**Implementation of a Automated Attendance for Library Attendance**

**CHAPTER 1**

**I. INTRODUCTION**

**I. background of the study**

Student attendance is important since it helps to support academic performance of both the student and the college as a whole. Regretfully, no automated attendance record exists. keeping college applications open. It is necessary to have a tool for methodically reminding students when their attendance records are required to the growing number of college students (Sudha, et. al, 2019).

According to Elaskari, et. al. 2021 In a university setting, the majority of teachers and staff track student attendance and college assets manually. Nevertheless, there are a number of issues with these approaches. The two main problems with manually recording attendance are data collecting errors and the loss of some lecture time. Since it is impossible to overstate how important it is for students to attend class, administrators and lecturers at different academic institutions are worried about irregular attendance (Saheed, et. al, 2019).

To solve these problems, this study introduces a barcode-based library attendance system. The system uses a barcode scanner to read the USN printed on the student ID. This allows for quick and accurate logging of attendance data into a digital database. An admin panel is also included to monitor and generate reports based on the collected data. The system aims to streamline attendance monitoring and provide a more organized and reliable method of record keeping.

**II. statement of the problem**

The proposed system seeks to address the following issues:

* **Inaccuracy and inefficiency of manually logging attendance**
* **Time-consuming verification and retrieval of attendance records**
* **Difficulty in organizing and analyzing attendance data**
* **Potential for attendance fraud such as proxy sign-ins**
* **Lack of real-time access to attendance information**

**III. objectives**

This study aims to develop a system that will improve the current attendance process in the ACLC library. The specific objectives are:

* **To design an automated attendance system using barcode scanning**
* **To record student entry efficiently using their USN**
* **To provide an admin interface for monitoring and reporting**
* **To reduce manual errors in attendance records**
* **To store data in a structured and retrievable format**

**IV. Scope and Limitation**

The system is designed specifically for recording student attendance in the ACLC library. It uses a barcode scanner to read USNs from student IDs and logs attendance digitally. The scope and limitations include:

* **Records attendance using barcode scanners or manual input**
* **Operates within the ACLC campus library**
* **Includes admin access for managing and viewing attendance reports**
* **Assumes all students possess valid ID cards with readable barcodes**
* **Does not cover book lending, returning, or integration with other departments**

**V. Significance of the study**

The proposed system will benefit both students and library administrators by offering a fast and reliable way of tracking attendance. By eliminating manual entry, it enhances accuracy and saves time.

Key benefits include:

* **Faster check-in process for students**
* **Reliable and secure storage of attendance records**
* **Easier access to attendance reports for administrators**
* **Reduction in workload for library staff**
* **Better data for analyzing library usage trends**

