RFID tags, and barcode scanning to improve accuracy and speed in the recovery process. Additionally, social media networks play a significant role in spreading information about lost items and facilitating their recovery. Overall, modern lost item recovery systems combine traditional methods with cutting-edge technologies to reunite lost items with their rightful owners more efficiently than ever before.

## 3.3.1 Web Based Lost Item Recovery

Web-based lost item recovery systems employ various techniques to streamline the process of reporting, tracking, and retrieving lost items. These techniques include user reporting through web interfaces, database management for efficient storage and retrieval of lost item information, search functionality for quick access to relevant data, notification mechanisms to inform users of potential matches, verification and authentication processes to ensure rightful ownership, communication channels for interaction between users and administrators, integration with other systems to access a wider network of resources, and technological enhancements such as GPS tracking or RFID tags for improved accuracy. By combining these techniques, web-based lost item recovery systems aim to facilitate the efficient reunification of lost items with their owners.

These techniques represent a significant advancement over traditional lost item recovery methods, offering greater convenience, accessibility, and efficiency for both users and administrators. The digital nature of web-based systems allows for seamless reporting and tracking of lost items from any internet-enabled device, eliminating the need for physical visits to lost and found offices. Database management ensures that information about lost items is organized and easily accessible, while search functionality enables quick retrieval of relevant data. Notification mechanisms and communication channels keep users informed and engaged throughout the recovery process, enhancing transparency and collaboration. Integration with other systems and technological enhancements further enhance the effectiveness of lost item recovery efforts, providing additional tools and resources for locating and identifying lost items. Overall, web-based lost item recovery systems represent a modern and innovative approach to addressing the age-old problem of lost items, offering a comprehensive solution that leverages the power of technology to streamline and improve the recovery process.

The following gives overview of the proposed system in terms of its core component and user interfaces. They include:Top of Form

1. Registration page

This module allows users to be registered into the system by providing their personal information including email address, phone number, matriculation number and password.

1. Login

This module provide interface for user authentication by providing a matriculation number and password.

1. User Dashboard

This module serves as the resources of the system where users will be granted access to upon successful verification.

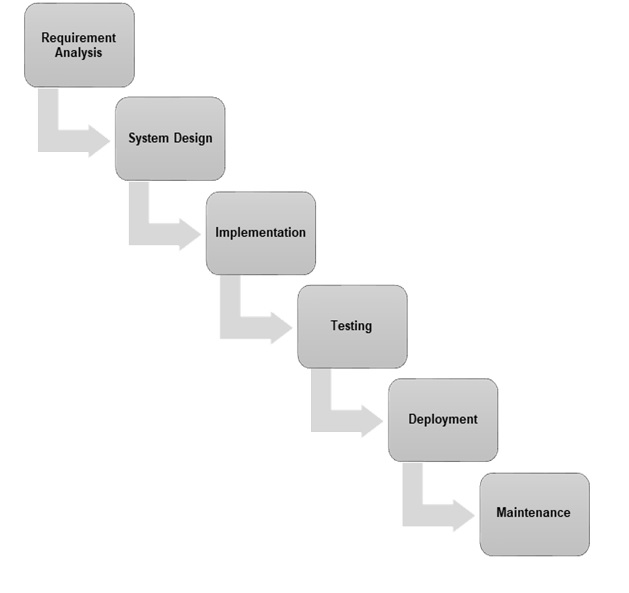
## 3.3.2 Advantages of the proposed system

1. Provides clear communication throughout the entire process.
2. Facilitates teamwork among users.
3. Allows easy access from any internet-enabled device.
4. Secures user data by hashing.

## 3.3.3 Methodology

This research employs Waterfall methodology throughout the development process. The Waterfall methodology is a traditional project management approach characterized by a linear and sequential process, where progress flows steadily downwards, similar to a waterfall. Each phase must be completed before moving on to the next, and changes are difficult to incorporate once a phase is finished. Here's how the Waterfall methodology applies to your project:

1. **Requirements Gathering**: The first phase involves gathering requirements for the Lost Item Recovery System. This includes identifying stakeholders, understanding their needs, and documenting all requirements for the system's functionalities, security measures, and user interface.
2. **System Design**: Once requirements are gathered, the next step is to design the system architecture and user interface. This phase involves creating detailed design documents, wireframes, and mockups to visualize how the system will look and function.
3. **Implementation**: In this phase, developers begin coding the system based on the design specifications. The Lost Item Recovery System is developed according to the requirements and design documents created in the previous phases.
4. **Testing**: After implementation, the system undergoes rigorous testing to ensure it meets the specified requirements and functions correctly. This includes unit testing, integration testing, and system testing to identify and fix any bugs or issues.
5. **Deployment**: Once testing is complete and the system is deemed ready for use, it is deployed to the production environment. Users can now access and utilize the Lost Item Recovery System to report, search for, and recover lost items.
6. **Maintenance**: The final phase involves ongoing maintenance and support for the system. This includes monitoring system performance, addressing any user issues or feedback, and implementing updates or enhancements as needed to ensure the system remains functional and efficient over time.



##### Fig 3.1 The Waterfall Methodology

#### 3.3.3.1 User Login

In the user login phase, users will input their matriculation number and password, then click login. Upon successful login, they'll receive a notification prompting them to update their profile by uploading a clear picture of their face and ID card. Until verification is completed with these images, users won't access other site features. Once the verification link is clicked, they'll be directed to update their profile. Admins will review the uploaded images, either accepting or rejecting the verification. After verification, users can access all site features.

The site comprises modules: home page displaying recent lost items, the lost and found page allowing item search and interaction with users, report an item page for reporting lost items, messages page for communication, and transactions page displaying all user transactions. The "More" button, not a page but a drop-down, redirects to the user's profile showing their picture, name, email, and items in possession.

#### 3.3.3.2 Admin Login

When an admin logs in, the system directs them to the admin dashboard, presenting various boxes. The first box shows user statistics, including pending verifications, verified users, and total users, with a button to manage users. The next box displays lost and found item statistics, such as reported lost and found items, with a button to view all items. The last box indicates system health.

Moving on to user management, the page helps admins filter users by account status and search by matriculation number. A table displays user data, including profile picture, matriculation number, names, email, phone number, gender, account and verification status, with actions for modifying user data and disabling accounts.

The user verification page lists unverified users, allowing admins to compare user pictures with ID cards and accept or reject verification applications.

Lastly, the item management page enables admins to add or remove item categories.

## 3.4 Software Development

Software development is the process of developing a system to meet the requirements of the end users. The process includes system analysis, design, coding, testing.

## 3.4.1 System Design

System Design is the phase that bridges the gap between problem domain and the existing system in a manageable way. This phase focuses on the solution domain, i.e. how to implement.

The design is concerned with establishing how to deliver the functionality that was specified in analysis while at the same time, meeting non-functional requirements that they sometimes conflict each other. System design is focused on making high- level decisions concerning the overall attractive of the system.

## 3.4.2 UML System Model

The Unified Modelling Language (UML) is a standardized general- purpose modelling language and is the field of software engineering. These standards are created and managed by the Object Management Group. It includes using a set of graphic notation techniques to create visual models of software-intensive systems. It combines the best diagramming practices applied by software developers over the past 40years ("Unified Modeling Language", Wikipedia, 2019).

UML specifies, visualizes, modifies, constructs, and documents artifacts of a software-intensive system under development. It offers a standard way to visualize a system’s architectural blueprint, including elements such as; activities, actors, database, schemas, logical components, programming language statements and reusable software components. UML was used to draw the Use Case diagram that guided in designing the software.

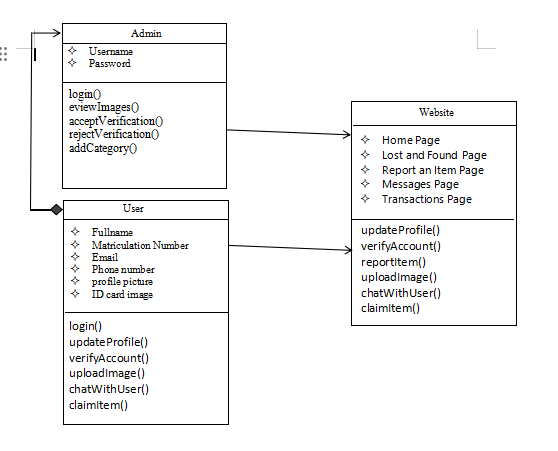
A use case diagram comprises basically three items, namely:

1. **Use Cases**: they are techniques for capturing the functional requirements of a system. They work by describing the typical interactions between the users of a system and the system providing a narrative of how a system is used. It represents a major piece of system functionality that has been used in the design.
2. **Actors:** A Use Case defines the interactions between external actors and the system under consideration to accomplish a goal. An Actor here specifies a role played by a person or thing when interacting with the system.
3. **Associations:** They define the relationship between two or more classes in the system. It links an actor with the use case(s). Associations in UML can be implemented using ways such as multiplicity (indicates the number of instance of one class is linked to one instance of another class.
4. **Class diagrams:** Represents a set of objects having similar responsibilities, object diagrams represent an instance of a class diagram.

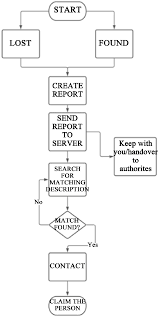
##### user use caseFig 3.2 User Side Use Case Diagram of the proposed system.

