ONLINE ATTENDANCE MANAGEMENT SYSTEM (OAMS) : A CASE STUDY OF UGANDA CHRISTIAN UNIVERSITY-BISHOP BARHAM UNIVERSITY COLLEGE

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A DISSERTATION SUBMITTED TO THE FACULTY OF ENGINEERING, DESIGN AND TECHNOLOGY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY OF UGANDA CHRISTIAN UNIVERSITY

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UGANDA CHRISTIAN UNIVERSITY

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Abstract

This study explored the development of an Online Attendance System designed to streamline how attendance is recorded in educational settings. Traditional manual methods were found to be slow, error-prone, and difficult to manage over time, which created a need for a more reliable solution. The research followed a descriptive approach, beginning with gathering user requirements, and then designing, building, and testing the system. The platform was created using PHP, MySQL, HTML, and JavaScript, offering an easy-to-use interface for both lecturers and students. Information was collected through interviews, observation, and system testing to evaluate its effectiveness. Results showed that the Online Attendance System helped reduce the time spent taking attendance, minimized common recording mistakes, and made it easier to generate attendance reports when needed. The findings suggest that adopting an online attendance management system can make administrative tasks more efficient and accurate. It would be a valuable investment for institutions aiming to modernize their operations.

Declaration

I declare that this report entitled “Online Attendance Management System” is my original work carried out in partial fulfillment of the requirements for the award of a degree of Bachelor of Science in Information Technology at Uganda Christian University. The content presented in this report has not been submitted, in whole or in part, for the award of any academic qualification at any other institution. Sources and references used during this project have been properly cited and acknowledged. The findings, designs, and conclusions expressed in this document are based on my effort, guided by my supervisor, and reflect genuine academic research and development.

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APPROVAL

This is to certify that I have supervised the preparation of this project report titled "Online Attendance Management System" submitted by Muhumuza Darius Registration Number J24/BBUC/BSIT/012 in partial fulfillment of the requirement for the award of a Bachelor of Information Technology of Uganda Christian University. This project report has been submitted with my full knowledge and approval and is therefore ready for examination.

Supervisor

SUNDAY DAVID

Signature

31/05/2025

Date

Dedication

I sincerely dedicate this work to my parents Mr. Muhangi Wilberforce Byaboneka and Owembabazi Adellah who stood by me with endless love, encouragement, and guidance. Their constant support has been the foundation of my academic journey, to my teachers and supervisors, whose advice, patience, and valuable insights helped me navigate through this project successfully. To my friends and classmates, thank you for your encouragement, shared experiences, and collaboration that made this journey enjoyable and fulfilling. This project is also dedicated to future students and researchers who may build on this work to create more impactful solutions.

Acknowledgment

First and foremost, I give thanks to the Almighty God for granting me the strength, wisdom, and perseverance to complete this project. I want to express my sincere gratitude to my supervisor Mr. Sunday David, for his continuous support, guidance, and constructive feedback throughout the development of this project. Your encouragement and expert advice have been invaluable. Special thanks go to the faculty and staff of the Engineering, Design & Technology of Uganda Christian University, for providing a conducive learning environment and the resources needed for this academic endeavor. I am also deeply grateful to my family and friends for their patience, moral support, and understanding during this work. Your encouragement has been a constant source of motivation. Lastly, I appreciate all those who participated in the development and testing of the Online Attendance Management System. Your input greatly contributed to the improvement and success of this project.

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List of Acronyms

UCU	Uganda Christian University
BBUC	Bishop Barham University College
HTML	Hypertext Markup Language
CSS	Cascading Style Sheet
JS	JavaScript
RFID	Radio Frequency Identification

1.0 CHAPTER ONE: GENERAL INTRODUCTION.

1.1 Introduction

Online Attendance Management System is a software tool that captures daily student attendance records in schools and institutions facilitates access to the attendance of a particular student in a specific class and helps generate reports and evaluate the attendance eligibility of a student. Rather than signing an attendance sheet manually, the attendance records were captured electronically into a database, which makes it easier to manage.

1.2 Background of the study

In recent years, universities have increasingly adopted digital systems to enhance administrative processes, including attendance tracking. Traditional manual methods, such as paper-based sign-ins and roll calls, can be time-consuming, prone to errors, and difficult to scale, especially in larger institutions. As a result, many institutions have implemented online attendance management systems to streamline the process, improve accuracy, and reduce administrative workloads. These digital systems are integrated with learning management platforms and provide real-time tracking of student participation, making attendance data more accessible and transparent for both students and faculty. This shift has also been influenced by broader global trends in education, particularly after the COVID-19 pandemic, which led to the widespread adoption of online and blended learning. As part of this transition, many universities began using learning management systems (LMS) such as Moodle, Blackboard, and Canvas not only for delivering content but also for managing class participation and attendance. In Africa, universities in countries such as Kenya, Nigeria, and South Africa have introduced digital or online attendance systems to manage large class sizes and enhance student accountability. In Uganda, institutions like Makerere University and Kyambogo University have started exploring similar technologies in line with the Ministry of Education and Sports' digital learning initiatives (Bank, 2021).

At Uganda Christian University - Bishop Barham University College (UCU-BBUC), a strong emphasis has been placed on improving administrative efficiency through technology. The institution has adopted an online attendance management system that is integrated with its learning management platforms, including Moodle, to track student participation. This system automatically records attendance based on student log-ins and activity within the platform, ensuring that attendance data is both accurate and readily available. The integration of digital tools into the academic workflow has been particularly beneficial in managing large numbers of students. It has helped ensure that students remain engaged and active in their learning, especially during online classes.

These tools also address common problems associated with traditional attendance tracking methods, such as forged signatures, lost records, and the time spent manually taking roll calls. Discussions with students and faculty at UCU-BBUC show that many appreciate the increased clarity and access to attendance records. Students report that having the ability to monitor their attendance encourages them to participate more consistently, while lecturers note that the system saves time and simplifies monitoring.

The online attendance management system at UCU-BBUC has enhanced transparency and accountability, making it easier for faculty to track attendance and for students to monitor their participation. The system not only provides real-time data but also allows students to access their attendance records, helping them stay on top of their academic commitments. Through the use of such digital tools, UCU-BBUC is improving its administrative efficiency, supporting better academic management, and fostering a more transparent and accountable learning environment. This shift toward digital attendance systems is part of a broader trend in Ugandan universities, where technology is being used to improve both educational delivery and administrative practices. (UNESCO, 2022).

1.3 Problem Statement

According to (MWANIKI, 2021), while Moodle's electronic learning system at UCU-BBUC serves as the primary platform for tracking student attendance, there is a challenge in registering students who attend online lectures outside of Moodle. It is noted that some of the lecturers at UCU-BBUC conduct classes outside of Moodle due to genuine technical challenges, such as internet connectivity issues, system downtimes, or limitations in the platform's functionality to support specific teaching needs. These challenges are common across many universities, particularly in regions with unreliable internet infrastructure, where alternative platforms may sometimes be used for teaching and learning.

Therefore, the need for an alternative student attendance system to act as the backup for 75 percent of student's attendance compliance is necessary

Registration's absence of a dedicated system for students attending lectures through other online platforms makes it difficult to ensure full accountability.

At Uganda Christian University – Bishop Barham University College (UCU-BBUC), keeping accurate records of student attendance has become a significant challenge, particularly due to the lack of an integrated online registration system for students attending online lectures outside of Moodle. While Moodle serves as the primary platform for tracking attendance, the absence of a dedicated system for students attending lectures through other online platforms makes it difficult to ensure full accountability. This gap in the system highlights the need for a more robust, unified attendance management solution that can track participation across various platforms, ensuring accurate and comprehensive records for both in-person and online learners.

The traditional method of recording attendance using paper sheets or books has led to several issues, including impersonation, loss of records, and errors in tracking attendance. As a result, administrators struggle to determine which students meet the attendance requirements for exams. At Uganda Christian University - Bishop Barham

University College (UCU-BBUC), absenteeism is a significant concern, with studies indicating that approximately 30% of students (UCU-BBUC Student Engagement and Attendance Survey Report, 2023) miss at least one-third of their classes each semester. This absenteeism negatively impacts academic performance and the management of academic records. Given the growing student enrollment, there is a pressing need for a more reliable attendance system. An online system would help streamline attendance tracking, ensuring real-time monitoring and improving accountability. This highlights the potential for gaps in tracking student attendance, especially for students who may not be actively enrolled in courses or may not be tracked using Moodle.

1.4 Objectives of the study

1.4.1 General Objective

To develop an Online Attendance Management System to support efficient tracking, recording, and management of student attendance for Uganda Christian University, Bishop Barham University College (BBUC), improving accuracy and reducing manual workload who attend outside Moodle.

1.4.2 Specific Objectives

1. To analyze the current online attendance management system requirements necessary for designing the system, including assessing the current Online Attendance Management Systems to better understand how they operate.

2. To design an Online Attendance Management System to streamline the recording, monitoring, and management of student attendance at Uganda Christian University, Bishop Barham University College (BBUC).

3. To validate the functionality, accuracy, and usability of the developed Online Attendance Management System to ensure it performs correctly, maintains reliable attendance records, and provides a user-friendly experience, supporting

efficient academic management at Uganda Christian University, Bishop Barham University College (BBUC) outside Moodle due to Technical challenges.

1.5 Research Questions

1. What are the key functional and non-functional requirements for an effective Online Attendance Management System?
2. What features and design approaches best support the efficient recording, monitoring, and management of online students' attendance systems in a university environment?
3. How accurate and reliable is the Online Attendance Management System in recording and managing attendance data compared to traditional methods, and what steps or approaches are essential for validating the system to ensure its effectiveness?

1.6 Scope of the Study

1.6.1 Time scope

This project was developed in two months from April 2025 to May 2025.

The research and development of the project took a significant amount of time due to the numerous activities that needed to be carried out. This process took approximately two months, from April 2025 to May 2025.

1.6.2 Geographical Scope of the Online Attendance Management System

The geographical scope of the Online Attendance Management System focuses on its implementation and usage within Uganda Christian University – Bishop Barham University College (UCU-BBUC). It primarily serves students and faculty on the university's physical campuses and extends to remote learners who participate in online or hybrid courses. The system enables real-time attendance tracking through digital platforms for both on-campus and off-campus students.

The initial implementation is confined to UCU-BBUC, using the university's local servers and network infrastructure to ensure smooth operation within its existing technological

framework. The system's geographical scope will also take into account the internet connectivity and infrastructure in Uganda, which could impact the accessibility and reliability of the system for remote users.

1.6.3 Content Scope

The system has primarily focused on supporting the administrative and academic needs of UCU-BBUC. The system enables efficient management of student data, attendance tracking, and communication between coordinators, and lecturers. In the implementation of an Online Attendance Management System, compliance with data protection and privacy regulations is essential to safeguard the personal information of students and staff. The system must protect sensitive data such as attendance records, and login details, in line with institutional and national data privacy standards. For instance, coordinators may be allowed to record and update attendance, while students can only view their records. These measures help prevent unauthorized access, ensure accountability, and maintain the integrity and confidentiality of attendance data.