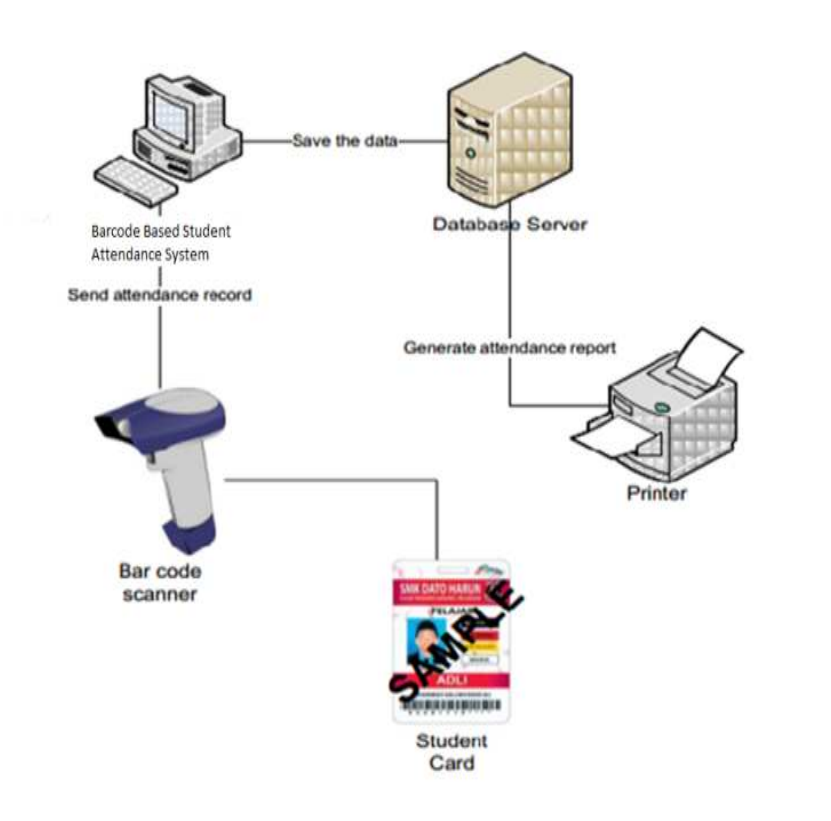
**CHAPTER 2**

**II. REVIEW OF RELATED LITERATURE**

**I. introduction**

This system eliminates the need for manual logging, reduces human errors, and provides a centralized database where attendance records can be monitored and managed through an admin panel. It aims to improve efficiency, ensure data accuracy, and enhance overall library operations.

**II. Theoretical Framework**



**Figure 1. Theoretical Framework**

Figure 1 shows the architecture of a Barcode-Based Student Attendance System. In this setup, each student carries an ID card with a unique barcode representing their student number. When the barcode is scanned using a barcode scanner, the data is transmitted to a computer system running attendance software. This system processes the scanned data and sends the attendance record to a centralized database server, where it is stored securely. Additionally, the stored data can be used to generate attendance reports, which can be printed as needed. This system enhances efficiency, reduces manual errors, and ensures accurate and automated tracking of student attendance.

**III. Review of related literature**

1. **Barcode based Student Attendance System (2019)**

Lakshmi Sudha et al. (2019) developed a barcode-based attendance system aimed at improving the efficiency of attendance tracking in colleges. The system uses barcode scanners to read student ID cards, automating attendance recording and generating defaulter lists. This approach significantly reduces manual workload, minimizes errors, and speeds up the attendance process.

This study is relevant to the ACLC library attendance system as it illustrates how barcode technology can automate attendance recording, reduce human error, and improve efficiency—key objectives for the proposed system.

1. **barcode-based system for admission and attendance management (2020)**

Reddy and Reddy (2020) designed a barcode-based system for admission and attendance management that uses unique barcodes on student ID cards. The system provides real-time feedback, prevents proxy attendance, and offers easy data management through a user-friendly interface.

This study supports the ACLC library system by demonstrating how barcode scanning can enhance security, provide instant attendance validation, and simplify data handling, which are essential for efficient library attendance monitoring

1. **Design and Implementation of Online Barcode Attendance System: Case Study of ESPAM Formation University, Benin Republic (2025)**

Komolafe et al. (2025) developed an online barcode attendance system integrated with a web platform to allow real-time tracking and secure database management. The system improved accuracy, efficiency, and scalability for educational institutions

This research is pertinent to the ACLC library project as it highlights the benefits of combining barcode technology with online platforms for real-time attendance tracking and secure data management, aligning with ACLC’s goal of digital transformation

1. **Automated Attendance System Using Barcode Reader (2019)**

Ahmad et al. (2019) implemented an automated attendance system using barcode readers at a Malaysian university. The system reduced manual errors, streamlined attendance recording, and provided instant access to attendance data for students and faculty.

This study relates to the ACLC library system by demonstrating the practical benefits of automation in attendance tracking, reducing administrative workload and improving data accessibility.

1. **Student Attendance Management System Using Barcode Scanner (2021)**

Oluwafemi and Adeyemi (2021) introduced a barcode scanner-based attendance management system at a Nigerian university to replace manual attendance. The system improved data accuracy, minimized proxy attendance, and provided robust reporting features.

This study is relevant to the ACLC library system as it highlights how barcode technology can prevent fraudulent attendance and enhance the reliability of attendance records in educational environments.