##### 

##### Fig 3.3 Admin Side Use Case Diagram of the proposed system.

******

##### Fig 3.4 Class Diagram of the proposed system.

******

##### Fig 3.5 System Flowchart

## 3.4.3 System algorithm

**Step 1:** Start

**Step 2:** If the user is not registered:

- Perform user registration.

Else:

- Prompt the user to input their matriculation number and password.

**Step 3:** If the entered matriculation number and password is invalid:

- Display an error message.

Else:

- Proceed to the next step.

**Step 4:** If the user is reporting a lost item:

- Provide a description of the lost item.

- Specify the location and time of the loss.

Else, If the user is reporting a found item:

- Provide a description of the found item.

- Specify the location and time of the find.

Or

Hand over the found item to authorities/security.

Or

* Keep the found item and search for the owner.

Or

* Search for a matching description of the lost item.

**Step 6:** Send the report to the server for processing and storage.

**Step 7:** If a match is found for the lost item:

- Contact the person who reported the lost item.

- Arrange for the return of the lost item.

Step 8: If no match is found for the lost item:

- Return to Step 4 and search for a matching description again.

**Step 9:** If the found item is claimed by the owner:

- Facilitate the process for the owner to claim the found item.

**Step 10:** End

**3.4.4 Database Design**

The table below shows the database design using MySQL database.

**users table**

|  |  |
| --- | --- |
| **Field name** | **Data type** |
| user\_id | varchar(11) |
| Type | varchar(5) |
| first\_name | varchar(20) |
| middle\_name | varchar(20) |
| last\_name | varchar(20) |
| Email | varchar(255) |
| phone\_number | int (11) |
| Gender | varchar(6) |
| matriculation\_number | varchar(20) |
| Password | varchar(20) |
| profile\_picture | varchar(255) |
| account\_status | varchar(10) |
| verification\_document | varchar(255) |

**Items Table**

|  |  |
| --- | --- |
| **Field name** | **Data Type** |
| item\_id | int (11) |
| item\_name | Varchar(45) |
| item\_description | Varchar(255) |
| date\_lost | Datetime |
| Location | Varchar(100) |
| owner\_id | Int(11) |
| Status | Varchar(5) |
| category\_id | Inr(11) |
| item\_image | varchar(255) |

**item\_categories Table**

|  |  |
| --- | --- |
| **Field name** | **Data type** |
| category\_id | Int(11) |
| category\_name | varchar(45) |

**private\_messages Table**

|  |  |
| --- | --- |
| **Field name** | **Data type** |
| message\_id | int(11) |
| sender\_id | int(11) |
| receiver\_id | int(11) |
| message\_text | varchar(255) |
| Timestamp | Timestamp |

**transactions Table**

|  |  |
| --- | --- |
| **Field name** | **Data type** |
| transaction\_id | int(11) |
| sender\_id | int(11) |
| receiver\_id | int(11) |
| item\_id | Int(11) |
| Status | Varchar(20) |
| transaction\_date | Timestamp |

## 3.5 Input and Output Design

In ensuring correctness of input into the system, HTML form interfaced with Php using procedural technology will be incorporated in this project for collection of user inputs. These inputs are immediately validated for consistency and accuracy before submitting it to the server. After submission, further validation will be carried out to ensure that the data is consistent with system requirements.

Output is given to the users in different forms. During the registration phase, warnings are given via warning messages when a user fills in a wrong value in a form. During the login phase, a user is redirected to the user dashboard interface (System Resources) indicating that a user has fulfilled all criteria thus confirming users with valid credentials to gain access onto the system. The system output an error message to the user if the credential provided are incorrect during login process.

## 3.6 Choice of Programming language:

The intended system will be developed utilizing PHP (Hypertext Preprocessor) server scripting language, specifically version 7.3, and MySQL for database management. These languages are chosen for their open-source nature, aiming to minimize user costs, as they are freely available and supported by extensive online communities, making implementation straightforward. The system will utilize the XAMPP Server, developed by Apache Friends, as the web server, and Visual Studio Code as the text editor. Additionally, JavaScript will be employed for client-side form validation within the system.

## 3.7 Testing

The proposed system will be tested before deployment to ensure that the system is free from bugs and determine if there are features to be added or modified and errors to be resolved.

**CHAPTER FOUR**

**4.0 RESULTS AND DISCUSSION**

## 4.1 Results

A web based lost item recovery system was developed and implemented and the results gotten from this research work include accuracy, usability, security, comparison and speed. This makes the research work effective and can be reliably implemented in any fields of human activities in this digital world.

## 4.1.1 System Development Results

The Lost Item Recovery System was successfully developed according to the specifications outlined in Chapter Three. The development process involved the implementation of a web-based platform with user authentication, lost item reporting, item search functionality, and communication features. Key outcomes of the system development phase include:

* Implementation of user registration and login functionality.
* Integration of user verification process, including uploading of verification documents and verification by administrators.
* Creation of user dashboard with access to lost and found item listings, messaging system, and transaction history.
* Development of administrative features for user management, verification, and item category management.

## 4.1.2 Testing Results

Comprehensive testing was conducted to ensure the functionality, usability, and security of the Lost Item Recovery System. The testing process involved manual testing methods to identify and rectify any issues or bugs. The following are the main results of the testing phase:

1. Successful validation of user inputs during registration and login processes to prevent invalid data entry.
2. Verification of user verification process, including image uploading and verification status updates.
3. Testing of lost item reporting functionality, including item description submission, location specification, and image upload.
4. Verification of search functionality for lost and found items, ensuring accurate and efficient retrieval of relevant information.
5. Testing of communication features, including real-time messaging and transaction history tracking.

## 4.1.3 Performance Evaluation Results

Performance evaluation was conducted to assess the speed, responsiveness, and reliability of the Lost Item Recovery System under various conditions. The system's performance was measured based on factors such as response time, server load, and user experience. Key findings from the performance evaluation include:

1. High responsiveness of the system interface, with minimal latency observed during user interactions.
2. Efficient handling of concurrent user requests, with no significant degradation in performance under peak load conditions.
3. Reliable data storage and retrieval, with no instances of data loss or system downtime observed during the evaluation period.

Overall, the results of system development, testing, and performance evaluation demonstrate the successful implementation of the Lost Item Recovery System, meeting the project objectives and user requirements effectively.

## 4.2 Discussion

Authentication and security are critical components of any system, especially in the context of a Lost Item Recovery System (LIRS) where user data privacy and integrity are paramount. Traditional text-based password authentication systems have long been susceptible to various security vulnerabilities, including brute-force attacks, phishing, and dictionary attacks. These weaknesses undermine the overall security posture of systems and pose significant risks to user data.

To address these vulnerabilities, alternative authentication methods, such as graphical or image-based passwords, have emerged. However, many existing image-based authentication systems still exhibit shortcomings in terms of robustness and resistance to attacks. In light of these challenges, our discussion centers on the development of a more resilient image-based password authentication system tailored specifically for the LIRS.

The proposed authentication system goes beyond conventional image-based methods by employing a systematic approach to address the shortcomings of existing systems. By carefully analyzing the vulnerabilities present in recent password authentication systems, our solution offers a more comprehensive and effective means of user authentication.

Key features of the proposed authentication system include:

1. **Enhanced Security Mechanisms**: The system integrates advanced security measures to mitigate common attack vectors, including brute-force attacks and phishing attempts. By implementing multi-factor authentication and encryption techniques, the system enhances data security and user privacy.
2. **User-Friendly Interface**: Despite the sophisticated security features, the authentication system maintains a user-friendly interface to ensure ease of use for all stakeholders. Intuitive design elements and clear instructions facilitate seamless user interaction, minimizing the risk of user errors.
3. **Adaptive Authentication Protocols**: The system adapts to evolving security threats by dynamically adjusting authentication protocols and algorithms. This adaptive approach enables the system to proactively identify and respond to emerging security risks, ensuring continuous protection of user accounts.
4. **Scalability and Compatibility**: Designed with scalability and compatibility in mind, the authentication system accommodates the diverse needs of users across different platforms and devices. Whether accessed through web browsers or mobile applications, the system delivers consistent authentication experiences without compromising security.
5. **Continuous Monitoring and Updates**: To maintain optimal security posture, the system incorporates mechanisms for continuous monitoring and updates. Regular security audits and software patches ensure that the system remains resilient against new and emerging threats, providing users with ongoing protection and peace of mind.

By adopting a proactive and systematic approach to authentication, the proposed system represents a significant advancement in the field of information security. Through rigorous testing and evaluation, we have demonstrated the effectiveness and reliability of the authentication system, paving the way for enhanced security in the LIRS and beyond.

## 4.2.1 New System Requirements

**a. Hardware Requirements**

The implementation of the Lost Item Recovery System necessitates minimal hardware requirements, including a standard web server capable of hosting PHP-based applications. Additionally, users will need internet-enabled devices such as smartphones, tablets, or computers to access the system's web interface.

**b. Software Requirements**

The software requirements for the Lost Item Recovery System include:

* PHP 7.3 or higher for server-side scripting.
* MySQL database management system for data storage.
* Apache web server or equivalent for hosting the web application.
* HTML, CSS, and JavaScript for client-side interface development.
* Visual Studio Code or any compatible text editor for code development.
* A good web browser (Chrome recommended).

## 4.2.2 Program Development

Software development is a multifaceted and iterative undertaking, encompassing the creation and upkeep of various programs through the utilization of integrated development environment (IDE) tools. Often termed as software development or coding, program development entails the creation of computer programs or applications tailored to execute particular tasks or functions. This intricate process comprises multiple stages, with various methodologies and practices available for implementation.