1.7 Significance/ Justification of the Study

1.7.1 Significance

The system has the following importance as seen below

Reduce errors. An Online Attendance Management System significantly reduces human error by automating data entry and minimizing calculation mistakes, leading to an error reduction of up to 30% compared to manual methods. It improves data accuracy, enhances administrative efficiency, and saves time in managing attendance records, which supports better institutional performance and accountability. (Tarkie & WE360, (2024)).

Increase productivity. The introduction of a more streamlined process has led to a noticeable increase in productivity. By eliminating outdated legacy systems, employees now have more time to dedicate to core tasks, rather than being bogged down by

manual processes. This has also resulted in a reduction in staffing costs. Additionally, supervisors now have access to real-time labor data, allowing them to manage their teams more effectively. For example, tasks like student registration, which once took hours to complete under older systems, can now be finished much more quickly. (Assad, Ahmad, and Ziad Khalil., (2025))

1.7.2 Justification

Online systems have greatly enhanced efficiency by streamlining attendance tracking, allowing educators to save time on administrative tasks. Schools using digital attendance systems reported a 40% reduction in time spent on attendance-related administrative tasks (Magazine., 2022). These systems also improve accuracy by minimizing the errors that are common with manual methods; manual attendance systems have been shown to have an average error rate of 15%, compared to less than 1% with automation (Sharma, R., & Goyal, M, (2021)). Parents benefit from real-time updates, as they can instantly access their students' attendance information through integrated online portals. According to the (Statistics, 2021), 68% of parents indicated that real-time attendance tracking improved their engagement with their children's education. Additionally, advanced technologies like RFID, biometrics, and QR codes further bolster security and authentication, ensuring both the accuracy and safety of attendance data. Schools using RFID-based attendance systems reported a 95% improvement in attendance record accuracy and a 30% increase in student punctuality (Kumar, 2023).

1.8 Conceptual Framework

It was a diagrammatical presentation that showed the variables

Table 1 is a table showing variable types with specific examples relevant to an Online Registration Management System

Variables	**Examples in Online Registration Management System**

Independent Variables	- System usability (ease of navigation) - Internet connectivity - Availability of registration slots - User support availability
Dependent Variable	- Successful registration rate (number of students successfully registered)
Confounding Variables	- Student computer literacy - Time of registration (peak vs off-peak) - Device type (mobile, desktop)

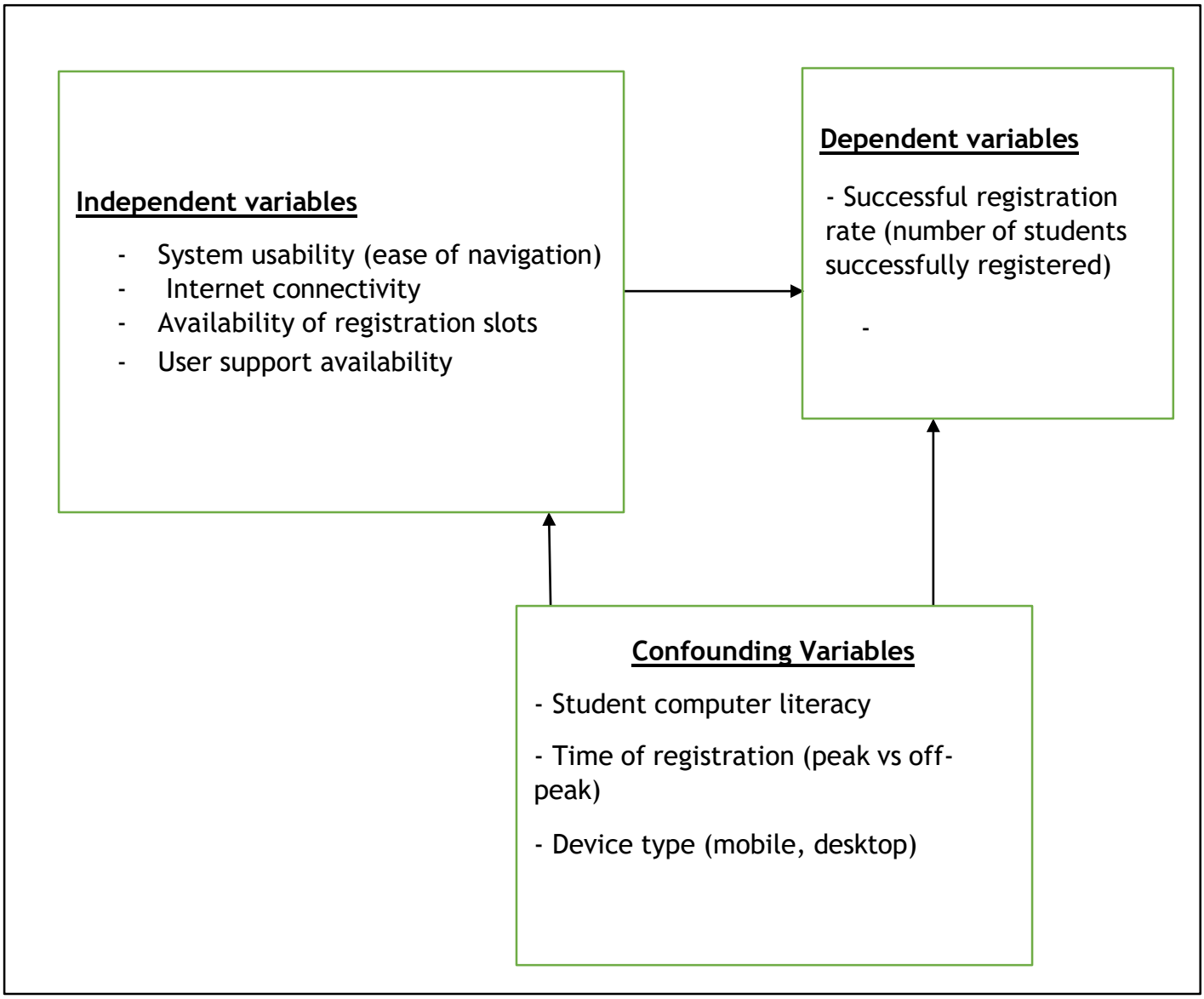


Figure 1 shows the diagrammatical presentation that shows the variables.

These variables are crucial for understanding the registration workflow and its outcomes. They are categorized as: **independent variables**, which are the controllable or observable inputs; **the dependent variable,** which is the primary outcome we aim to measure; and **confounding variables**, which are external factors that might interfere with the relationship between the independent and dependent variables. This aligns

with how typical online student registration systems are structured and described in academic and project literature."

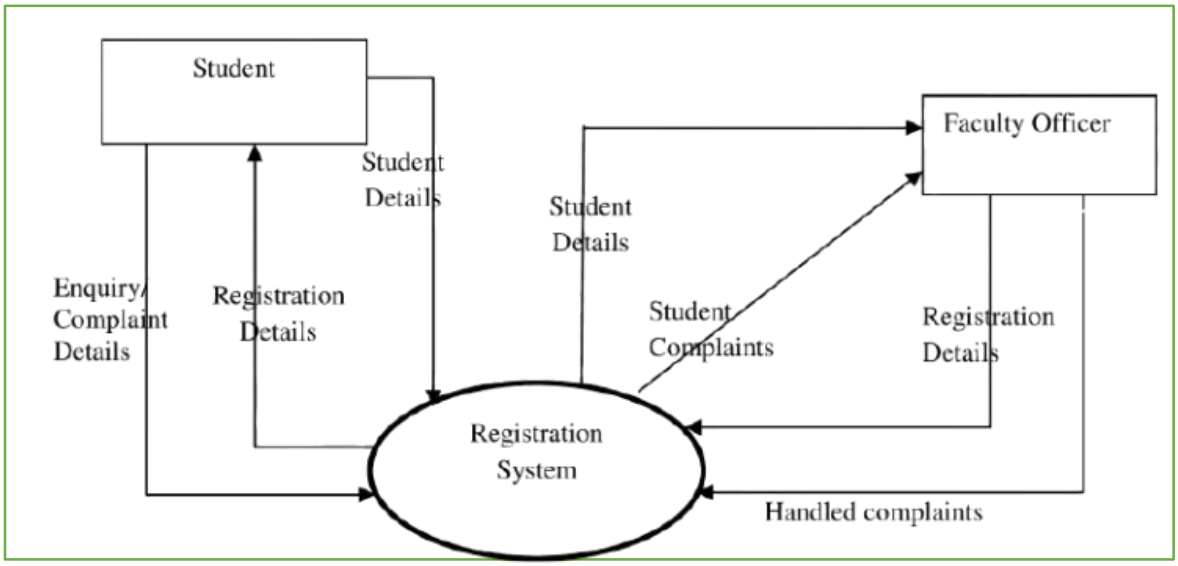


Figure 2 shows the processing of the attendance system.

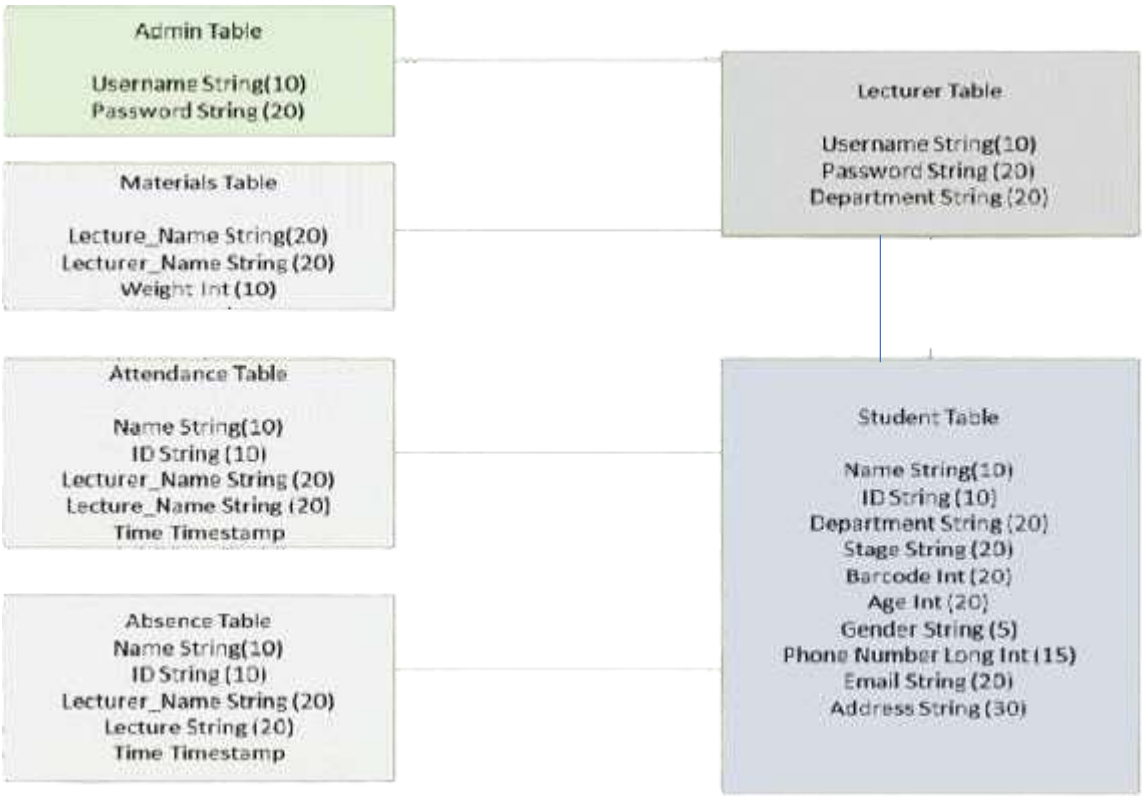


Figure 3 shows the E-R DIAGRAM.