1. **QR Code: Attendance Checker in TIP Manila Senior High School (2019)**

Barlin et al. (2019) developed a QR code-based attendance system for Technological Institute of the Philippines – Manila Senior High School. The system automated time-in and time-out logging, improved accuracy, and generated attendance reports automatically

This study relates to the ACLC library system by demonstrating the effectiveness of automated code-based attendance tracking in Philippine educational institutions, supporting the transition from manual to digital systems for improved efficiency and accuracy.

1. **Development of Barcode-Based Library Attendance System in a Philippine College (2021)**

Garcia and Santos (2021) implemented a barcode-based attendance system in a Philippine college library to monitor student visits. The system enhanced tracking accuracy and reduced the time required for attendance logging compared to manual methods

This project aligns directly with the ACLC library system’s goals by providing a successful example of barcode technology streamlining library attendance processes in a Philippine context.

1. **Automated Attendance Monitoring System Using Barcode Technology (2022)**

Reyes et al. (2022) developed a barcode-based attendance monitoring system for a university library in the Philippines. The system allowed real-time tracking, reduced manual errors, and facilitated efficient report generation

This literature supports the ACLC library system by showcasing the benefits of automation and real-time data access for library attendance management in local educational settings.

1. **Implementation of Barcode-Based Student Tracking System in a Philippine High School (2020)**

Delgado and Cruz (2020) introduced a barcode-based student tracking system in a Philippine high school to monitor attendance and student movement on campus. The system improved security and provided accurate attendance records for administration

This study relates to the ACLC library system by highlighting the broader applicability of barcode attendance systems for improving security and data accuracy in Philippine educational institutions

1. **Evaluation of Barcode-Based Attendance Systems in Philippine Colleges (2023)**

Lopez and Ramos (2023) conducted a comparative evaluation of barcode-based attendance systems across several Philippine colleges. Their study found significant improvements in efficiency, data integrity, and user satisfaction compared to manual attendance

This evaluation supports the ACLC library system’s adoption of barcode technology by providing empirical evidence of its advantages in the local educational context.

**IV. System Literature**

1. **Developing and Implementing a Barcode-Based Student Attendance System (2019)**

This study presents a barcode-based attendance system designed for universities, replacing traditional manual attendance methods with automated scanning. The system utilizes barcode scanners, a database, and web-based software to allow lecturers to efficiently record and monitor student attendance in real-time. By leveraging technologies such as UML, Microsoft Access, and ASP.NET, the system streamlines the attendance process, minimizes errors, and enables the generation of comprehensive attendance reports

This literature was chosen because it demonstrates a practical and scalable approach to automating attendance management in educational institutions, directly aligning with the goals of the ACLC library system to improve efficiency, accuracy, and reporting through barcode technology

1. **Using Barcodes for School Management (2020)**

Barcodes have become essential tools in school management, particularly for tracking student attendance and managing assets. The technology assigns unique barcodes to student IDs, which are scanned upon entry, instantly updating attendance records in the management system. This automation reduces manual errors and administrative workload while providing real-time data for compliance and reporting

This reference is relevant as it provides a broad overview of barcode applications in educational settings, supporting the implementation of a barcode-based attendance system in the ACLC library by highlighting proven benefits such as efficiency, scalability, and data accuracy

1. **Simulation of Barcode-Based Students’ Examination Attendance System (2024)**

Sarjiyus and colleagues developed an examination attendance system using barcode verification to address issues of impersonation and manual errors in Nigerian universities. The system includes barcode scanners, unique student barcodes, and a centralized database, allowing authorized personnel to verify and record attendance efficiently during examinations

This system literature is significant for the ACLC library project as it showcases how barcode technology can enhance security, reduce fraud, and ensure reliable attendance documentation, which are critical for maintaining integrity in institutional processes

1. **Barcode Education Service: Navigating the Classroom (2024)**

Barcode-based attendance systems are highlighted as transformative tools in classroom management, offering automated, accurate, and real-time tracking of student presence. The literature discusses the basics of barcode technology, its integration with existing systems, and its benefits in reducing paperwork, improving data accuracy, and supporting decision-making through analytics.