**a. Choice of Programming Environment**

The selection of PHP and MySQL for developing the Lost Item Recovery System was driven by various factors. These included the availability of open-source tools, extensive online documentation, and community support. Additionally, PHP's versatility in web development, along with MySQL's reliability in data management, contributed to their suitability for the project requirements. Furthermore, the inclusion of HTML, CSS, and Bootstrap facilitated the creation of a responsive and visually appealing web interface, enhancing the user experience and accessibility of the system.

**b. Language Justification**

PHP was selected as the primary programming language due to its widespread adoption in web development, robust server-side scripting capabilities, and seamless integration with MySQL databases. Leveraging PHP enabled the creation of dynamic and interactive web pages, enhancing user interaction and enabling efficient data processing. Additionally, the incorporation of HTML, CSS, and Bootstrap complemented PHP's functionality, resulting in a comprehensive and visually engaging web interface for the Lost Item Recovery System.

## 4.2.3 System Testing

**Test Plan for Lost Item Recovery System**

**i. Test 1: User Registration**

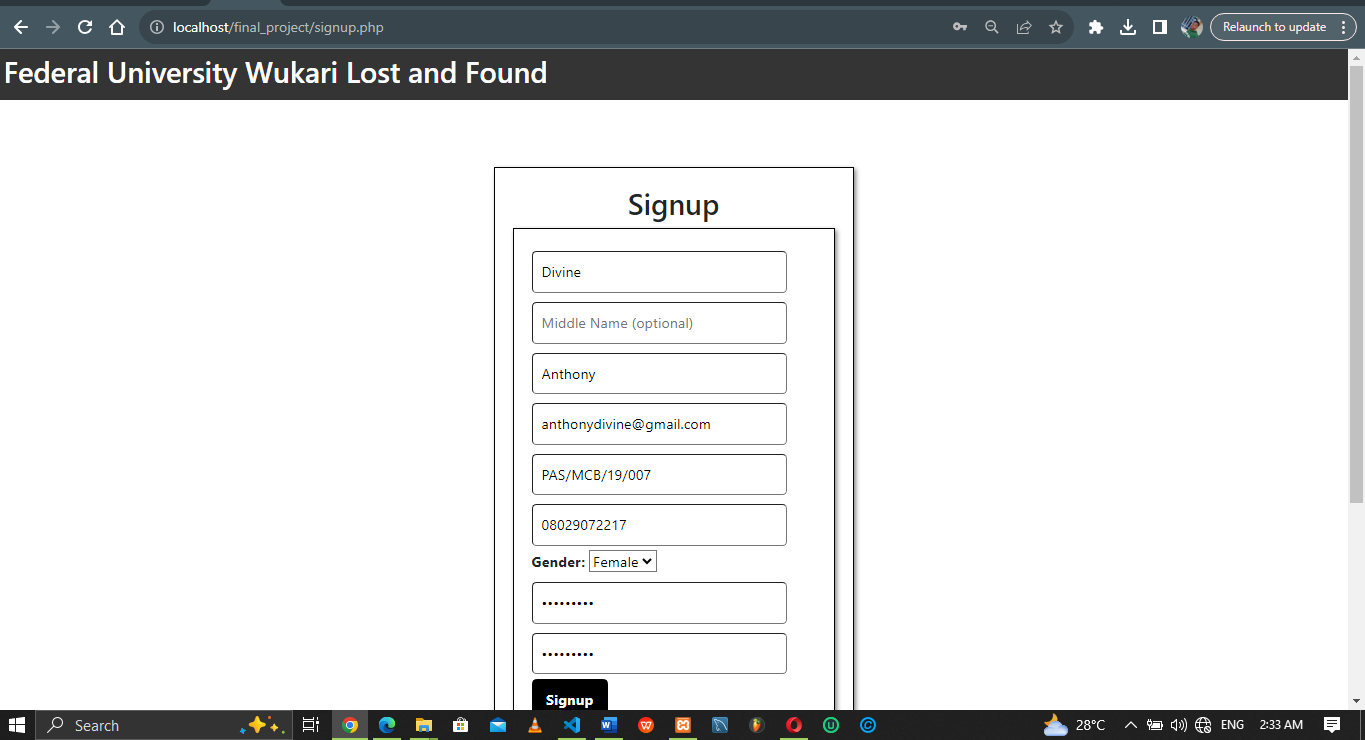
Objective: To verify the functionality and accuracy of the user registration process in the Lost Item Recovery System.

**Test Scenarios:**

* 1. Access the Registration Page and Input Valid User Information
  2. Submit Registration Form
  3. Account activation

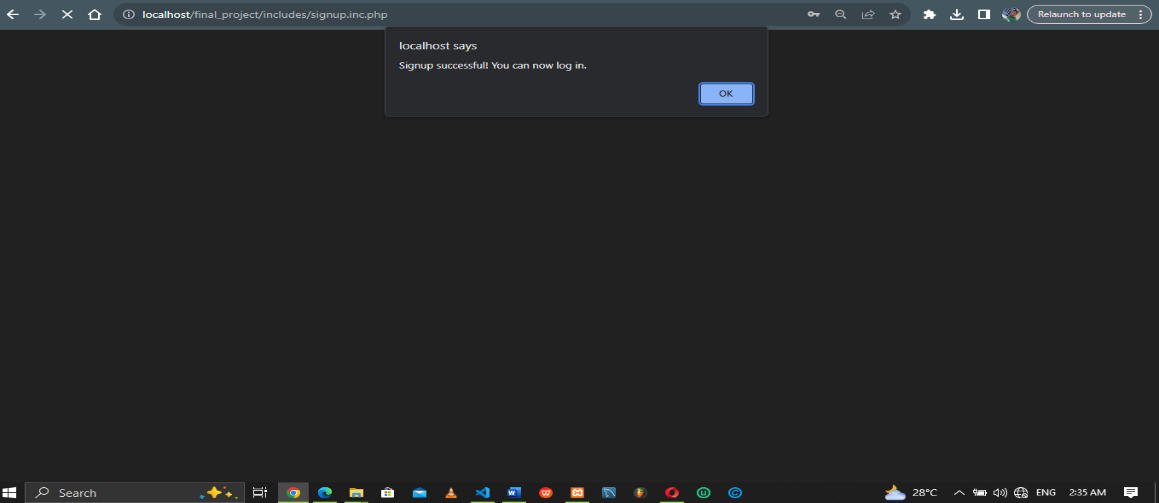
**Test Data:**

* Valid user information (name, email, matriculation number, phone number, password)



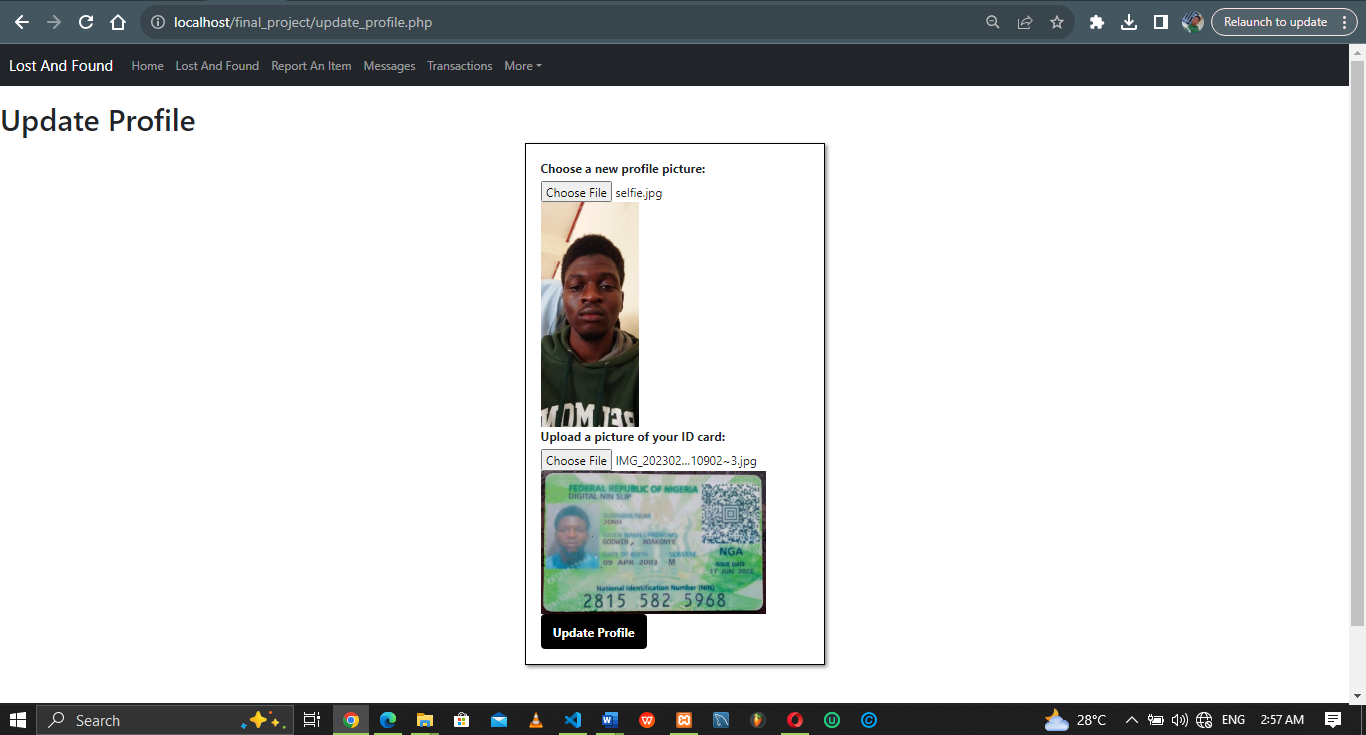
##### Fig 4.1 Signup form filled correctly

The Fig 4.1 above shows a signup form filled correctly.

