LOCATION-BASED STUDENT ATTENDANCE MANAGEMENT SYSTEM

(CASE STUDY: BUSITEMA UNIVERSITY NAGONGERA CAMPUS)

BY

ETYONO ISAAC

BU/UP/2021/0901

isaacetyono@gmail.com

0760547129/0759334475

A RESEARCH REPORT SUBMITTED TO THE FACULTY OF SCIENCE AND EDUCATION FOR THE STUDY LEADING TO A PROJECT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE AND EDUCATION

BUSITEMA UNIVERSITY

SUPERVISOR

DR LUKYAMUZI ANDREW

DEPARTMENT OF COMPUTER STUDIES

DECLARATION

I ETYONO ISAAC Declare that the work presented in this project is mine

Signature: ____________________ date: 4th/05/2024

APPROVAL

This project report has been submitted for examination with the approval of the supervisor.

DR LUKYAMUZI ANDREW

SIGNED: ______________________ DATE: 4th/05/2024

TABLE OF CONTENT

Table of Contents

LIST OF ABBREVIATIONS AND ACRONYMS

DFD Data Flow Diagram

ERD Entity Relationship Diagram

LBSAMS Location-Based Students Attendance Management System

HTML Hypertext markup Language

CSS. Cascading Style Sheets

PHP. Hypertext Preprocessor

SSADM Structured System Analysis and Design Methodology.

ABSTRACT

Location-based students attendance system is a software tool that captures daily student attendance records from universities and schools facilitates access to the attendance of a particular student in a particular class and helps in generating reports and evaluating the attendance eligibility of a student. Rather than signing an attendance sheet manually, the attendance records are captured into the database which makes it easier to be managed.

The study was conducted at Busitema University Nagongera Campus. It resultantly came up with a location-based student attendance management system that aids in managing the physical and online students' attendance records.

The major objective of the study was to develop a location-based student attendance management system for Busitema University, the management can capture students' location and compute students' class records.

The specific objectives included investigating the current system, gathering requirements for the new system, and designing, testing, and implementing the developed system. Data was gathered using interviews, observation, and questionnaires. The collected data was sorted and analyzed using Microsoft excel software and it was found that the current manual system is inefficient, time and space consuming in addition to being insecure hence judged not good for the management of attendance records.

With the newly developed system (LBSAMS) management can capture, store, compute, and Generate attendance reports based on their location.

CHAPTER ONE

BACKGROUND OF THE STUDY

1.0 INTRODUCTION

The attendance management system is a critical component in the organizational framework, facilitating the systematic recording, storage, and retrieval of attendance data for both lecturers and students at Busitema university. Traditional and reliant on manual methods, the current attendance tracking system proves to be error-prone, time-consuming, and resource-intensive. Recognizing the need for an upgrade, the proposed attendance system integrates modern technology, specifically leveraging. Google Maps, to revolutionize the attendance capture process.

The emergence of a technological paradigm for learning compared to traditional methods and almost all information on the Internet, nowadays has caused students to be less motivated to come to the lecture rooms than ever before. Laziness on the part of students, nonchalance to school work, social activities that have no importance in aiding the objectives of the institution and a lot more, may prevent students from attending lectures. Sequel to these, lecturers and administrators in most institutions of learning have had to come up with ways to ensure healthy participation from students and make sure that the student-lecturer interactive relationship is kept intact(Ellis, 1995). This in some cases have come in simple forms like roll call, while in more interesting cases, can be formatted like surprise quizzes, extra credit in class, etc. these strategies are however time-consuming, stressful, and laborious because the valuable lecture time that could otherwise been used for a more efficient and effective method of automating the entire system of students class attendance (Ellis, 1995)

By transitioning from manual attendance methods to an online system integrated with Google Maps, Busitema University aims to enhance accuracy, save time and reduce administrative burdens. The proposed system aligns with the university's commitment to embracing technological advancements for improved academic management, offering a cost-effective and sustainable solution for long-term implementation.

1.2 PROBLEM STATEMENT:

In many institutions, and academic organizations, attendance is very important criterion which is used for various purposes. These purposes include record keeping, assessment of students and promotion of optimal and consistent attendance in class. As A policy, At Busitema University, a minimum percentage of class attendance is required by students in order to sit for final exams, in most cases this policy has not been adhered to, because of the various challenges the present method of taking attendance present for physical lectures that’s to say,

The manual attendance system at busitema university involves physical attendance sheet registration, this method allows impersonation and the attendance sheets could be stolen or even lost. This traditional approach not only poses challenges in terms of data accuracy but also requires considerable time and effort from both lecturers and administrative staff, this makes it hard difficult to ascertain the number of students that have made the minimum percentage and thus not eligible for exam. The proposed online attendance system, embedded with google maps functionality, offers a transformative shift towards accuracy, Reduction in costs, efficiency and user-friendly experiences for both academic staff and students.