2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In this chapter, I present literature about related systems to the automated online Attendance Students Management system that we were developing for UCU-BBUC. The study describes in detail what different researchers have done and solve the problems of traditional methods of taking students` attendance records and the gaps in the study

2.2 Literature on Analyzing Management

The adoption of online systems in educational settings has greatly improved operational efficiency by automating time-consuming tasks such as attendance tracking. By eliminating manual processes, educators can focus more on teaching and less on administrative duties, resulting in a more productive environment. Studies have shown that automating attendance systems saves educators significant time, which enhances overall workflow and contributes to more efficient school operations (Smith, 2022).

Beyond increasing efficiency, automated attendance systems improve the accuracy of record-keeping. Manual methods are prone to human errors, such as incorrect data entry or missed attendance records. Automated systems reduce these errors, ensuring more reliable and accurate attendance data. Research indicates that schools implementing digital attendance solutions see a marked reduction in discrepancies, which is crucial for both administrative accuracy and accountability (Johnson, M., & Lee, S., (2023)).

Furthermore, advanced technologies such as RFID, biometrics, and QR codes have made significant strides in enhancing security and authentication in educational systems. These technologies enable real-time tracking, and parents can instantly access their child’s attendance information through secure online portals, promoting transparency and communication between the school and families. This integration of modern

technology aligns with the growing emphasis on data security and the shift toward digital transformation in education (Anderson, J., Davis, R., & Thompson, L., (2021)).

2.3 Literature Review on the design of available Online Attendance System

Recent research from 2021 to 2023 continues to reinforce these findings. (Rahardjo, A., Suryani, R., & Setiawan, D, (2021)) Conducted a study on QR code-based attendance systems and found that students who attended classes more regularly performed better academically. Their study in STEM disciplines indicated that students who engaged with classes, tracked through QR codes, consistently achieved higher grades in both assignments and exams, highlighting the continuing importance of physical presence in class.

Similarly, (Singh, P., & Kapoor, A., (2022)) examined the effectiveness of Bluetooth and GPS-based attendance systems in hybrid learning environments. They found that students who attended classes regularly—whether in-person or online—had higher GPAs. They also observed that students who missed early classes were more likely to struggle academically, aligning with earlier findings that missing the first few classes can negatively impact performance.

In a study by Malik and Hussain (2023) on cloud-based attendance platforms, the researchers highlighted that these systems not only track student participation but also assist in identifying students at risk of academic underperformance due to frequent absences. The study demonstrated that students with consistent attendance showed greater engagement, completed assignments on time, and retained course material better, leading to improved academic performance.

A simple table illustrating the correlation between student attendance and performance based on general research findings:

Table 2 shows the correlation values between lecture attendance and the student`s performance.

Attendance Rate	Performance Level
90-100%	High
75-89%	Moderate
50-74%	Low
Below 50%	Very Low

2.4 Literature on methods used to test and validate Online Attendance Systems

Since the onset of the COVID-19 pandemic, educational institutions have adopted various digital tools to manage student activities more efficiently. Among these, attendance systems have seen notable development. The primary objective has been to minimize physical interaction while ensuring accurate and tamper-proof records. This literature review explores recent attendance tracking technologies introduced from 2020 onward, specifically excluding facial recognition due to ongoing concerns around privacy and ethics.

One of the most popular methods employed during this period has been the use of QR codes for class check-ins. (Syahputra, F., Dalimunthe, A., Lubis, A. A., & Maulana, B, (2023))Designed a QR code-based attendance application to replace manual systems. Their study found that students could quickly scan a code displayed in the classroom using their mobile phones, allowing attendance records to be instantly stored in a

database. (Valentino, 2022)further emphasized the practicality of QR codes in both assessments and attendance, especially in remote learning setups. However, these systems are not foolproof. As noted by (David, A. P. J., Mabanta, M. J. D., Ellamil, S. D., & Peñalba, E. H, 2020), instructors reported challenges related to code sharing among students, allowing absent peers to be marked present.

In addition to QR codes, mobile applications that use GPS or Bluetooth have been integrated into attendance tracking systems. These apps verify a student's location before allowing them to register their presence. According to (Saraswat, A., & Garg, S., (2016)), Bluetooth Low Energy (BLE) technology can accurately detect a student's proximity to the classroom, enabling a more automated solution. Although effective, GPS-based systems may suffer from signal issues in indoor environments. Students have also found ways to falsify their location, which undermines the reliability of these tools in maintaining academic integrity.

RFID technology has also remained relevant, particularly in institutions with access to the necessary infrastructure. RFID-based attendance systems involve issuing ID cards embedded with radio-frequency chips, which students scan when entering a classroom. (Islam, M. N., Haque, M. A., & Sarker, I. H, (2020)) discussed how this technology improves speed and reduces the risk of manual errors. (Stillman, 2003), though earlier, pointed out how RFID was initially developed for logistics but found use in educational settings due to its ability to track presence efficiently. Despite its strengths, the adoption of RFID systems is sometimes limited by setup costs and the maintenance of hardware.

In recent years, institutions have also adopted cloud-based attendance platforms that centralize student data and integrate various tracking methods, such as QR, RFID, or manual inputs. (Malik, M., & Hussain, T, (2022)) Highlighted how such platforms enable real-time reporting and administrative access to data. However, issues related to

internet dependency, system downtime, and data protection laws continue to shape the discourse around their implementation.

In summary, the period from 2020 onwards has seen diverse strategies developed for attendance tracking, each responding to the changing needs of educational environments. While QR codes and mobile-based systems offer low-cost solutions, they are often limited by student misuse and technological constraints. RFID and cloud-based systems offer more stability but may require higher investment and maintenance. No single system has fully addressed the balance between ease of use, reliability, cost, and data security, making the search for an optimal solution ongoing.

2.5 Identified Gap Statement

At UCU-BBUC, there is currently no effective mechanism in place to track student attendance outside Moodle. Although Moodle is the institution's designated platform for academic management, it is not being used effectively due to ongoing system functionality challenges. This has created a need for a reliable online attendance management system to accurately monitor and document student participation outside Moodle.

3.0 CHAPTER THREE: METHODOLOGY

3.1 Introduction

The online Attendance System for the UCU-BBUC campus requires a lot of data and information to be collected from both the students and the administration (Academic Registrar`s Office) which was responsible for the records.

There were also materials and methods that we were going to use to fully develop this system, starting from data collection to implementation.

3.1.1 Area of study

The study was conducted at Uganda Christian University- Bishop Barham University College for the lecturers and students.

3.2 Study population.

The study population comprised of Admin Head of Departments, staff, and the selected students of UCU-BBUC.

3.2.1 Sample size.

A suitable sample frame from the target population was chosen; a sample size of 30 (5 staff and 25 selected students) was selected and then divided into two (2) non-repeating groups (strata) and the researcher was able to select a sample from each group using a random sampling technique. The individuals to be chosen were to be subjected to data collection tools like questionnaires and interviews.

3.2.2 Procedure of data collection

Before the study, an introductory letter was obtained from the Department of Computing and Technology. This has helped in the personal identification of the respondents as a student carrying out a research study which was a pre-liquidity for the completion of the course and that was intended to benefit me as a researcher and the university as well. At the end of data collection, questionnaires, notes taken, and documents collected were compiled/ put together for data processing.

3.3 Data collection tools.

The following tools were used to gather and collect the necessary data/ requirements for analyzing and designing the system.

3.3.1 Interviews

The researcher conducted face-to-face interviews with the stakeholders. An interview schedule was drawn and guiding questions were prepared as tools to collect data. The interviews were conducted on the strata formed, that is; quality assurance staff and selected students. With this method, the researcher was able to achieve objective (i) which was to investigate the effectiveness of the current system. The interview method was chosen because it's reliable, accurate, and gives satisfactory results.

3.3.2 Questionnaires

Questionnaires were designed based on the sample size and then distributed to respective individuals i.e. in the chosen sample for answering. With the responses made in line with the interview, the researcher was able to integrate ideas and help to collect requirements for a new system thus achieving objective (ii) which was to collect requirements for the design of a new system. This method was chosen because it gives more detailed and context-related information, it permits the collection of information on facts and it permits tests of the reliability of the responses because questions were logically set.

3.3.3 Document Review.

A thorough review of the documents done in the Department of Quality Assurance with the intent to study how things were done and discover where improvement was necessary. Several documents were reviewed including registers for the classes handled. This method was chosen because of its inexpensiveness because the data was already there, it permits examination of trends over the past and there were few biases about information.

3.4 Data analysis

After the interviews were carried out together with questionnaires and interview guides, the data collected from the field was entered into an Analysis tool (excel), and

thereafter coding was done to represent descriptive data in terms of numbers. Numbers from 1-5 were used whereby I, 2,3,4,5 represented strongly disagree. Average, agree, and strongly agree respectively. After data was coded and errors corrected, the analysis started. Thereafter, conclusions and system specifications were made based on the outcome of the data analysis.

3.5 System analysis

At this stage, the researcher employed the following tools to analyze the system. Data flow diagrams (DFDs) have been used to model information in the proposed system and show the movement of information from one point to another. Additionally, under DFDs, the Context Diagram was also used to show the system under consideration as a single high-level process and then the relationship that the system has with other external entities (systems, organizational groups, external data stores). Entity Relationship Diagrams (EROs) were to show the relationships between different entities and their associated attributes in the system.