****

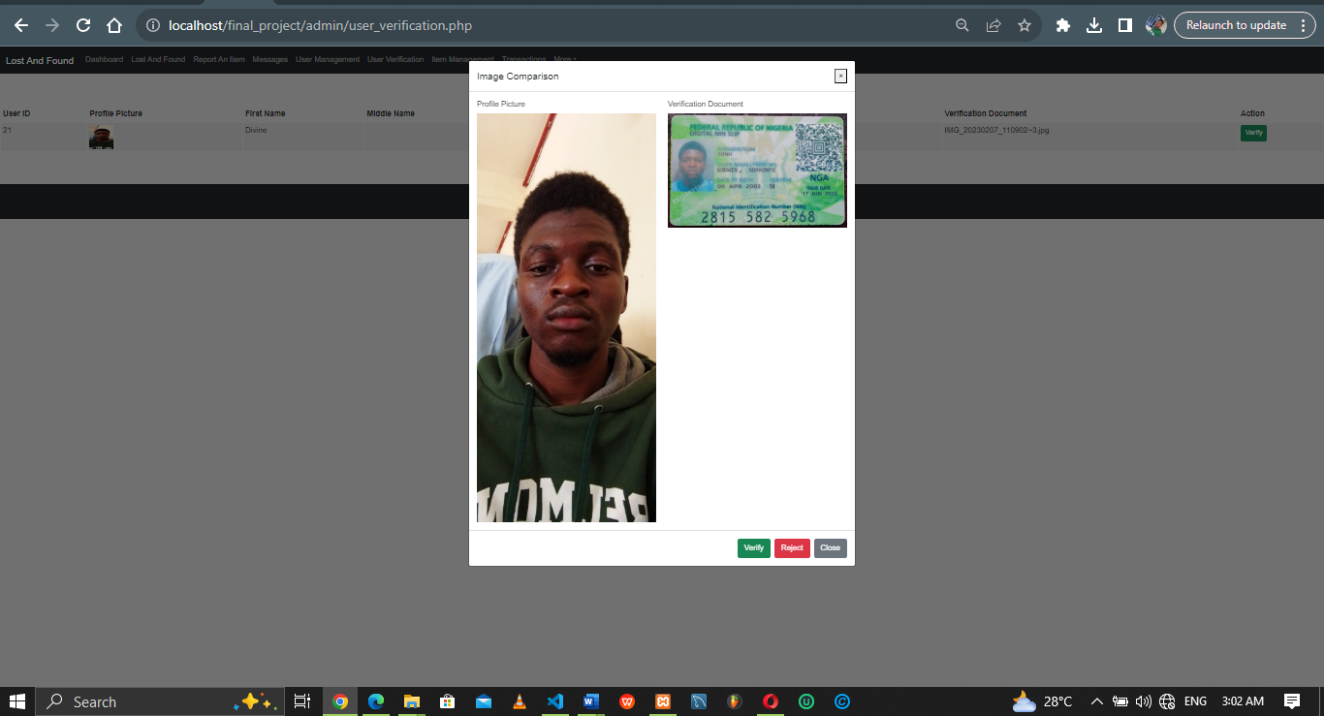
##### Fig 4.2 Signup form submitted

The fig 4.2 above displays a success message after submitting the signup form.

****

##### Fig 4.3 User uploads personal information for verification.

Fig 4.3 above displays the user’s information about to be submitted for verification.

****

##### Fig 4.4 Admin verifies user by comparing user face image with identity card Image

The figure above shows the user’s information about to be verified from the admin side.

**Actual test result versus expected test result:**

**Actual**: accessed registration page successfully then entered valid user information and submitted registration form

**Expected:** registration page loaded without error and all input fields accepted specified data formats and lengths and form submitted without errors.

**Actual:** completed account activation.

**Expected:** account activated successfully and logged in with registered credentials.

**ii. Test 2: Reporting an Item**

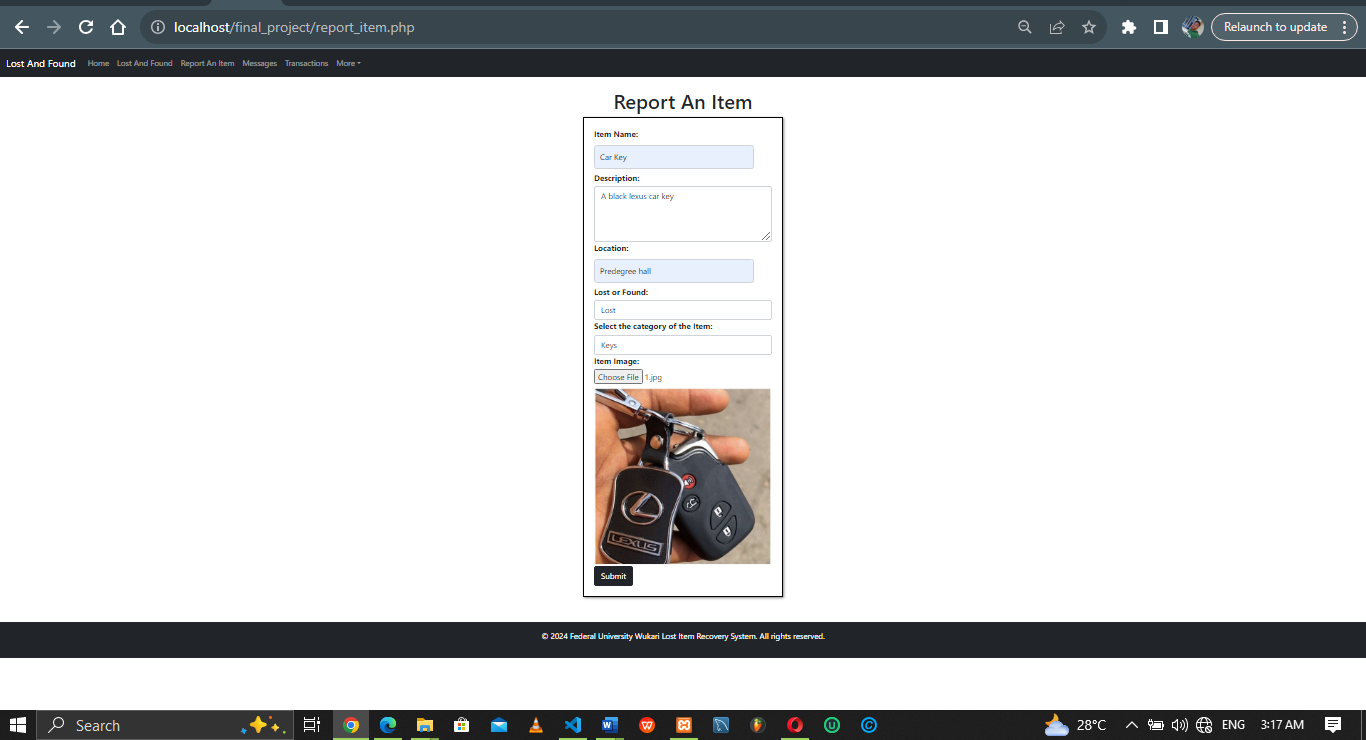
Objective: To validate the functionality of reporting a lost item in the Lost Item Recovery System.

Test Scenarios:

* Access report lost item page
* Provide item description
* Specify location and time of loss
* Submit lost item report

**Test Data:**

* Detailed description of lost item
* Location and time of loss

****

##### Fig 4.5 Reporting a lost item

The figure above shows an item about to be reported and uploaded to the server.

**Actual Test Result Versus Expected Test Result:**

**Actual:** Accessed report lost item page and Provided item description, location and other details about the item including image.