The choice to embed Google Maps in the attendance system is strategic allowing for real-time tracking of the physical presence of students and lecturers. This not only eliminates the need for costly biometric devices but also provides a seamless and intuitive experience for users. The online nature of the system enables simultaneous attendance capture for multiple classes, ensuring a timely and hassle-free process.

1.3 SIGNIFICANCE OF THE STUDY:

This study focuses on the development and implementation of an automated attendance system tailored to the specific needs of a University environment. The significance lies in its potential to streamline attendance tracking across diverse course and enhance the overall academic experience. The system not only aims to provide accurate attendance data but also offers opportunities for real-time monitoring, early intervention, and improved communication between students and faculty.

1.3.1 REDUCE ERRORS.

Location based students' attendance management system reduces the risk of human error and ensures easy, impartial and orderly approach in addressing specific needs without any confusion. In fact, such systems have been shown to have accuracy rate of more than 99% versus systems by eliminating errors in data entry and calculation (schroeder, 2010).

1.3.2 INCREASE PRODUCTIVITY.

Productivity increases because the process is seamless and makes day-to-day operations and convenient. Eliminating legacy practices frees up employees time, decrease staffing overhead, and provides lecturers with timely labor data to more effectively manage their operations.(Nawaz† et al.)

1.3.3 Reduced expenses.

Implementing a technology-based time and attendance solution will immediately help to reduce labor costs. Manually collecting, calculating and processing attendance data take a lot of time, but with a location based students attendance solution, companies are able to increase efficiency and save money (Nawaz† et al.)

1.3.4 SYSTEM APPLICATION

The System can be applied in

Corporate Settings: Many companies deal with attendance tracking for employees, especially for large organizations with multiple branches or remote workers. Implementing a similar system can streamline HR processes and Ensure accurate attendance records.

Healthcare Facilities: Hospitals and clinics can utilize such a system to track attendance of healthcare providers, staff, and even patients for appointments or treatments.

1.3.5 FUTURE FEATURES

Integration with learning management systems (LMS): Connecting the attendance system with the university's LMS can provide a seamless experience for students and faculty, allowing for automatic syncing of attendance records with course rosters and grades.

MAIN OBJECTIVES

To develop an online attendance management system for Busitema University

1.4 SPECIFIC OJECTIVES

- To Review the literature and establish requirements for Developing web-based attendance management system.
- To analyze and design an online attendance management system.
- To implement an online attendance management system
- To test and validate a web-based attendance management system

1.5 SCOPE OF THE STUDY

1.5.1 TIME SCOPE.

The study took 3 months to be conducted where in the first month literature was reviewed and analysis was made this helped to get the clear picture of the current attendance in organizations and institutions

1.5.2 GEOGRAPHICAL SCOPE

the study was conducted in the Department of computer studies in Busitema University Nagongera campus Faculty of science and education. Which was opened on 3rd October 2007

1.5.3 COST SCOPE

The study used around 350,000 where which include purchasing of the API for location and also transport was used to move around different campuses and also through making of phone calls

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

In this chapter, we will explore on a journey to understand how schools and universities keep track of student attendance. We will look into a variety of sources, including books, journals and studies, to see what others have discovered about the attendance management system. Our aim is to figure out what works well, what could be improved, and what areas still need more research.

We will start by looking at the history of attendance systems. Where we shall discover the time when attendance system begun and what forms of attendance where they using.

We shall also look at how attendance used to be recorded by hand and compare it how it's done now with technology. We will also take a close look at the problems that come up and the changes that need to happen to make the new ways of keeping track of attendance work smoothly.

Furthermore, we will explore the use of special devices like fingerprint scanners for keeping track of who's present. These devices are becoming more common, and we want to understand how effective they are in different situation.

By examining all of these aspects this will give us a clearer picture of how attendance systems work, what do they lack and what needs to be added. We want to make it easier for everyone to grasp how they have evolved over time, what obstacles they encounter, and how new technologies like google maps can make a difference.

Through this exploration, we aim to provide valuable insights that can help improve attendance management systems and make them more effective and accessible for all Students and lecturers at Busitema University.