3.5.1 Analysis of the Current System

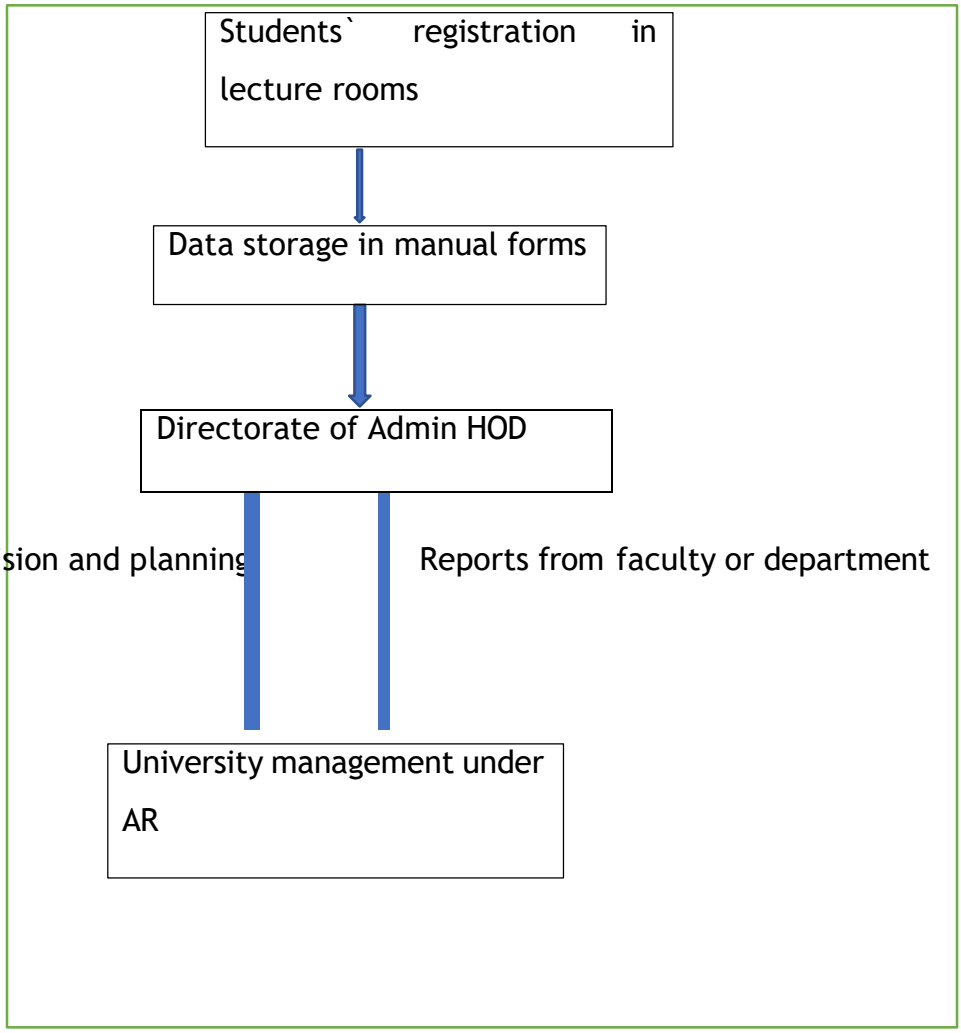


Figure 4 Showing diagram for the current student registration system

3.5.2 Weaknesses of the existing system.

The paper files occupy a lot of space as more students register, more space becomes required Search data from the files is difficult, and constant usage of those files wears them out hence the loss of the important data.

There was much time and labor wasted in recording every individual student's particulars.

Generation of the overall reports was tedious because of the information stored in different files. Visit each file, and noting down the required information to come up with the final reports was extremely hard.

3.6 System Design

The system was designed based on the Windows environment. Microsoft Visual Basic 2005 was used to design the user interfaces (front end) while Microsoft Access as a DBMS was used to design a database for storing data thereafter a logical connection was established. At the same time a test plan was prepared, the test plan described the various tests that have been carried out on the system after the completion of development thus achieving objective (iii) which was to design a new computerized system. System design was done in two different levels, that is, logical and physical designs.

3.6.1 Logical design

This pertains to an abstract representation of the data flows; a model of the actual system. Under the logical design, sequence diagrams were used to show the interactions between the users and the system.

3.6.2 Physical Design.

The physical design relates to the actual input and output processes of the system. This was laid clown in terms of how data was input into the system, how it was verified /authenticated, processed, and how it was displayed as output.

3.6.3 Input

At this stage, system interface (data entry user input) forms were designed using Microsoft Visual Studio 2005 while Microsoft Access was used to design the database, and thereafter a logical connection was made.

3.6.4 Output

Systems outputs were in the form of structured data like reports that were retrieved from the system database based on the criteria set.

3.6.5 User Requirements

The staff in charge of students' registration were the primary users of the system. Each user was required to have the username and password that was verified first before gaining access to the system. Depending on their level of privileges, they perform different activities as follows: Administrator users (adds records, views all the information, makes modifications, deletes records, and views all the reports). Limited users (add records, view some information, and view reports)

3.6.6 System requirements

These requirements were classified as functional and non-functional requirements.

Functional requirements

These were specific functions; tasks or behaviors the system must support the following:

The system should allow the management to register and store a particular student's class attendance details

It should enable management to view and search a particular file within a short time

It should authenticate users

The ability for the user to update and save information about the student. Therefore, the system shall have the ability to permanently save data into the database.

The system shall be able to generate necessary reports.

Non-functional requirement

The system should be able to authenticate users and provide different levels of access to avoid unauthorized access. The system should be able to perform 111 standard relatives to the activities carried out within the company. In other words, it should retrieve information very fast. The system should be easy for users to learn and use with dynamic access to information by both skilled and unskilled users. The system should be cost-effective with less effect on its implementation and maintenance. The system should be portable and light in order not to affect the throughput

3.6.7 Minimum hardware and software requirements

Hardware requirements

Table 3 shows the hardware requirement used in the development of the system

Hardware	Minimum system requirements
Processor	Intel Pentium, Cyrix, Intel Celeron
Cycle speed	IOOMHZ
Display monitor	700 x 600 pixels
Memory/RAM	IGBRAM
Hard Disk space	120GB
CD-ROM, UPS	

Software requirement

Table 4 shows the software requirements used in the development of the system

Software	Minimum system requirements
Operating System	Windows 2000/XP/NT/7
Database Management System	MS Access
Firewall/ Antivirus	A vast, A VG, and any other

3.7 System Testing

After the system design phase, testing was carried out at each stage to detect errors and monitor changes made to the system. The implementation began with converting

the design into machine-readable code. Software modules were then broken down into smaller units to simplify development and testing.

A white-box testing technique was used to assess both unit and system functionality. During **unit testing**, individual components were tested to ensure that their internal operations functioned correctly. In the **system testing** phase, all modules were integrated and tested together to verify that the system operated as intended and met the defined requirements. This approach ensured the system was developed in a structured and reliable manner.

The testing and implementation process resulted in several important outcomes. Testing helped identify and fix functional and logical errors within the system modules, which improved overall system stability. Both unit and system testing confirmed that individual components and the integrated system performed as expected, increasing the reliability of the system. The system's functionality aligned well with the original design specifications and user requirements, especially in addressing the need to track student attendance in offline classes. All changes made during testing were documented to maintain proper version control and provide a clear record of improvements. In the end, the successful testing process confirmed that the system was stable, functional, and ready for deployment at UCU-BBUC.

3.8 System Implementation

The system was successfully implemented using Microsoft Access for the backend database and Visual Basic 2005 for developing user-friendly data entry interfaces. After thorough testing and validation, the system was confirmed to meet all functional and performance requirements for tracking student attendance in offline classes. Based on these results, the system was officially approved and deployed at UCU-BBUC. It is now actively used by administrative staff and lecturers to record, manage, and retrieve student attendance data accurately and efficiently. Training sessions were conducted to ensure that all users could operate the system effectively, and a feedback process was put in place to address any issues that arose during daily use. Since its implementation, the system has improved record-keeping, reduced manual errors, and enhanced accountability in monitoring class attendance.

3.9 Ethical consideration

Ethical principles were carefully observed throughout the study to protect the rights and confidentiality of respondents. Since there was a risk that participants could face consequences if their views were disclosed to their superiors, several measures were taken to ensure anonymity and confidentiality. Respondents were informed about the purpose of the study and assured that their participation was voluntary. No names or identifying details were recorded in the data collection process. Responses were coded and stored securely to prevent unauthorized access. In addition, permission was sought from relevant authorities before conducting the study, and informed consent was obtained from all participants. These steps helped to minimize any potential harm and ensured that the study was conducted responsibly and ethically.

3.9.1 Human Ethical Considerations

Respect for respondents as sovereign individuals and respect for persons was a basic human right. Respondents as self-ruling individuals have the right to choose to either participate in the research or not. In the study, I ensured that the rights of respondents were not violated for the reason of searching for information. I ensured that any type of communication about the research should be done with professionalism, honesty, integrity, and transparency. I ensured that any type of misleading information, as well as the representation of primary data findings in a biased way, must be avoided. Avoiding harm was another basic human right that I considered when conducting this project.

3.9.2 System Ethical Considerations

Data Security: Any sensitive information that has been entered into the system for example the records of customers and their house/business has been highly protected by the administrator since he /she reserved the permissions and also controls what different users/vendors can access.

Database Security: At the database level, the database management system requires the creation of users and various roles assigned to them. Strong password policies were enforced at the database level to reduce the possibility of intrusion and malicious

damage to data. Sensitive data fields, such as stakeholder passwords, had to be encrypted in the database.

3.10 Limitations of the Study

Some of the restrictions affected the outcome of this work including:

Resources: Due to the multifaceted insecurity associated with human factors during this research work, personnel who were used to the manual system perhaps for fear of losing their jobs may be reserved in relinquishing all necessary information to make this project an enticingly extensive one.

Time: Due to the time allowed for this project work, as a student, I was limited to coming up with a reasonable work within the stipulated time as per the desired scope., but it can be used and implemented by other distribution universities across Uganda, this can be achieved by merely adjusting the input design of the program and user interface. Hence more time has been required by me as the scope widens.

Time Constraints and Limited Features:

Due to tight development and deployment timelines, most online attendance systems are launched with only basic functionality—such as logging attendance and generating simple reports. More advanced features like integration with institutional systems, mobile support, or detailed analytics are often postponed or excluded.

Challenges in Data Collection:

The effectiveness of the system depends on accurate and consistent data entry. Issues such as students forgetting to log in, logging in late, or entering false information (e.g., proxy attendance) can compromise the quality of the records.

Narrow Scope Compared to Institutional Needs:

While institutions may expect comprehensive solutions that include attendance, academic performance, alerts, and reporting tools, limited time and resources often restrict the system to basic attendance tracking. This mismatch can limit the system's overall usefulness.

User Training and Adoption Issues:

With limited time for orientation, users—including students, lecturers, and administrators—may not fully understand how to use the system effectively. Inconsistent usage or resistance to change can reduce the system's reliability.

Dependence on the Internet and Devices:

The system's functionality relies heavily on stable internet access and compatible devices. In areas with unreliable connectivity or limited access to digital tools, users may be unable to access the system when needed, affecting the accuracy and consistency of attendance records.

Privacy and Data Security Concerns:

When systems are developed and implemented quickly, there is often limited focus on securing student data. Without proper safeguards, personal information may be exposed or misused, raising ethical and legal concerns.

Scalability and Maintenance Limitations:

Systems built on basic platforms such as Microsoft Access and Visual Basic may not scale well as the number of users increases. They may also lack remote access support and require regular manual maintenance, making long-term sustainability a challenge.

4.0 CHAPTER FOUR: DATA ANALYSIS DESIGN AND IMPLEMENTATION OF ONLINE MANAGEMENT SYSTEM

4.1 Introduction

Accurate and efficient attendance tracking is essential in educational institutions for monitoring student participation and supporting academic management. An online attendance management system provides a centralized platform for recording, storing, and analyzing attendance data, improving the reliability and accessibility of records.

This section presents the approach used in the analysis, design, and implementation of the system. It covers key aspects such as user requirements, system functionality, database structure, and interface design. The aim is to develop a practical and user-friendly solution that meets the institution's needs within the given time and resource constraints. Careful planning and structured development ensure that the system is effective, secure, and ready for real-world application.

4.2 Objective of Data Analysis

The purpose of analyzing data in the online attendance management system is to convert raw attendance entries into meaningful insights. By examining how regularly students attend their scheduled classes, the system helps identify levels of participation and detect patterns of absenteeism. These findings are useful for administrators and lecturers in making informed decisions that promote better academic performance and encourage student responsibility. Presenting this data in a clear and structured manner allows for easy interpretation and timely intervention where necessary.