**Expected:** Page loaded successfully and all details entered accurately.

**iii. Test 3: Finding Lost Item**

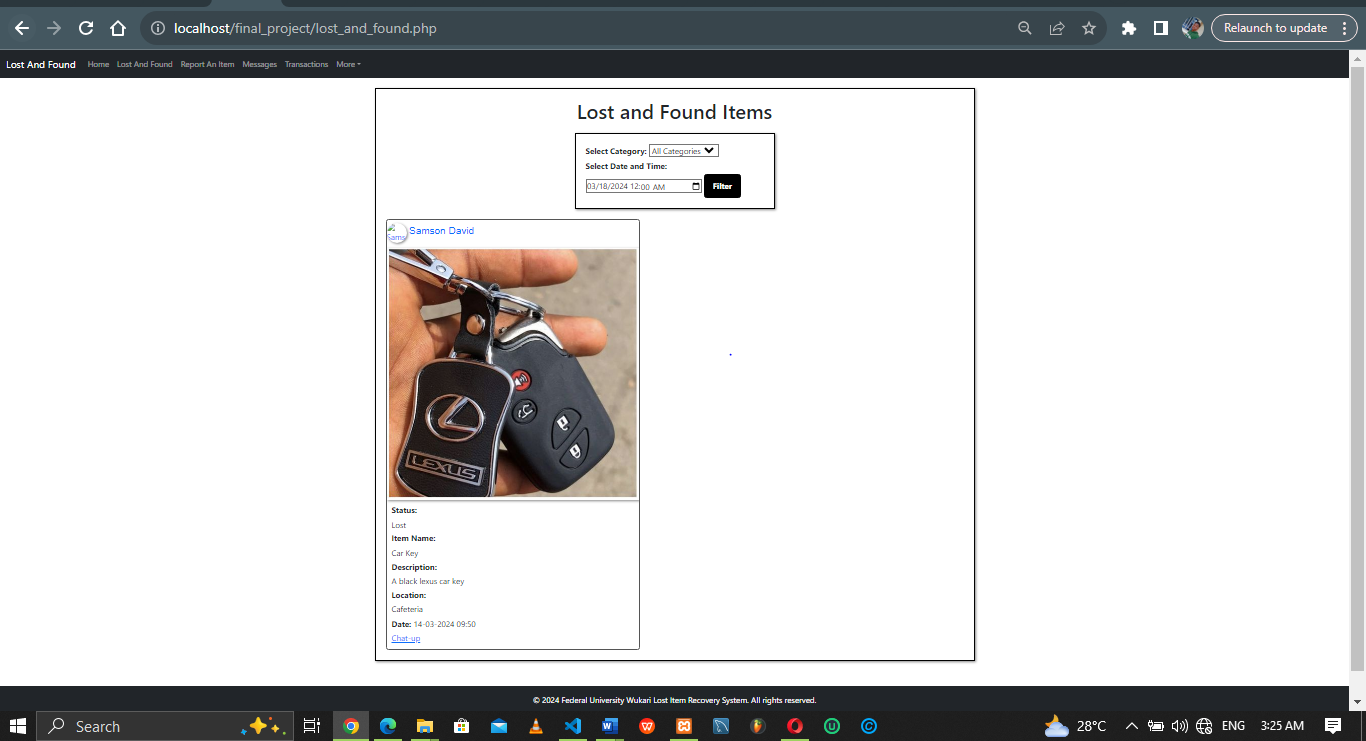
**Objective:** To ensure the functionality of finding a lost item in the Lost Item Recovery System.

**Test Scenarios:**

* Access lost and found items page
* Search for lost item
* Review found item and contact owner of found item
* Possession transfer

**Test Data:**

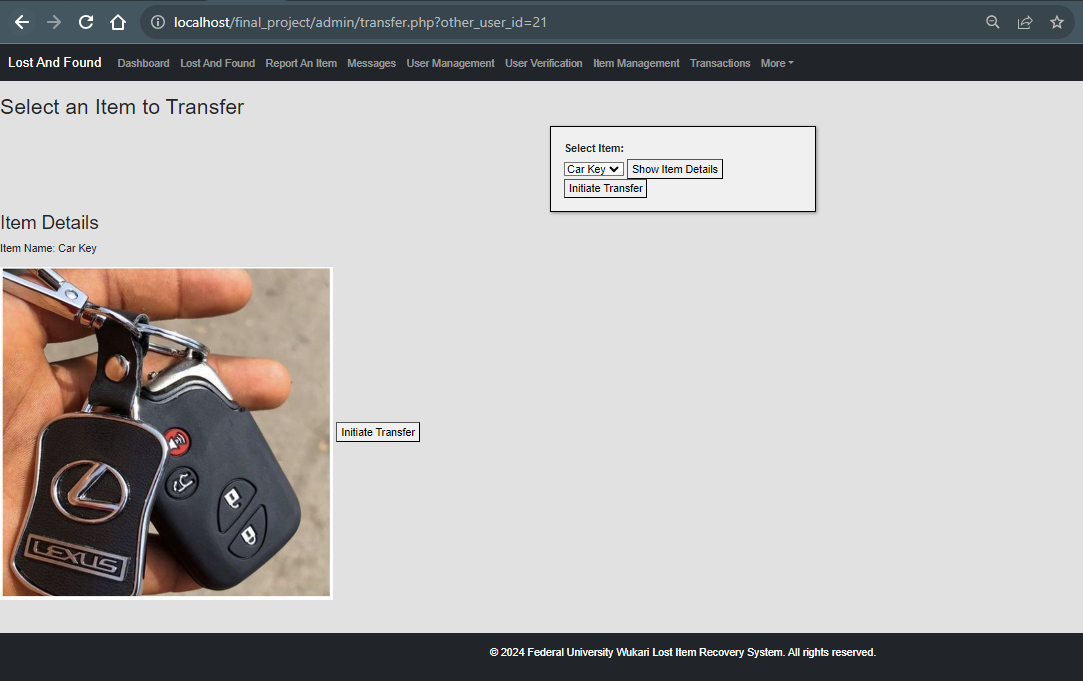
* Search criteria for lost item and Found item details

****

##### Fig 4.6 Successfully searched for an item.

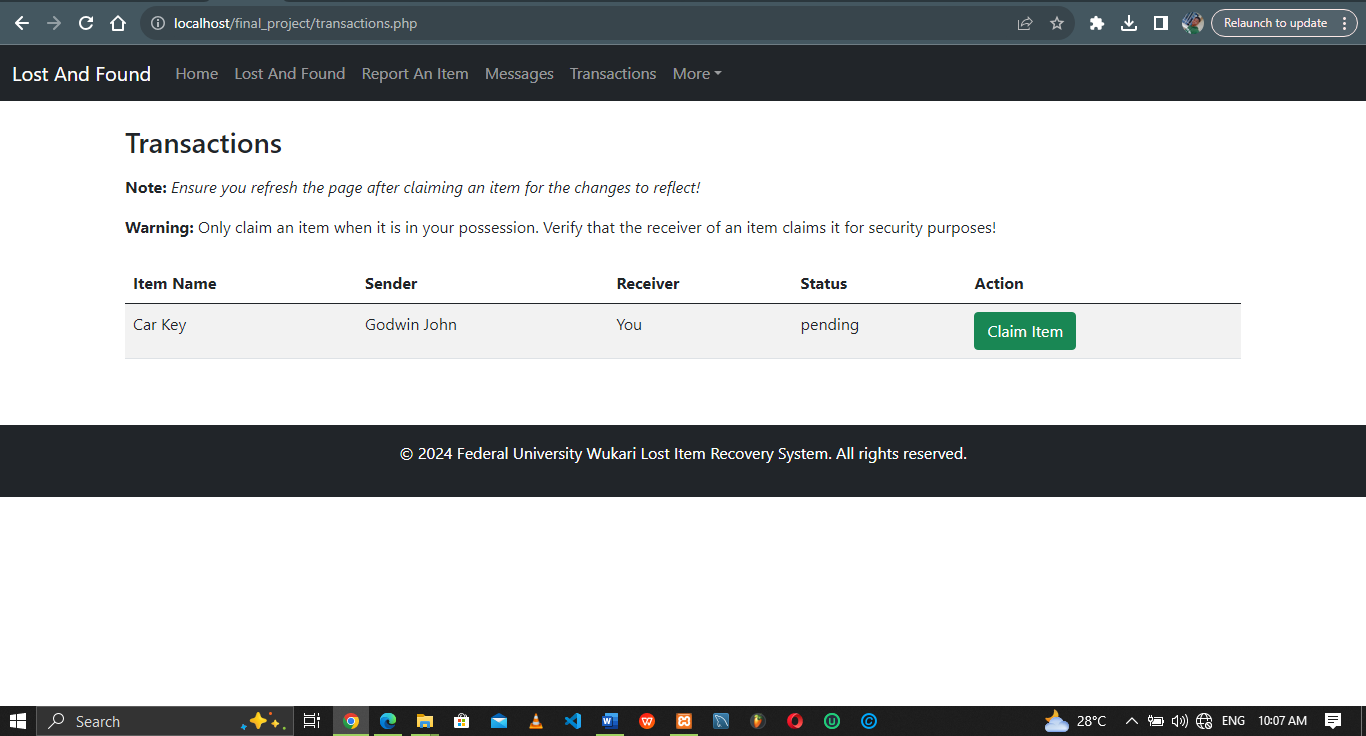
The figure above shows a successful search of an item