2.1 EVOLUTION OF TIME AND ATTENDANCE SYSTEMS

During the Industrial Revolution factories and industries, it was realized that there is need of capturing the working hours of their workers and monitor the working force. This helped to coordinate the logistic movements, the working hours of employees, and the finished goods. Later time had to be standardized, and workers were given time bound shift. Mechanical clocks and card punching were used and the first attendance system was established.

In the late 20th century the advent of electronic systems overtook mechanical systems. And in the 90's, smart cards-based attendance came into existence, it was considered the best at that time, but as workforce system evolved. These systems became inefficient and left a lot of gap to be fulfilled. By establishing an attendance management system that incorporates Google Maps shows appositive feedback in that students can access the attendance even on their mobile phones hence paving the way for a more efficient and connected future.(Black, 2024)

The historical evolution of attendance management systems is traced back to the industrial revolution in the 1800s, where the introduction of the employees' time clock marked a significant shift from manual labor to machine-based manufacturing. Redcort software's virtual timeclock, as a representative of modern systems, exemplifies a three-decade commitment to customer support and efficiency through a one-time software purchase model.(REDCORT, 2024)

In response to the shortcomings of traditional attendance systems, the concept of attendance management underwent a transformation. Modern attendance management systems now incorporate cutting-edge technologies, Such as Gps tracking and Mobile applications to provide real-time monitoring and accessibility. For instance, the integration of google maps into attendance management systems allows students to conveniently access their attendance records via Mobile phones, fostering greater transparency and engagement

2.1 WHAT IS AN ATTENDANCE

An attendance is for keeping records of number of students present in schools, colleges or in any organization, it is very important In maintaining discipline am employees in an organization and imparting quality education in schools, colleges and if someone changes from the required standards proper action can be taken.(Shailendra et al., 2015)

2.2 WEB-BASED ATTENDANCE MANAGEMENT APPLICATION

In addressing the challenges faced in educational intuitions, a web-based attendance management application is discussed. Where students can take attendance without manually writing it on the paper and this system was developed using php, sql, html bootstrap according to (Hassan & Zubair, 2015) but it lacked some functionalities like capturing on a physical or online lecture and also it lacked tracking of students' location this limited its overall effectiveness in monitoring attendance accurately.

To address these shortcomings and optimize the functionality of the attendance management system, several enhancements can be implemented by integrating features for capturing attendance during physical and online lectures is essential. This entails developing mechanisms to differentiate between in-person and students that are out of the lecture hence ensuring accurate attendance capturing.

Enhancing the system to include location tracking capabilities would significantly its accuracy. By using of GPS OR Wi-fi technology, the system can track student’s whereabouts in real time, providing valuable insights into attendance patterns and identifying students that have not attended that particular lecture.

Another crucial aspect to consider is thee user interface and experience. Designing a user-friendly interface is paramount to ensure easy adoption and usage among students and faculty members. Hence this will help to easily navigate and provide user satisfaction with the attendance management system of Busitema University

2.3 WHAT IS ABIOMETRIC DEVICE

Biometric device is based on a technology that can identify a person using their unique facial characteristics, fingerprints, signatures, DNA, or iris pattern. It has been derived from the Greek terms' 'bio', which means life and metric which means to measure. There are different types of biometric devices and they have varying characteristics, benefits and limitations. While selecting a biometric recognition system, prices are also crucial factor. The most used biometric device is fingerprint, mainly because it is affordable, easily implemented, and user-friendly. These features allow them to have the highest penetration when used in authentication and security systems in smartphones and other portable biometric devices. For scanning a design, biometric input devices like fingerprint scanners employ sensors with several ways to fingerprint, read and generate images.(TUDIP, 2022)

2.3.1 HOW DO BIOMETRIC DEVICES WORK

The entire security structure of biometrics authentication is based on comparison. Biometric systems capture and store individual characteristics that remain constant over time, such as fingerprints, voice, retinal patterns, facial recognition and hand patterns. When a user makes an authentication request, the system compares their biometrics with the data in the database. If there's an accurate match, access is granted. All biometric systems are made of three basic components. A sensor or reader for recording and scanning the biometric factor being used for identification, a program or software that converts the recorded or scanned data into digital formats and compares any new data with the stored one, a database that holds the biometric data so the program can run a comparison check(TUDIP, 2022). This shows that it only captures life but there are some details that are not captured like for example which class has been attended to. This shows that even though it's accurate in capturing attendance there are some needs like capturing the accurate attended class.