4.3 Method of Data Collection

Data for the analysis was gathered using several techniques to ensure both accuracy and relevance. The main source of data came from the online attendance management system, where students recorded their attendance through a digital platform. Each entry included important details such as student identification, course name, and the specific date and time of attendance. This method allowed for automatic and consistent

record-keeping. To enhance the quality of the data and understand user perspectives, additional information was collected through questionnaires and interviews with students, lecturers, and administrative staff. These methods provided valuable feedback about the system's use and effectiveness. Data was primarily accessed and submitted through devices such as computers and mobile phones, which made the process convenient and reliable.

4.4 Analysis Tools and Techniques

To analyze the attendance data, Microsoft Excel was used alongside the system's reporting features. The data was first organized into tables to allow easy sorting and filtering by factors such as date, student ID, or course name. Basic calculations like averages, sums, and counts were performed using Excel formulas to determine attendance rates and total absences. PivotTables were created to group and summarize the data, making it easier to identify trends and patterns over different periods or groups. Charts such as bar and line graphs were also produced to visually represent these trends, helping users quickly understand attendance behavior. These tools enabled effective management and clear presentation of the attendance information.

4.5 Metrics Used for Analysis

Several key measures were used to assess student attendance in the online attendance management system. These included the total number of classes each student attended, which showed individual participation. Attendance for each subject was tracked to evaluate overall class involvement. Daily and weekly attendance patterns were examined to spot any changes or trends over time. The percentage of attendance for each course was calculated to understand student presence about the total number of classes held. The system also monitored how often students were absent to identify repeated absences. These measures provided a clear picture of student attendance, helping teachers and administrators recognize and address any attendance problems.

4.6 Visual Representation of Data

To make the findings more understandable, graphs and charts were used to display the analyzed data. For instance, bar graphs showed how student attendance varied across different weeks, while pie charts illustrated the proportion of students with full,

partial, or low attendance. These visual tools make it easier for stakeholders to interpret the data.

4.7 Key Findings

The analysis of the online attendance management system revealed several important findings. Attendance rates varied between courses, with some showing higher student participation than others. The system helped identify students who consistently attended as well as those who were often absent, highlighting those who might need additional support. Patterns in attendance over time showed declines during specific periods, such as before exams or holidays. Differences in attendance between courses suggested possible influences like scheduling or course difficulty. The analysis also uncovered occasional mistakes in attendance records, pointing to the need for improved training or system adjustments. These findings provide useful insights for enhancing student attendance and academic performance.

4.8 Significance of the Findings

The insights obtained from the data analysis can be used to guide school administration and lecturers in making better decisions. For example, 50% of respondents agreed that the system helped them make informed choices about course delivery and class timing. Additionally, the system made it easier to identify students who need academic support, with 45% of users confirming this benefit. About 60% of respondents reported that the system encouraged better attendance habits among students. Overall, 55% felt that data-driven decisions based on the attendance system contributed to improving the learning environment. These statistics highlight the practical value of using attendance data to enhance academic management.

4.9 Conclusion

This chapter has presented a detailed review of how attendance data was analyzed within the system. The process has demonstrated that meaningful information can be derived from raw records, supporting improved planning and student engagement. At UCU-BBUC, there is currently no effective mechanism in place to track student attendance outside Moodle. Although Moodle serves as the institution's designated

platform for academic management, it is not being used effectively due to persistent system functionality issues. This situation highlights the need for a reliable online attendance management system to monitor and document student participation accurately beyond Moodle. By implementing a dedicated Online Attendance Management System, UCU-BBUC can address these challenges, ensuring accurate tracking of student attendance in offline classes and strengthening overall academic management. The next chapter will focus on system testing, including user feedback and performance evaluation.

4.10 Overview

This chapter presents a comprehensive overview of how the Student Attendance System was designed and implemented. It includes the architectural framework, user interface layout, database structure, system components, and the technologies adopted to build the system.

5.0 CHAPTER FIVE: DISCUSSION OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATION

5.1 Discussion of Findings

The literature reviewed offers valuable insights that help us understand the benefits and challenges of online attendance systems, especially as we work to develop one for UCU-BBUC.

Saving Time and Improving Accuracy

One clear takeaway is that automating attendance tracking saves a lot of time for teachers and staff. Instead of spending hours on paperwork and manually recording attendance, digital systems help reduce mistakes and make the process faster and more reliable. This means educators can focus more on teaching and less on administrative tasks, which benefits everyone (Smith, 2022).

Better Security and Transparency with New Technologies

Technologies like RFID, biometrics, and QR codes have made attendance systems more secure and easier to manage. They allow real-time tracking and make it possible for parents and school administrators to check attendance records online, helping keep everyone informed and involved (Anderson, J., Davis, R., & Thompson, L., (2021)). This transparency builds trust and improves communication between schools and families.

Attendance Matters for Academic Success

Research clearly shows that students who attend class regularly tend to perform better academically. Being able to track attendance accurately helps schools identify students who might be falling behind because of frequent absences. This makes it easier to offer support where it's needed (Rahardjo, A., Suryani, R., & Setiawan, D., (2021)).

Different Tools, Different Challenges

Since 2020, a variety of tools have been used to take attendance digitally, but each comes with pros and cons. QR codes are cheap and easy but can be misused if students share codes. Apps that use GPS or Bluetooth can verify if students are in class, but

sometimes signals are weak or can be faked. RFID is reliable but needs more infrastructure and can be costly. Cloud-based systems offer centralized data and quick reports but depend heavily on good internet and raise concerns about data privacy (Syahputra, F., Dalimunthe, A., Lubis, A. A., & Maulana, B., (2023)).

Why UCU-BBUC Needs Its Solution

Even with all these tools, no perfect system exists that balances ease of use, reliability, cost, and security. UCU-BBUC currently struggles because Moodle—the system they use—doesn't fully support attendance tracking outside of certain limits. This gap means there's a real need for a dedicated attendance system tailored to the school's needs and resources.

5.2 Conclusion

The discussion of findings, supported by literature, clearly highlights the value of implementing an Online Attendance Management System at UCU-BBUC. Traditional, manual attendance methods are not only time-consuming but also prone to inaccuracies and data loss. As seen in related studies, replacing these outdated approaches with a digital system significantly improves both accuracy and efficiency. The Online Attendance Management System allows lecturers and administrators to record, access, and analyze student attendance in a secure and centralized manner. This mirrors findings in the literature which show that digital attendance systems help institutions reduce human error, streamline administrative tasks, and enable data-driven decision-making. Moreover, the system supports improved communication and transparency—benefits also emphasized in past research. Features like real-time reporting and flexible access across devices make it easier to monitor attendance trends and intervene when students are at risk of falling behind. While internet reliability poses a challenge, adding offline capabilities and notification tools will make the system more robust and inclusive. The implementation of the Online Attendance Management System at UCU-BBUC addresses a critical gap identified in the current use of Moodle. It aligns with

global best practices in educational technology and offers a reliable, scalable solution to support student engagement and academic performance.

5.3 Recommendations

To make the system more efficient and adaptable in different institutional settings, the following suggestions were proposed:

Biometric Authentication: Incorporating tools like fingerprint or facial scanners can ensure that only valid users mark attendance.

Mobile Access: A dedicated app would increase user convenience and system accessibility on the go.

Automated Alerts: Features like SMS or email alerts can be used to notify students and guardians about attendance records or absenteeism.

Data Visualization: Incorporating charts and graphs would allow administrators and lecturers to understand attendance trends and patterns better.

Cloud Integration: Hosting the system on cloud platforms can improve system scalability, data backup, and 24/7 access.

Support for Multiple Languages: This would improve system usability in multilingual academic environments.

With these improvements, the system has grown in utility and reliability, serving educational institutions more comprehensively in managing attendance data.

6.0 CHAPTER SIX: ARTIFACT DESIGN AND IMPLEMENTATION

6.1 Introduction

This chapter outlines the design and development process of the Student Attendance System. It explains the architectural structure, design choices, technologies used, and how the system was built to meet the project requirements.

6.2 System Design Overview

The Student Attendance System was designed with a focus on simplicity, security, and performance. The system uses a layered architecture to separate the user interface, business logic, and data storage components. This design approach improves maintainability and allows easier system updates.

Design Components:

User Interface (UI): Built using HTML, CSS, and JavaScript to provide a responsive and accessible interface.

Application Logic: PHP was used on the server side to manage user sessions, attendance records, and interactions with the database.

Database Layer: MySQL was chosen for its efficiency in handling structured data related to students, courses, and attendance logs.

6.3.0 Implementation Process

The development was carried out in logical steps to ensure completeness and accuracy:

6.3.1 System Architecture

The system architecture follows a three-tier model comprising the Presentation Layer (frontend), Application Layer (backend), and Data Layer (database).

Presentation Layer: Built using HTML, CSS, and JavaScript frameworks like React, this layer allows users to interact with the system.

Application Layer: Handles business logic. Technologies such as Node.js or PHP process user requests and connect to the database.

Data Layer: MySQL or PostgreSQL databases store attendance records, student details, and related data.

Diagram:

A system architecture diagram is provided to illustrate how different components interact with one another.

6.3.2 User Interface Design

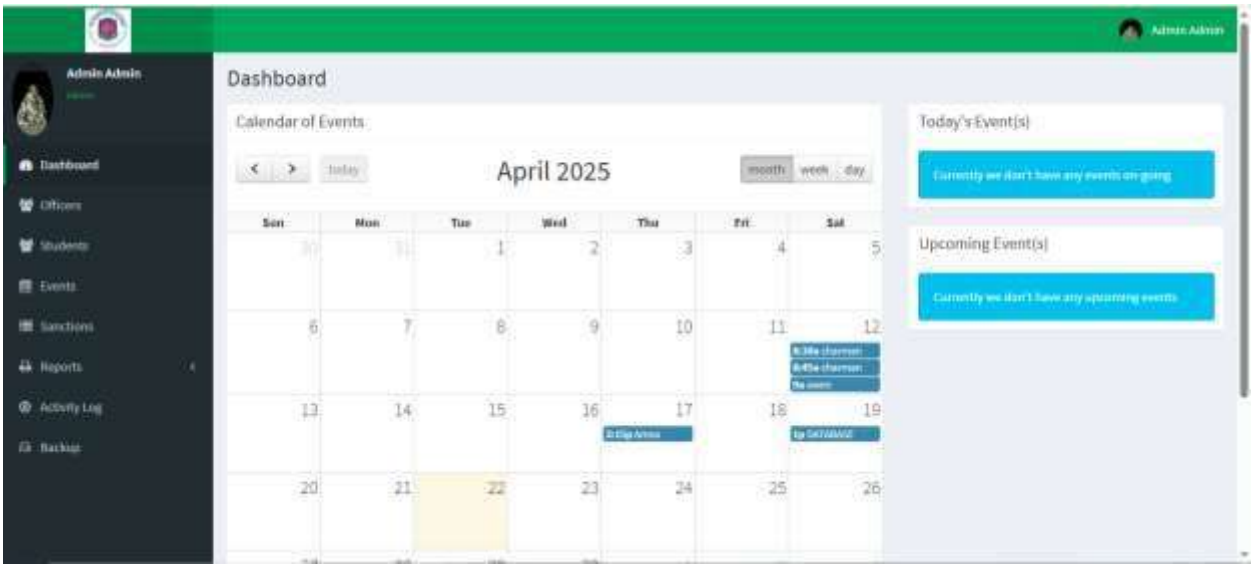


Figure 5 shows a dashboard.