This source was selected because it encapsulates best practices and implementation considerations for barcode attendance systems, providing valuable insights for designing a robust and user-friendly solution for the ACLC library.

1. **Barcode Attendance System Types and Features (2025)**

The resource outlines various barcode attendance systems, including standalone and cloud-based solutions. Standalone systems are cost-effective and simple, suitable for single-site use, while cloud-based systems offer real-time data access, multi-location support, and advanced analytics. Both types streamline attendance tracking and improve organizational efficiency.

This literature is pertinent as it helps inform the selection of the most appropriate system architecture for the ACLC library, ensuring scalability, ease of use, and effective data management.

1. **Smart Attendance Monitoring System: An IoT-Based Barcode System (2022)**

This project proposes an IoT-based barcode system for educational institutions, utilizing IoT devices and barcode technology to automate attendance tracking. Each student’s barcode is scanned via IoT-enabled devices, transmitting data to a centralized database for real-time monitoring and reporting. The system enhances efficiency, security, and data management.

This literature was chosen as it demonstrates the integration of modern IoT technologies with barcode systems in a Philippine educational context, offering a model for real-time, secure, and efficient attendance monitoring suitable for ACLC’s library

1. **QR Code: Attendance Checker in TIP Manila Senior High School (2019)**

Barlin et al. developed a QR code-based attendance system for the Technological Institute of the Philippines – Manila. The system automates attendance recording, improves accuracy, and generates reports, replacing manual sign-in methods. It also ensures organized data storage and minimizes administrative workload.

This study is relevant as it shows the effectiveness of automated code-based attendance tracking in a local educational institution, supporting the ACLC library’s move toward digitalization and efficient record-keeping.

1. **Automated Attendance Monitoring System Using Barcode Technology (2022)**

Reyes and colleagues implemented a barcode-based attendance system in a Philippine university library, enabling real-time tracking and efficient report generation. The system minimizes manual errors and provides administrators with timely, accurate attendance data.

This literature was selected because it directly addresses the challenges of manual attendance in Philippine libraries, offering a tested solution that aligns with ACLC’s needs for automation and data reliability.

1. **Development of Barcode-Based Library Attendance System in a Philippine College (2021)**

Garcia and Santos designed a barcode-based system to monitor library attendance in a local college. The system improved tracking accuracy, reduced logging time, and provided comprehensive attendance records for administrative use.

This reference is important as it demonstrates the successful application of barcode technology in a Philippine library setting, providing a practical framework for ACLC’s own system.

1. **Implementation of Barcode-Based Student Tracking System in a Philippine High School (2020)**