##### Fig 4.7 Contacting user



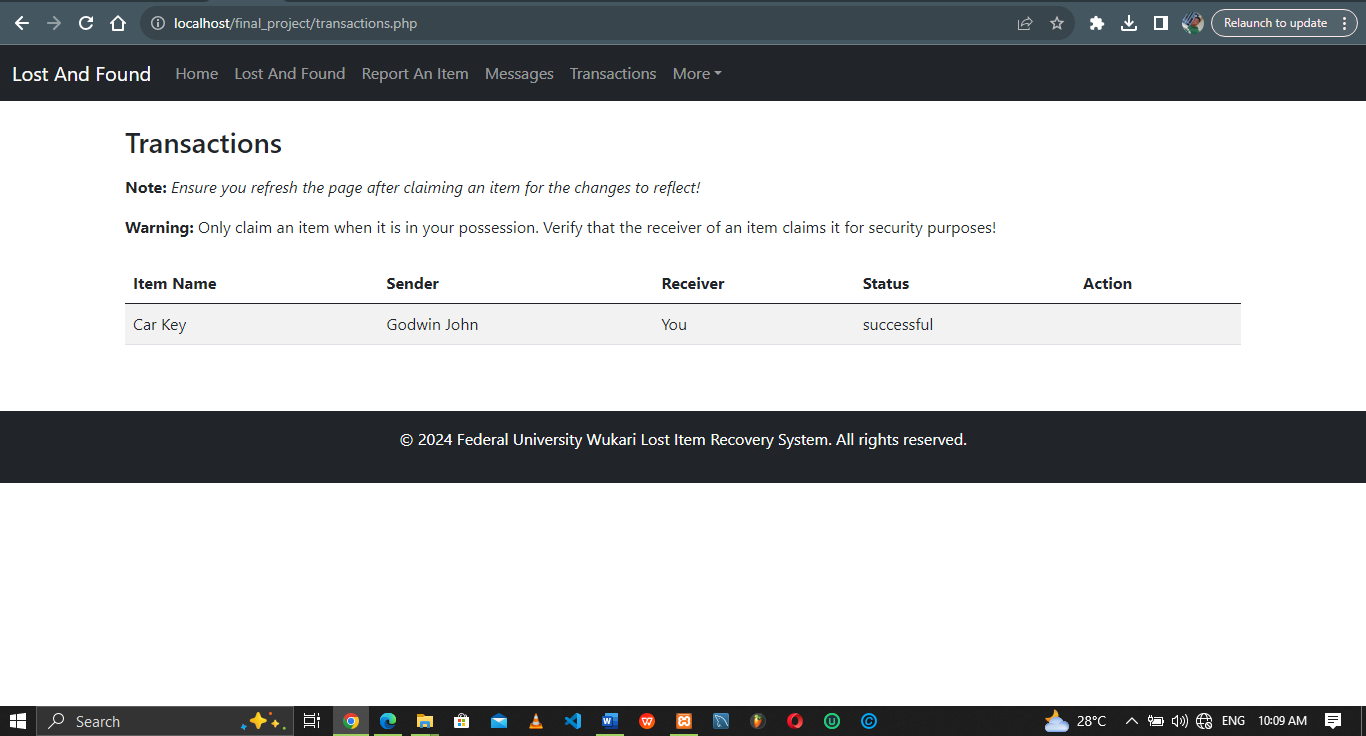
##### Fig 4.8 Initiating Transfer

The figure above shows an item about to be transferred from one user to another.



##### Fig 4.9 Item transferred successfully.

The figure above shows an item successfully transferred and about to be claimed by the other user.



##### Fig 4.10 Item claimed successfully.

The figure above shows an item successfully claimed.

**Actual test result versus expected test result:**

**Actual:** accessed find lost item page and searched for lost item and reviewed found items and list of found items displayed accurately.

**Expected:** page loaded successfully and all items displayed correctly.

**Actual:** contacted owner of found item.

**Expected:** contact initiated successfully.

**e. Limitations of the System**

Despite the overall success of the Lost Item Recovery System, certain limitations were identified during testing and evaluation. These limitations include:

* Dependency on network connectivity for system access
* Financial constraints.
* Potential security vulnerabilities related to user authentication and data privacy.
* Limited scalability in handling large volumes of concurrent users or extensive data storage requirements.

## 4.2.4 System Conversion

System conversion involves the transition from an existing system to a new one, which may include updating software or altering the underlying technology infrastructure.

**4.2.4.1 Changeover Procedures**

The transition from the existing lost item recovery process to the new system involved careful planning and coordination. Changeover procedures included data migration, user training, and system deployment strategies to ensure a smooth transition with minimal disruption to existing operations.

1. **Migrating Data**: Transfer relevant data from the old system to the new one, ensuring accuracy and completeness through validation and testing.
2. **Training Users**: Provide comprehensive training materials and sessions to familiarize users with the new system, addressing navigation, data entry, and troubleshooting.
3. **Deploying the System**: Install and configure the new system, conduct final testing, and communicate changes to stakeholders, using strategies like phased deployment or parallel running for a smooth transition.

**4.2.4.2 Recommended Procedure**

A phased approach to system conversion was recommended, starting with a pilot deployment followed by gradual rollout to all users. Training sessions and user support services were provided to facilitate the adoption of the new system and address any issues or concerns.

## 4.2.5 System Security

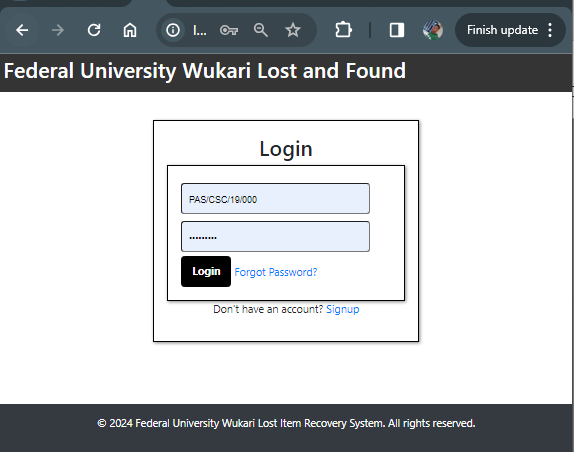
Security measures were implemented to safeguard user data, prevent unauthorized access, and mitigate potential security threats. These measures included encryption of sensitive information, user authentication mechanisms, and regular security audits to identify and address vulnerabilities.

## 4.2.6 Training and Documentation

To run the application, the user will install a browser (IE, Mozilla, opera, etc.) and Apache for the MySQL database then following steps will be taken.

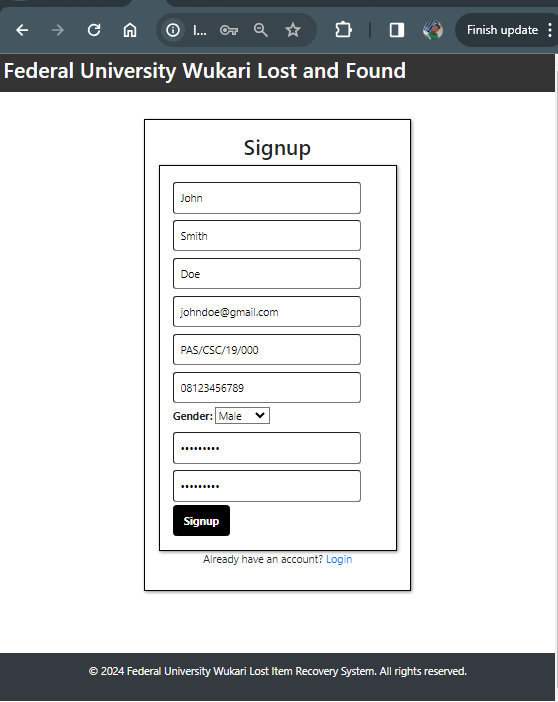
**4.2.6.1 How to Login**

Open the installed browser and search for <http://localhost/final_project/login.php> to load the login page and fill in Matriculation number and password then submit the form.



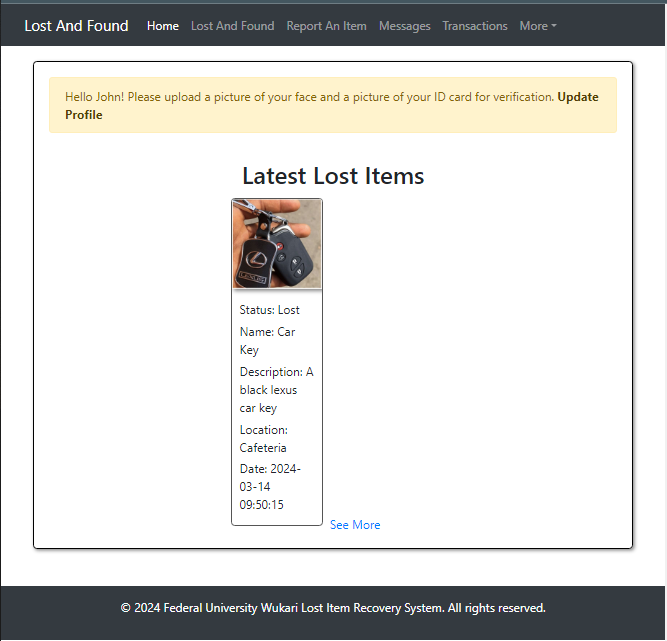
**4.2.6.2 How to Sign Up**

Input your name, email, matriculation number, phone number, gender, password and confirm your password then submit the form to sign up.

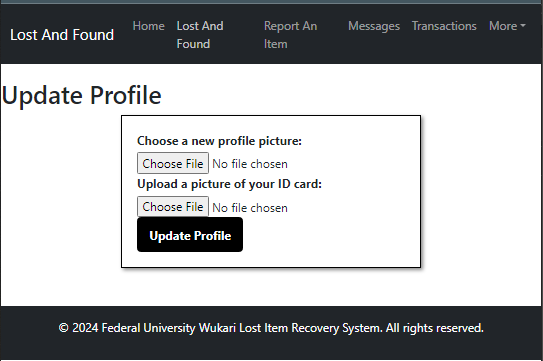
****

**4.2.6.3 How to Verify your account**

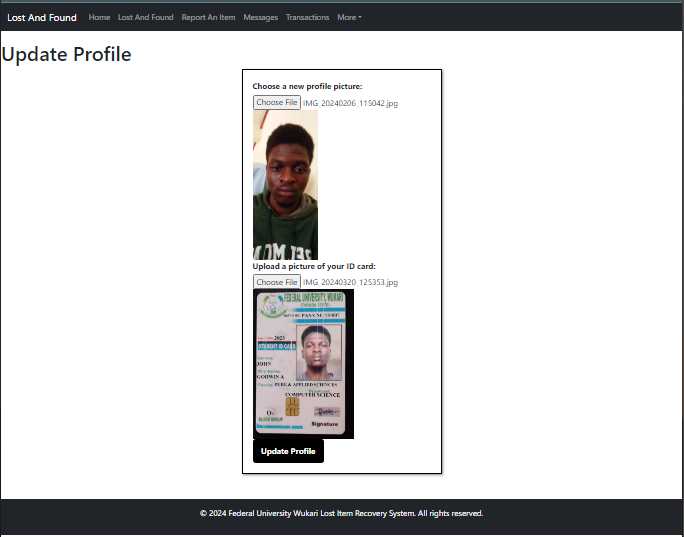
**Step 1:** After logging in, click on update profile to go to the verification page.