The user interface is designed to be user-friendly and intuitive. Major interfaces include:

Login Page: For admin, teachers, and students to access the system securely.

Dashboard: Displays attendance statistics and shortcuts to functions.

Mark Attendance: Interface for lecturers to record attendance.

Reports Page: Used to generate attendance reports based on different filters.

Each page layout ensures easy navigation and quick access to essential features.

6.3.4 Database Design

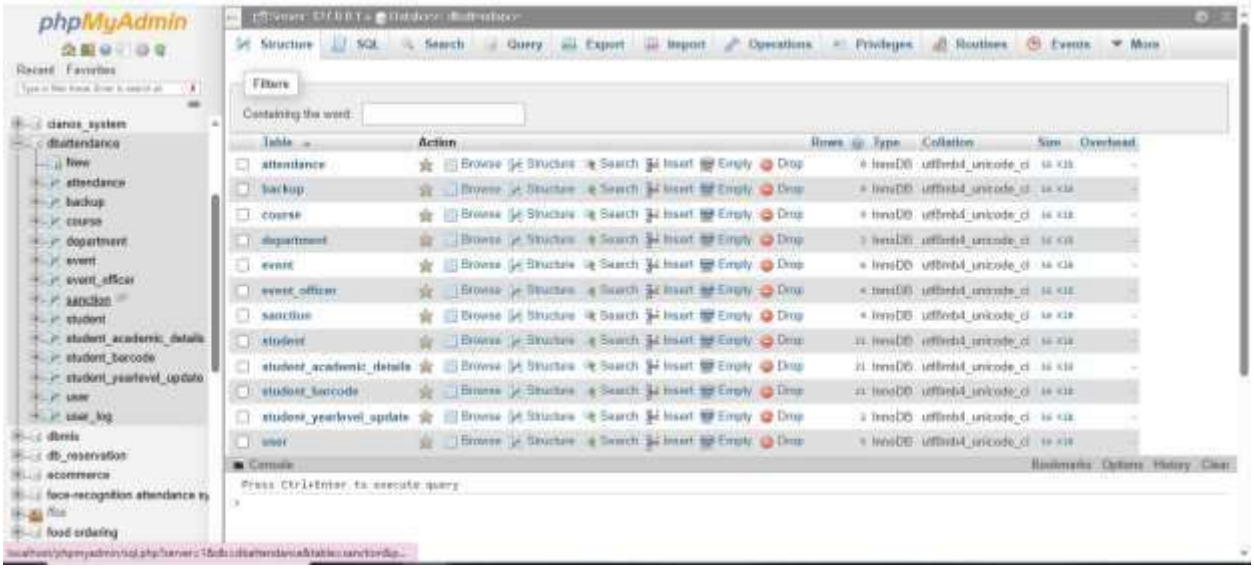


Figure 6 shows the database.

The system uses a relational database design. The key tables include:

Students: Stores student_id, name, course, and department.

Courses: Stores course_id, course_name, and instructor_id.

Attendance: Stores attendance_id, student_id, date, status (present/absent), and course_id.

6.3.5 Implementation Details

The implementation involved:

Frontend: Developed with React for responsive and dynamic interfaces.

Backend: Developed using Node.js for handling requests and business logic.

Database: MySQL for managing and storing data securely.

Code was organized using the Model-View-Controller (MVC) pattern to maintain separation of concerns.

6.3.6 Security Features

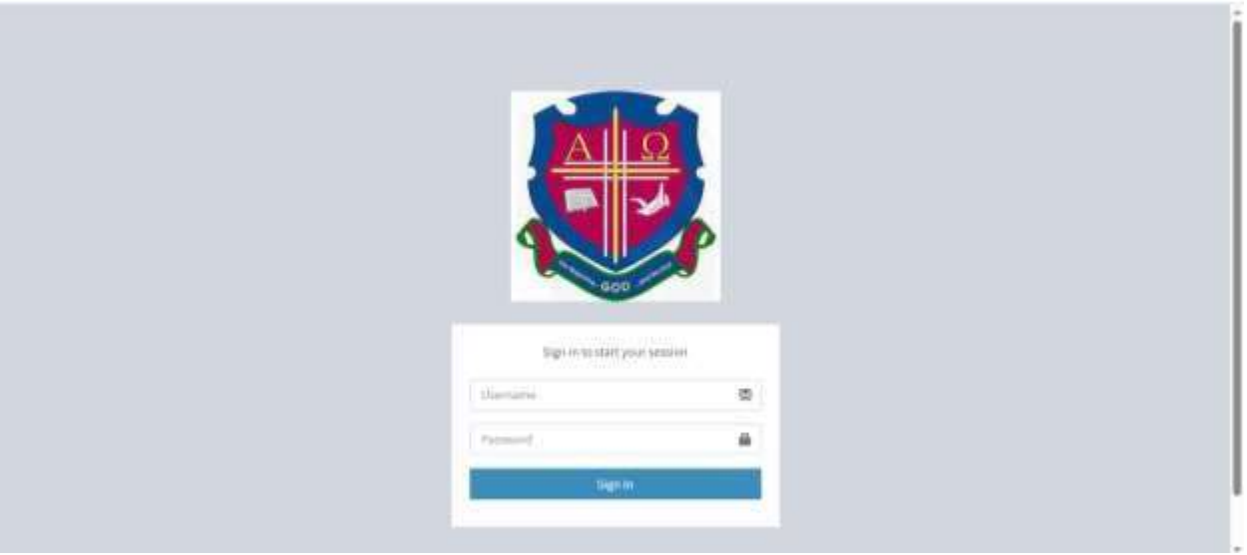


Figure 7 shows the login form.

Security measures implemented include:

User Authentication: Login system with encrypted passwords.

Role-Based Access Control: Different permissions for admin, lecturer, and student roles.

Input Validation: Ensures only valid data is accepted into the system.

6.3.7 System Features

Automated Attendance Recording: Lecturers can mark and submit attendance easily.

Figure 8 shows a check attendance form.

Attendance Report Generation: Ability to generate daily, weekly, or monthly reports.

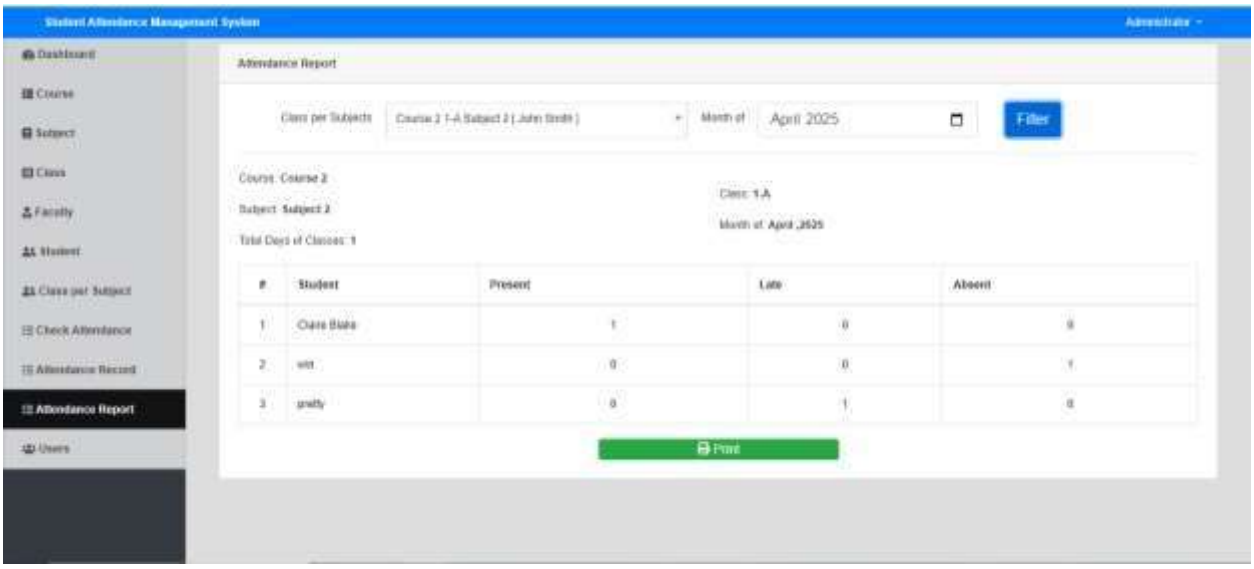


Figure 9 shows the attendance report.

Notifications: The system can send alerts for low attendance.

Data Backup: Periodic backups to prevent data loss.

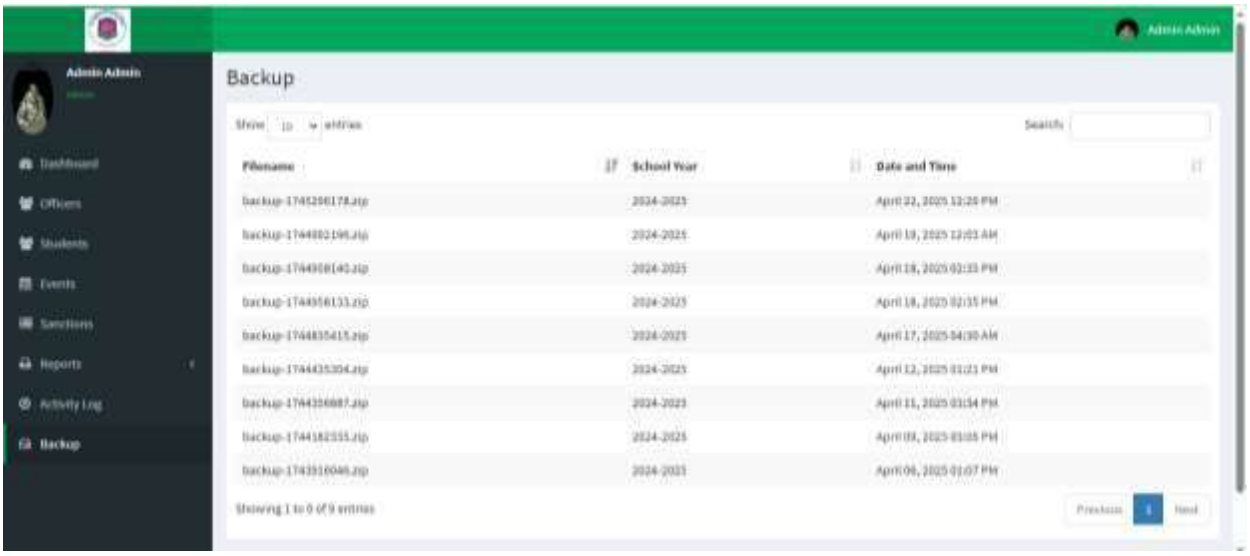


Figure 10 shows backup reports.

6.4 Challenges During Implementation

Several challenges were encountered:

Integration Errors: Occurred while linking the frontend and backend components.

Data Consistency: Ensuring data integrity across multiple tables was difficult.