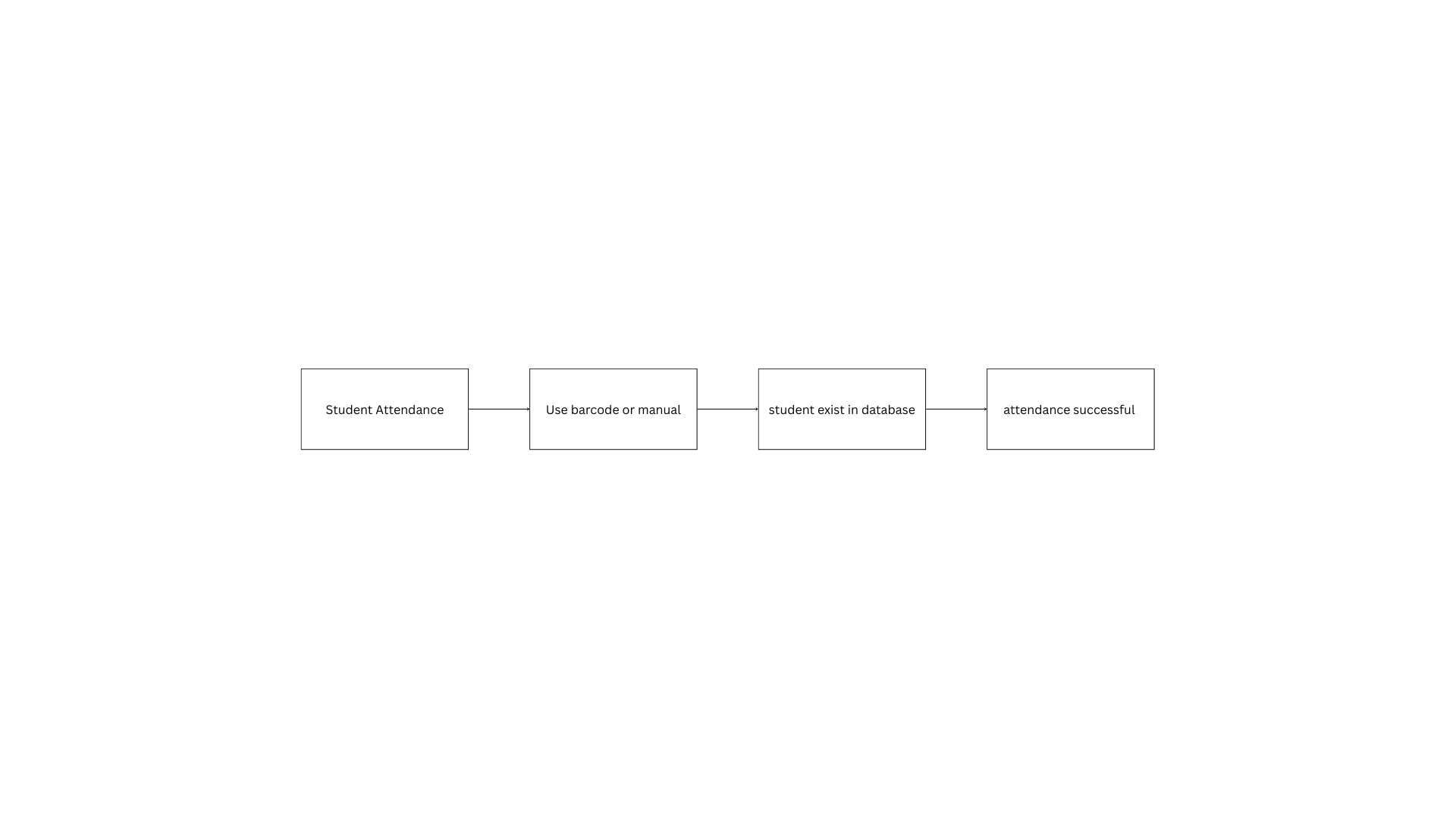
Delgado and Cruz introduced a barcode-based tracking system in a Philippine high school, enhancing security and ensuring accurate student attendance records. The system facilitated efficient data management and reduced opportunities for attendance fraud.

These system literatures collectively provide a comprehensive overview of barcode-based attendance technologies, their practical implementations, and their proven benefits in both foreign and local educational contexts. Each was selected for its relevance to ACLC’s goal of establishing an accurate, efficient, and secure library attendance system.

**CHAPTER 3**

This chapter contains discussions, and tools, and illustrations that will be used to develop the proposed study.