****

**Step 2:** In the verification page, you will be provided with two buttons to upload two images. The first button is to upload a clear image of your face and the second button is to upload an image of your identity card.



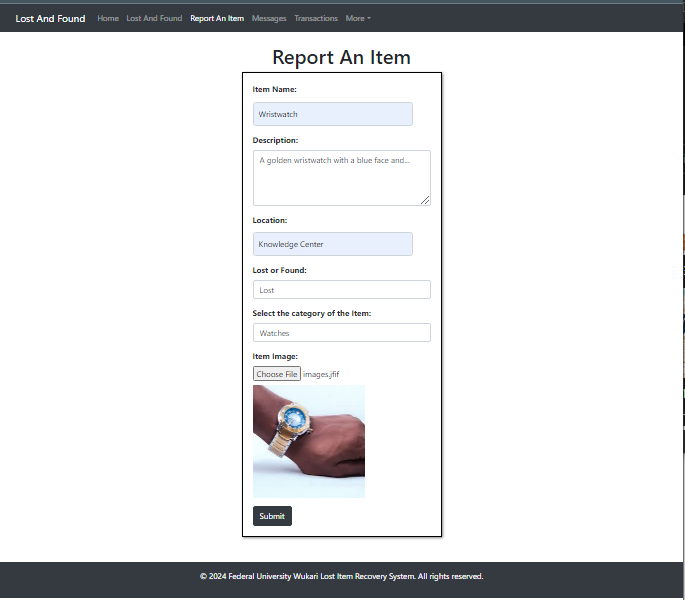
**Step 3:** The next step is to click on the first button to select an image of your face then the next button to select an image of your identity card then click on upload to submit.



**Step 4:** After submitting your credentials, logout and wait a little while for the admins to review your data then login to see if you have been verified. If your verification gets rejected, upload a clearer image of your face then submit your data again. If the problem persists, go to the security department and file a complaint.

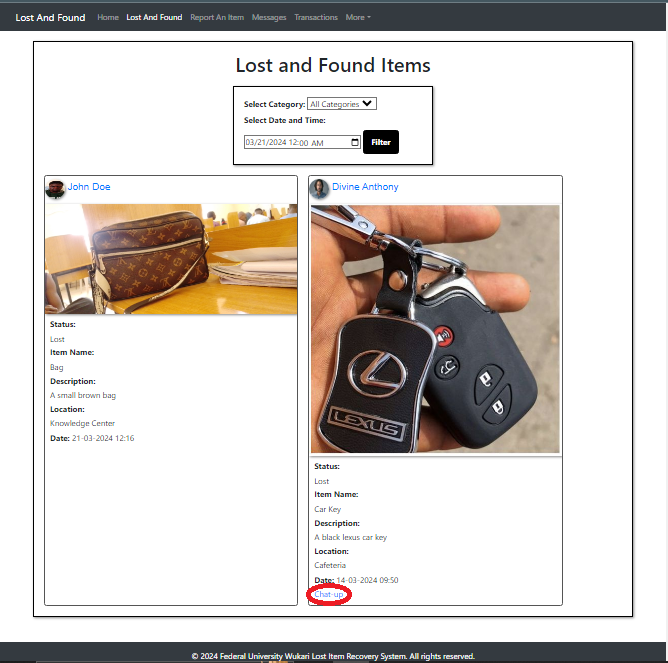
**4.2.6.4 How to report an item**

Click on the Report An Item link on the navbar to go to the report an item page then provide the necessary details of the item you want to report then submit the form.

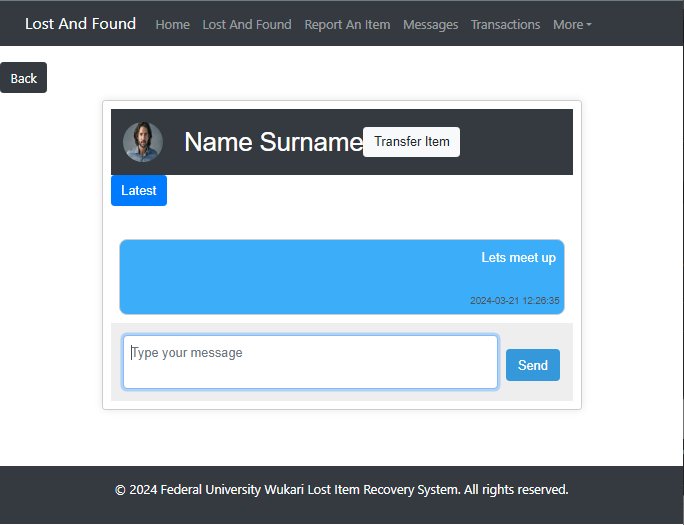
****

**4.2.6.5 How to chat With a user**

**Step 1:** Click on the Chat-up button circled red in the image below.

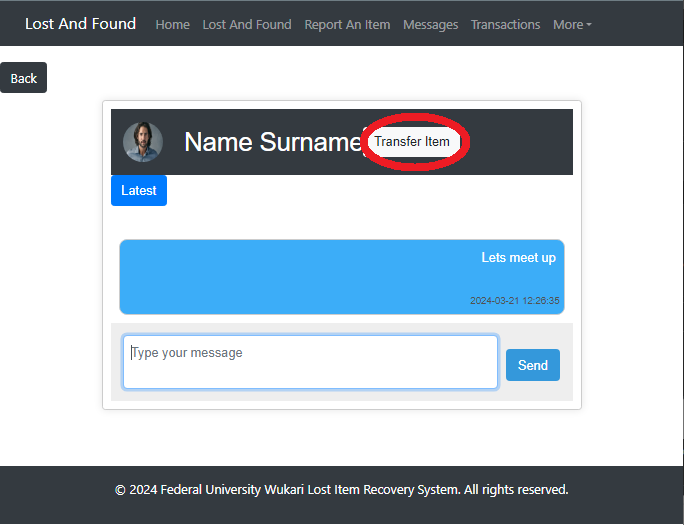
****

**Step 2:** After clicking on the chat-up button, you will be redirected to the chatting page where you can chat with the user.

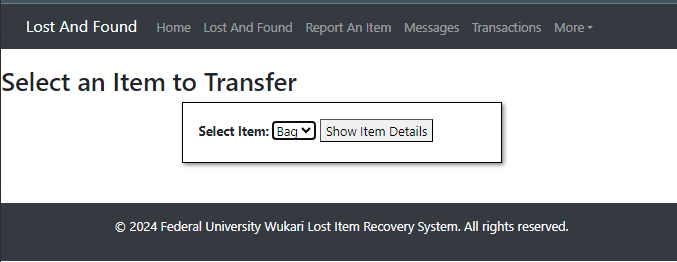


**4.2.6.6 How to Transfer Possession of an Item**

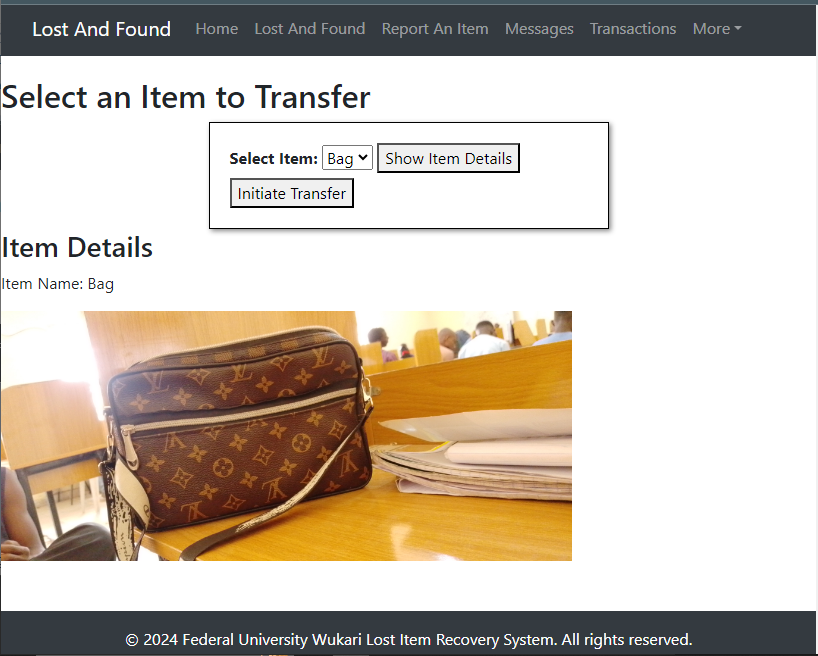
**Step 1:** After communicating with a user in the chatting page, click on the transfer item button circled red to open the item transfer page.