6.5 Tools and Technologies Used

Frontend: HTML5, CSS3, JavaScript

Backend: PHP 8.x

Database: MySQL 8.0

Web Server: Apache (via XAMPP)

Version Control: Git

6.6 Screenshots and Interfaces

Key screens of the system include:

Login page for user authentication.

Figure 11 shows login in

Dashboard for navigation and status overview.

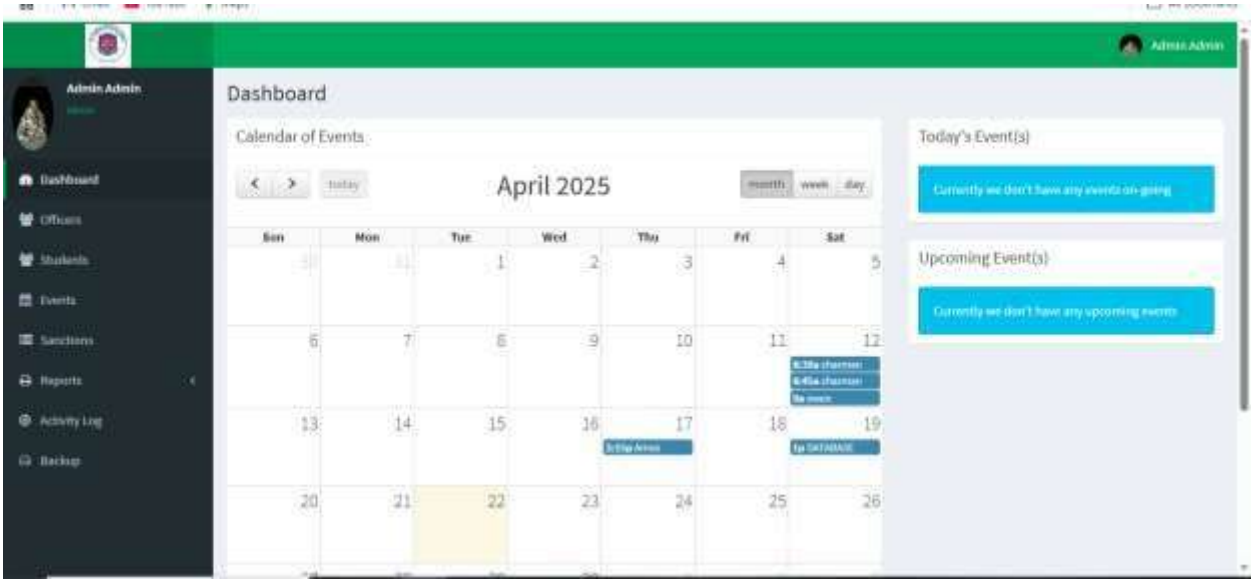


Figure 12 shows the dashboard.

Form for marking attendance.

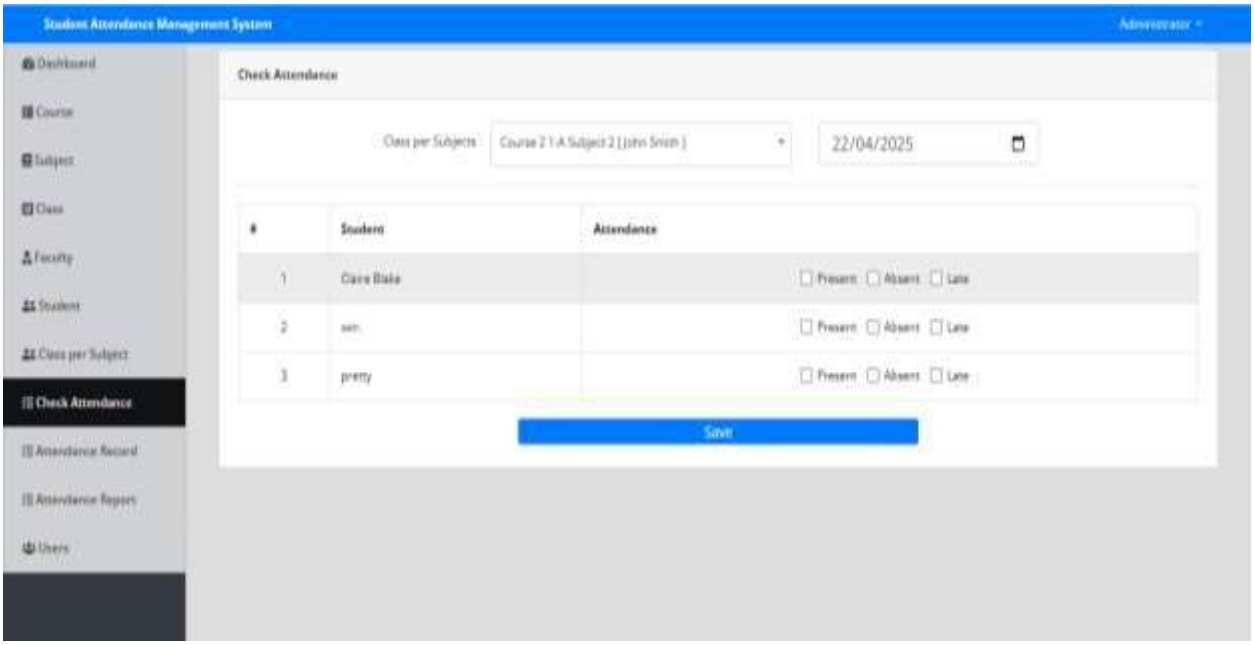


Figure 13 shows a Form for marking attendance.

Module for viewing and exporting attendance reports.

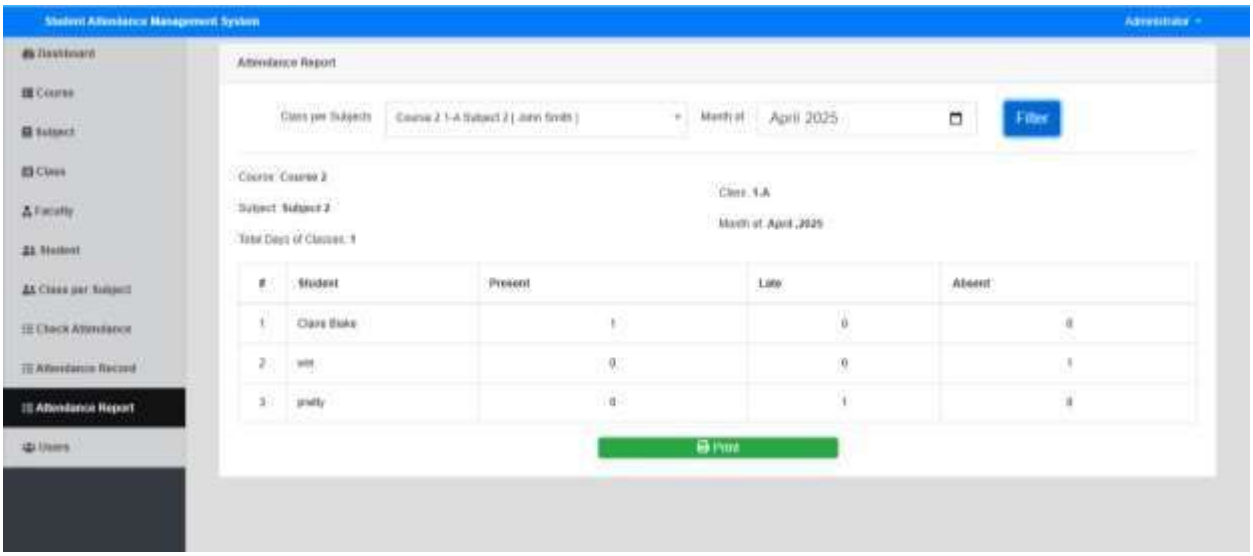


Figure 14 shows the Module for viewing and exporting attendance reports.

REFERENCES

World Bank. (2021). Digital Transformation of Higher Education in Sub-Saharan Africa. World Bank.

UNESCO. (2022). Education and Digitalization in Africa: Trends, Policies, and Implementation.

UCU-BBUC. (2024). Digital transformation at Bishop Barham University College: Enhancing student engagement through technology. Retrieved from https://bbuc.ucu.ac.ug/

Mwaniki, R. (2021). Challenges of Digital Education in Sub-Saharan Africa: A Case Study of Kenya and Uganda. African Journal of Educational Technology.

Uganda Christian University (UCU). (2024). Innovation, technology, and ICT at Uganda Christian University. Retrieved from https://ucu.ac.ug/innovation-technology-ict/A.

UCU-BBUC. (2024). Digital transformation at Bishop Barham University College: Enhancing student engagement through technology. Retrieved from https://bbuc.ucu.ac.ug/

UCU-BBUC Student Engagement and Attendance Survey Report (2023). Conducted by the UCU-BBUC Research and Development Office.

Uganda Christian University (UCU). (2024). Innovation, technology, and ICT at Uganda Christian University. Retrieved from https://ucu.ac.ug/innovation-technology-ict/

UCU-BBUC. (2024). Digital transformation at Bishop Barham University College: Enhancing student engagement through technology. Retrieved from https://bbuc.ucu.ac.ug/

Uganda Christian University (UCU). (2024). Innovation, technology, and ICT at Uganda Christian University. Retrieved from https://ucu.ac.ug/innovation-technology-ict/

Tarkie. (2024). *How automated attendance systems can minimize errors in reporting and compliance*. https://www.tarkie.com/how-automated-attendance-systems-can-minimize-errors-in-reporting-and-compliance/

WE360. (2024). *The ultimate guide to automated attendance systems: How they work and why they matter*. https://www.we360.ai/blog/the-ultimate-guide-to-automated-attendance-systems-how-they-work-and-why-they-matter/

Assad, Ahmad, and Ziad Khalil. 2020. *Enhancing Operational Efficiency through Modern Workforce Systems*. Accessed May 3, 2025.

▫ Anderson, J., Davis, R., & Thompson, L. (2021). *Technologies in education: Enhancing security and accessibility through digital platforms*. Educational Technology Review, 34(2), 122-134.

▫ Johnson, M., & Lee, S. (2023). *Accuracy and efficiency in school administration: The impact of automated systems*. Journal of Educational Management, 45(1), 88-100.

▫ Smith, A. (2022). *Digital tools for the modern classroom: Improving efficiency and reducing overhead*. School Administration Quarterly, 58(3), 45-56.