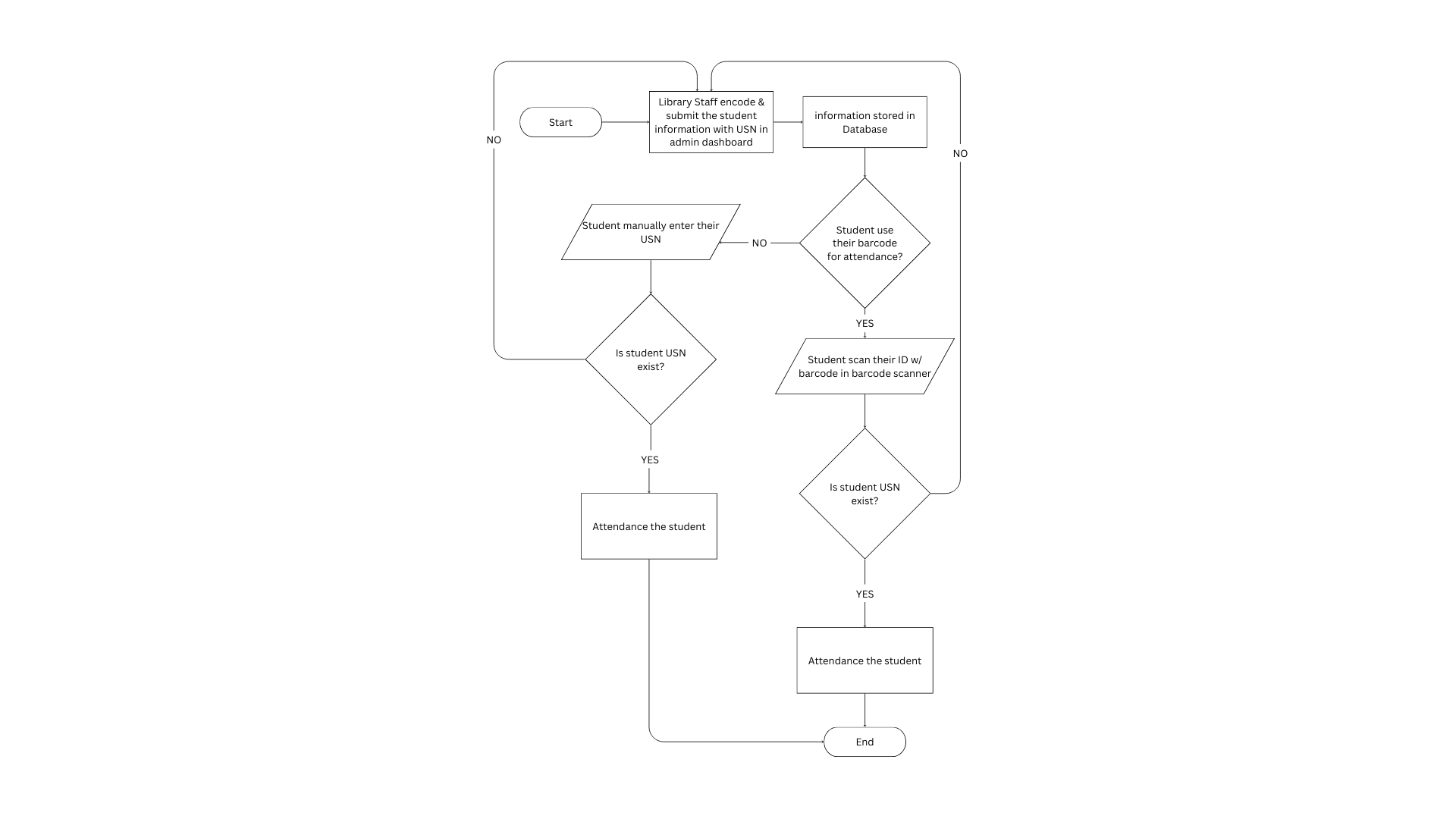
1. **Framework of the study**

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**Figure 2. Conceptual Framework**

Figure 2 illustrates our conceptual model. The researchers' investigation encompasses multiple levels.