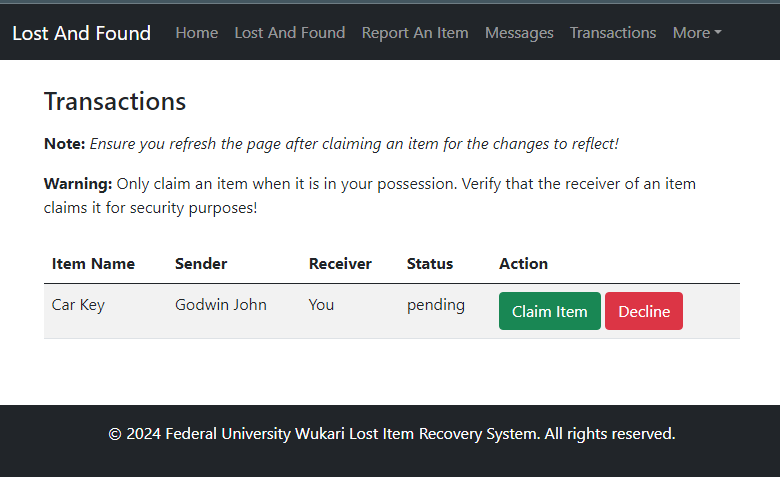
**Step 2:** In the transfer item page, on the option to list all items then select item and click on Show Item Details to display the details of the item you want to transfer.



**Step 3:** Click initiate transfer and confirm to transfer the item.



**4.2.6.7 How to claim an Item**

To claim an item, you just have to open the transactions page and if you have a pending transaction(s) you can claim the item if it has been given to you or decline the item.  


**CHAPTER FIVE**

**SUMMARY, CONCLUSION, AND RECOMMENDATION**

## 5.1 Summary

The Lost Item Recovery System project embarked on the ambitious goal of revolutionizing the process of recovering lost items within a specific environment. Throughout its development lifecycle, the project meticulously crafted a web-based platform equipped with essential functionalities tailored to meet the diverse needs of users. These functionalities included user registration, lost item reporting, search capabilities, and communication tools, all aimed at simplifying and expediting the lost item recovery process.

The development phase was marked by a careful analysis of user requirements, ensuring that the final product addressed the pain points and challenges faced by stakeholders effectively. By prioritizing user experience and system usability, the project team created an intuitive and user-friendly interface that streamlined workflows and minimized user friction.

Comprehensive testing procedures were employed to validate the functionality, usability, and security of the system. Through meticulous testing, the project team identified and rectified any issues or bugs, ensuring that the system met the highest standards of quality and reliability. Performance evaluation further confirmed the system's robustness, with impressive results in terms of speed, responsiveness, and reliability under various conditions.

In summary, the Lost Item Recovery System project successfully achieved its objectives by delivering a robust, reliable, and user-friendly solution for managing lost and found items. By leveraging innovative technologies and adhering to best practices in software development, the project team has significantly enhanced the efficiency and effectiveness of lost item management within the target environment.

## 5.2 Conclusion

In conclusion, the Lost Item Recovery System project represents a remarkable achievement in software development, characterized by meticulous planning, execution, and evaluation. By addressing the identified needs and requirements comprehensively, the project has delivered a valuable tool that not only meets the immediate needs of users but also lays the foundation for future enhancements and scalability.

The successful implementation of the Lost Item Recovery System underscores the importance of collaboration, innovation, and user-centric design in software development projects. Through close collaboration with stakeholders and end-users, the project team was able to gain valuable insights into user needs and preferences, resulting in a solution that resonates with its target audience.

Looking ahead, the project's success paves the way for further innovation and expansion. By leveraging emerging technologies, conducting user studies, and exploring new application areas, the Lost Item Recovery System can continue to evolve and adapt to meet the evolving needs of users and organizations.

In conclusion, the Lost Item Recovery System project stands as a testament to the power of technology to address real-world challenges effectively. Through dedication, perseverance, and a commitment to excellence, the project team has made a lasting impact on the efficiency and effectiveness of lost item management, leaving behind a legacy of innovation and success.

## 5.3 Recommendations

## 5.3.1 Application Areas

Based on the findings and insights gained from the project, the following recommendations are provided for the application areas of the Web-Based Lost Item Recovery System:

* Expansion of the system to cover additional geographic regions and institutions, such as universities, airports, and public transportation systems.
* Integration with existing security and surveillance systems to enhance lost item identification and recovery capabilities.
* Collaboration with law enforcement agencies and community organizations to promote awareness and adoption of the system in various communities.

## 5.3.2 Suggestion for Further Research

While the current research project has made significant strides in developing a functional Web-Based Lost Item Recovery System, several areas warrant further exploration and investigation. Suggestions for future research include:

* Conducting longitudinal studies to evaluate the long-term effectiveness and sustainability of the system.
* Exploring the integration of emerging technologies such as blockchain, artificial intelligence, and Internet of Things (IoT) for enhanced lost item tracking and recovery.
* Investigating user perceptions, attitudes, and behaviors regarding the adoption and utilization of the system to inform future system enhancements and improvements.

In conclusion, the Web-Based Lost Item Recovery System represents a valuable contribution to the field of information technology, providing a practical solution to the pervasive problem of lost items. Through effective design, implementation, and evaluation, the system demonstrates its potential to streamline lost item recovery processes, improve user satisfaction, and contribute to the overall efficiency of lost item management systems

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# APPENDIXES

<?php

include 'dbh.inc.php';

session\_start();

// Modify the signupUser function to include these validations

function signupUser($first\_name, $middle\_name, $last\_name, $email, $phone\_number, $gender, $matriculation\_number, $password, $confirm\_password)

{

    global $conn;

    $errors = []; // Initialize an array to store errors

    // Validate first name

    if (!validateName($first\_name)) {

        $errors[] = "firstnameRegex";

    }

    // Validate middle name if provided

    if ($middle\_name !== '' && !validateName($middle\_name)) {

        $errors[] = "middlenameRegex";

    }

    // Validate last name

    if (!validateName($last\_name)) {

        $errors[] = "lastnameRegex";

    }

    // Validate phone number

    if (!validatePhoneNumber($phone\_number)) {

        $errors[] = "numberRegex";

    }

    // Validate password

    if (!validatePassword($password)) {

        $errors[] = "pwdRegex";

    }

    // Check if the password and confirm password match

    if ($password !== $confirm\_password) {

        $errors[] = "passwordmismatch";

    }

    if (userExists($matriculation\_number)) {

        $errors[] = "uidExists";

    }

    // Check if there are any errors before proceeding

    if (!empty($errors)) {

        // Redirect to signup page with error messages

        $errorString = implode('&', $errors);

        header("Location: ../signup.php?error={$errorString}");

        exit();

    }

    $hashed\_password = password\_hash($password, PASSWORD\_DEFAULT);

    // Set the default type to "user"

    $default\_user\_type = "user";

    $sql = "INSERT INTO users (first\_name, middle\_name, last\_name, email, type, phone\_number, gender, matriculation\_number, password) VALUES (?, ?, ?, ?, ?, ?, ?, ?, ?)";

    $stmt = mysqli\_stmt\_init($conn);

    if (!mysqli\_stmt\_prepare($stmt, $sql)) {

        return "sqlerror";

    } else {

        mysqli\_stmt\_bind\_param($stmt, "sssssssss", $first\_name, $middle\_name, $last\_name, $email, $default\_user\_type, $phone\_number, $gender, $matriculation\_number, $hashed\_password);

        mysqli\_stmt\_execute($stmt);

        mysqli\_stmt\_close($stmt);

        echo '<script>alert("Signup successful! You can now log in."); window.location="../login.php";</script>';

        exit();

    }

}

function userExists($matriculation\_number)

{

    global $conn;

    $sql = "SELECT user\_id FROM users WHERE matriculation\_number=?";

    $stmt = mysqli\_stmt\_init($conn);

    if (!mysqli\_stmt\_prepare($stmt, $sql)) {

        return false; // Consider it as non-existing if there's a SQL error

    } else {

        mysqli\_stmt\_bind\_param($stmt, "s", $matriculation\_number);

        mysqli\_stmt\_execute($stmt);

        mysqli\_stmt\_store\_result($stmt);

        $num\_rows = mysqli\_stmt\_num\_rows($stmt);

        mysqli\_stmt\_close($stmt);

        return $num\_rows > 0;

    }

}

function loginUser($matriculation\_number, $password, $user\_type = 'user')

{

    global $conn;

    $sql = "SELECT \* FROM users WHERE matriculation\_number=? AND type=?";

    $stmt = mysqli\_stmt\_init($conn);

  if (!mysqli\_stmt\_prepare($stmt, $sql)) {

        return "sqlerror";

    } else {

        mysqli\_stmt\_bind\_param($stmt, "ss", $matriculation\_number, $user\_type);

        mysqli\_stmt\_execute($stmt);

        $result = mysqli\_stmt\_get\_result($stmt);

        if ($row = mysqli\_fetch\_assoc($result)) {

            $password\_check = password\_verify($password, $row['password']);

            if ($password\_check) {

                // Login successful

                session\_start();

                $\_SESSION['user\_id'] = $row['user\_id'];

                $\_SESSION['matriculation\_number'] = $row['matriculation\_number'];

                $\_SESSION['first\_name'] = $row['first\_name'];

                $\_SESSION['middle\_name'] = $row['middle\_name'];

                $\_SESSION['last\_name'] = $row['last\_name'];

                $\_SESSION['email'] = $row['email'];

                $\_SESSION['profile\_picture'] = $row['profile\_picture'];

                $\_SESSION['user\_type'] = $user\_type;

                mysqli\_stmt\_close($stmt);

                return "success";

            } else {

                mysqli\_stmt\_close($stmt);

                // return "invalidpassword";

                header("Location: ../login.php?error=invalidpassword");

                exit();

            }

        } else {

            mysqli\_stmt\_close($stmt);

            return "{$user\_type}notfound";

        }

    }

}

5x6,p