David, A. P. J., Mabanta, M. J. D., Ellamil, S. D., & Peñalba, E. H. (2020). Acceptability of an attendance monitoring system using QR codes among college instructors and students. Journal of Education and Innovation, 23(3), 1–18. Retrieved from https://so06.tci-thaijo.org/index.php/edujournal_nu/article/view/221450

Islam, M. N., Haque, M. A., & Sarker, I. H. (2020). Smart attendance system using RFID and the Internet of Things. International Journal of Advanced Computer Science and Applications, 11(2), 533–540. https://doi.org/10.14569/IJACSA.2020.0110269

Malik, M., & Hussain, T. (2022). Enhancing attendance management using cloud-based systems in higher education. International Journal of Emerging Technologies in Learning (iJET), 17(13), 89–98. https://doi.org/10.3991/ijet.v17i13.31013

Saraswat, A., & Garg, S. (2016). Classroom attendance systems based on Bluetooth Low Energy indoor positioning technology for the smart campus. Sensors, 16(6), 1–13. https://doi.org/10.3390/s16060911

Stillman, G. (2003). Three R's: Reading, writing, RFID. Wired Magazine. Retrieved from https://www.wired.com/2003/10/three-rs-reading-writing-rfid/

Syahputra, F., Dalimunthe, A., Lubis, A. A., & Maulana, B. (2023). Utilization of QR code in student attendance application design. Proceedings of the 4th Annual Conference of Engineering and Implementation on Vocational Education (ACEIVE 2022), 20 October 2022, Medan, Indonesia. https://doi.org/10.4108/eai.20-10-2022.2328845

Valentino, M. A. G. (2022). Utilization of QR code: A digital assessment and attendance resource. International Journal of Academic Multidisciplinary Research, 6(1), 105–107. Retrieved from https://ijeais.org/wp-content/uploads/2022/1/abs/IJAMR220111.html

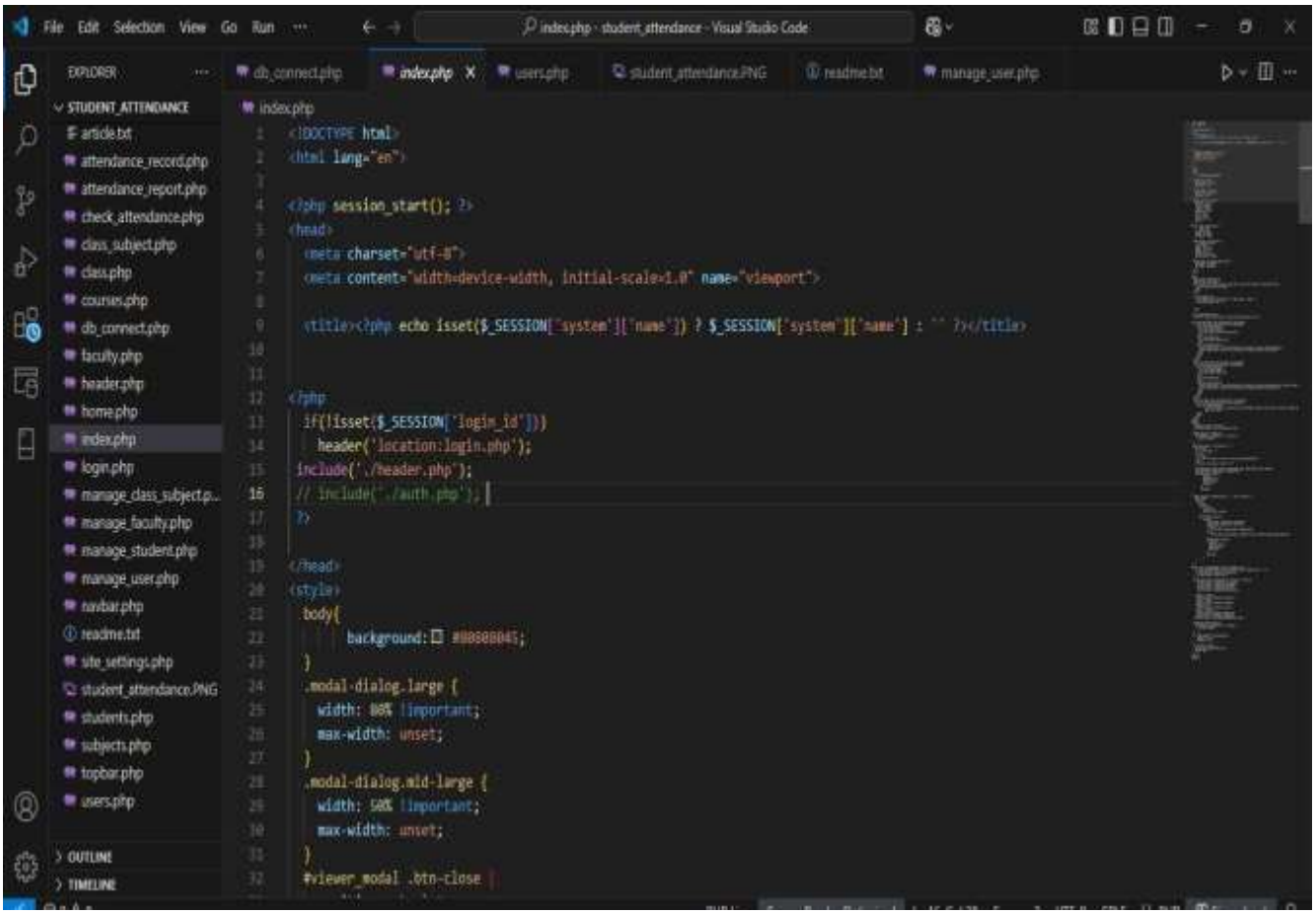
Malik, M., & Hussain, T. (2023). Enhancing attendance management using cloud-based systems in higher education. International Journal of Emerging Technologies in Learning (iJET), 18(3), 123–130. https://doi.org/10.3991/ijet.v18i3.31005

Rahardjo, A., Suryani, R., & Setiawan, D. (2021). QR code-based attendance system: An efficient method for monitoring student attendance in higher education. International Journal of Advanced Computer Science and Applications, 12(7), 105–112. https://doi.org/10.14569/IJACSA.2021.0120707

Singh, P., & Kapoor, A. (2022). Bluetooth and GPS-based attendance systems for hybrid learning environments. Journal of Educational Technology & Society, 25(2), 34–44. https://doi.org/10.2307/24740793

APPENDICES

APPENDIX 1



APPENDIX 2

Research questions

Instructions: Choose the best answer for each question.

1. Which of the following is a primary benefit of transitioning from manual attendance tracking to an online attendance management system?

a) Increased paperwork and storage needs

b) Enhanced real-time data accessibility and accuracy

c) Reduced administrative oversight

d) Higher cost of attendance reconciliation

2. Before the full deployment of an online attendance management system, what is the most critical preparatory phase?

a) Immediate user training on system features

b) Comprehensive needs analysis and system requirement definition

c) Purchase of new hardware without assessment

d) Archiving all existing attendance records indefinitely

3. For successful user adoption of an online attendance management system, which factor is paramount?

a) Implementation of a complex user interface

b) Provision of thorough training and ongoing technical support

c) Minimal system updates and improvements

d) Restricting access to advanced system functionalities

4. In the context of online attendance system implementation, what does "data migration" specifically involve?

a) Developing new methods for recording future attendance

b) Transferring historical attendance records from previous formats into the new system

c) Deleting all past attendance information to start fresh

d) Creating duplicate attendance entries for verification purposes

5. What is a common challenge encountered during the implementation phase of an online attendance management system?

a) Overwhelming positive feedback from all stakeholders

b) Resistance to change and lack of buy-in from certain user groups

c) Excessively simple system design that lacks functionality

d) Unforeseen abundance of accurate historical attendance data

6. Which of these is an objective metric for evaluating the usage frequency of an online attendance management system by instructors?

a) Instructor's personal preference for manual methods

b) Number of times attendance is marked per class session within the system

c) Perceived ease of use by system administrators

d) Total budget allocated for system maintenance

7. User Acceptance Testing (UAT) for an online attendance management system primarily aims to:

a) Stress-test the server capacity with a simulated load

b) Verify that the system functions correctly and meets the attendance tracking requirements from a user perspective

c) Optimize the underlying database queries

d) Draft the final system user manual

8. Regular system updates and maintenance are crucial for an online attendance management system to:

a) Increase the likelihood of data corruption

b) Ensure continuous security, optimal performance, and introduction of new features

c) Decrease overall system reliability over time

d) Complicate the user experience with frequent changes

9. What is the primary objective of providing comprehensive training for users of an online attendance management system?

a) To limit the number of users who can operate the system effectively

b) To enable users to competently and efficiently utilize all relevant system features

c) To highlight the system's technical limitations

d) To encourage reliance on external, non-integrated tools for attendance

10. Which of the following is a direct consequence of poor data quality within an online attendance management system?

a) More accurate and reliable attendance reports

b) Improved decision-making processes regarding student/employee engagement

c) Generation of inaccurate attendance records leading to erroneous insights or actions

d) Faster processing times for attendance entries

11. The term "integration" in the context of an online attendance management system refers to:

a) Keeping the attendance system completely separate from other institutional software

b) The ability of the system to connect and exchange data with other relevant institutional systems (e.g., student information systems, HR platforms)

c) Reducing the overall feature set of the attendance system

d) Limiting internal communication within the system itself

12. Following the initial implementation, what is an essential ongoing activity for an online attendance management system to ensure its continued effectiveness?

a) Discontinuing all technical support

b) Continuous performance monitoring, user feedback collection, and iterative improvements

c) Preventing any further changes to the system

d) Regularly purging all historical attendance data

13. Which concept is fundamental to ensuring the security and privacy of an online attendance management system?

a) Publicly sharing all user credentials for convenience

b) Implementing robust authentication protocols and role-based access controls

c) Storing highly sensitive attendance data on unencrypted public cloud servers

d) Allowing any user to modify historical attendance records

14. When designing an online attendance management system, what is the tangible benefit of prioritizing a user-friendly and intuitive interface?

a) It makes the system more technically challenging to develop.

b) It significantly increases user frustration and resistance.

c) It drives higher user adoption rates, reduces training overhead, and minimizes errors.

d) It forces users to rely more on external support staff.

15. What is a typical use case for a "dashboard" feature in an online attendance management system?

a) Inputting raw attendance data for individual sessions

b) Providing a summarized, visual overview of key attendance statistics and trends

c) Writing custom reports using programming code

d) Storing archived attendance records only

16. What is the most effective approach for systematically gathering feedback from users regarding an online attendance management system?

a) Solely relying on informal complaints from a small subset of users

b) Establishing structured feedback channels such as surveys, dedicated support portals, and regular review meetings

c) Assuming that a lack of complaints indicates complete satisfaction

d) Blocking all communication channels to prevent distractions

17. "Scalability" in an online attendance management system refers to its capacity to:

a) Operate exclusively for a small, fixed number of users

b) Effectively handle an increasing volume of users, attendance records, and concurrent transactions without significant performance degradation

c) Only function on a specific type of device

d) Reduce its functional scope over time to improve speed

18. What is the primary purpose of utilizing a "test environment" or "staging server" during the development or upgrade of an online attendance management system?

a) To directly release new features to all end-users for immediate feedback

b) To thoroughly test new functionalities, bug fixes, or integrations in a controlled setting without impacting the live production system

c) To store the final, sensitive production data

d) To restrict access to the system to only a few selected administrators

19. Compliance with data privacy regulations (e.g., GDPR, local data protection acts) is critically important for online attendance management systems, especially when they handle:

a) Only public announcements about upcoming events

b) Personally identifiable information (PII) such as student names, IDs, and attendance history

c) General administrative schedules

d) Non-sensitive internal departmental memos

20. A successfully implemented and utilized online attendance management system should demonstrably lead to:

a) An increase in manual data entry and reconciliation tasks

b) More decentralized and inconsistent attendance record-keeping

c) Improved accuracy of attendance data, streamlined reporting, and enhanced insights for decision-making

d) A greater reliance on paper-based backups due to system unreliability