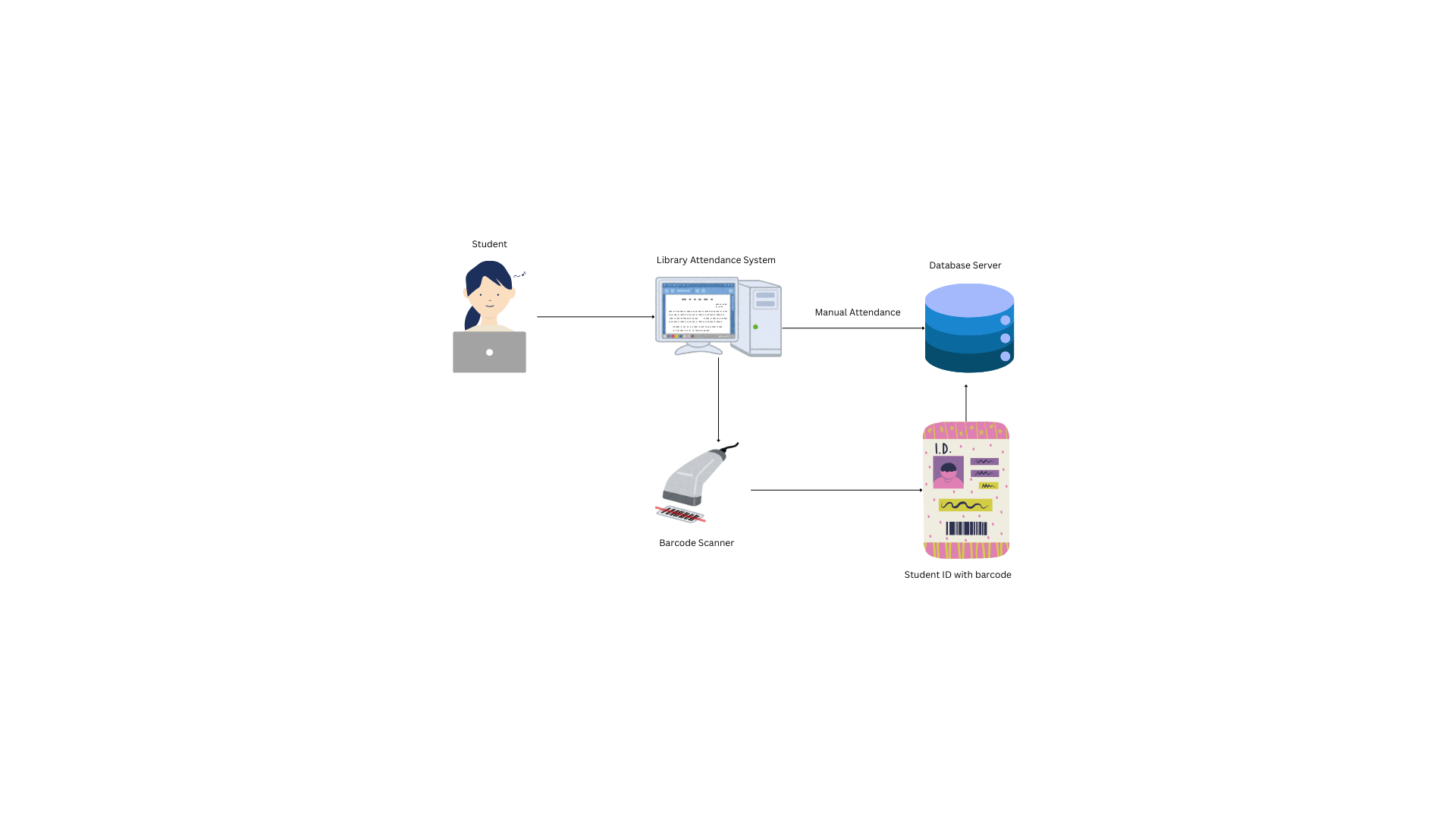
1. **Materials**
   1. **Software**
      1. **Front-End Tools**
         * React.js – used to create a responsive and dynamic user interface
         * Tailwind CSS – provides a clean, mobile-friendly, and easily customizable UI
      2. **Back-End Tools**
         * Node.js with Express.js – manages server-side logic, API routes, and data processing
         * MySQL – stores attendance logs and student information in a structured format
   2. **Hardware**
      1. **Barcode Scanner**
         * Used to scan the USN from student ID cards for fast and accurate attendance logging
2. **Development**
   1. **System Analysis and Design**
      1. **Flowchart**

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**Figure 3. Flowchart**

In figure 3 the researcher discusses the flow and a step by step process and functions of the system, where students have two options: first is to use their barcode and second is to manually enter their USN.

* + 1. **User Case Diagram**

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**Figure 4. Use Case Diagram**

Figure 4 shows the diagram and flow of the student whenever the student will try using the barcode scanner or manually input their usn on the library attendance system.

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