2.4 BIOMETRIC ATTENDANCE TRACKING SYSTEM AT MAKERERE UNIVERSITY

Efforts to reduce absenteeism in academic settings are examined through the implementation of a biometric attendance tracking system at Makerere university. Resistance from lectures, communicated via the Makerere university academic staff association (MUASA), shed light on the complexities of integrating advanced attendance management systems in academic environments, emphasizing the unique nature of academic work in contrast to routine public service structures

2.5 EFFECTS OF CLASS ATTENDANCE ON ACADEMIC PERFORMANCE

Students attendance is one of the issues that most teachers in high education institute and universities face today. Many colleges and universities have compulsory attendance policies while others have refrain from making it as such. Despite the different policies, higher education teachers believe that attendance has positive effect in academic performance. Non-attendance in class lecture is seen as one of the reasons for academic failure. By implementing the Busitema Attendance management system will incrementally help to reduce the academic failure of Busitema University students.(Ancheta et al., 2021)

This study showed the outcomes of students who attend and those that don’t attend where by the Omani undergraduate students studying English during the first semester of 2020-2021. The students were required to have atleast an IELTS score of 6.0 to enter the undergraduate program. The study found that about 71% of the students had poor attendance, meaning they didn’t meet the required attendance of 70%. On average, students missed about five classes per semester. The study also showed that there’s a significant link between attendance and academic performance in English classes. This clearly indicated that students who attended more classes tend to get higher grades, hence attendance is important for learning and academic success.

Course Name	Number (N)	Attendance		Academic Performance	
		Mean	SD	Mean	SD
ELC 1	155	5.33	2.90	38.81	18.67
ELC 2	155	5.34	2.99	40.57	18.86
Total	**310**	**10.67**	**5.89**	**79.38**	**37.53**

2.6 GOOGLE MAPS API AND MAPBOX API PERFORMANCE

According to(Saputra et al., 2019) the Performance of Google API is more accurate than the Google box API where by on their measurements they found out that the error percentage of Google API is 9.250% and that for Google Box API is 12.128% from these results the calculation shows that in calculating the distance google maps is more accurate than google box API.(Saputra et al., 2019)

2.6.1 HOW TO USE GOOGLE MAPS API

Visit google console page. After signing up on the project selector page, click create project to begin to create new cloud project. Make sure that billing is enabled for your cloud project. Confirm that billing is enabled for your project. Google cloud offers a $0.0 charge trial meaning anyone can test it out on his or her project, and that you can cancel any time because the trial expires after 90 days and then after that you are charged. Once you are set up you can begin using the google map API(TUDIP, 2022)

2.6.2 WHY IS GOOGLE API IMPORTANT

The ability to access Data and computing resources greatly increases a developer's efficiency. It is much easier to use an API than to build every single program. Method or dataset from scratch. APIs re built with the developer in mind and many a time does not offer a graphical user interface (GUI). Google offers APIs that can be applied to many different fields and sectors. APIs are often used in Web development, machine learning, data science and system administration workflow.(TUDIP, 2022)

2.7 CLASS ROOM MEETINGS

Educators must find ways of to create acclimate of cooperation in order to teach students to teach the academic, social, and emotional skills they need function successfully according to (Edwards & Mullis, 2003) this in turns makes it great idea for tracking lecturers if it's physical lecture. If a lecturer submits the attendance his location is covered and if students are not near to the lecturer no attendance can be captured hence enabling lecturers to meet in a class room for making attendance.

Student Attendance is one of the issues that most teachers in higher education institutions (HEIs) is facing today. Many colleges and universities have compulsory attendance policies while others have refrain from making it as such. Despite the different performance. Non-attendance in class lecture is seen as one of the reasons for academic failure.

Relationships between attendance and academic performance while other disagree on the matter. Darling-Hammond (2000) argues that attending classes regularly is important in providing students an opportunity achieve a desired learning outcome.

Moreover, researchers found that when the material covered in the class was not available in the course textbook, students who attend classes benefited from interactions with the teacher and classmates and did better in the examinations. Students who attend classes also were able to take class notes, and such note taking has been shown to have positive learning benefits (Ehsaan, 2013). A widely cited study of Romer (1993) on absenteeism of undergraduate students in economics reported that the average attendance rate of the students was 67 percent and showed a significant difference in the mean of GWA of students with strong attendance over those with poor attendance. He reported positive effects of class attendance on performance that prompted some researchers to undertake the same study to improve on attendance of students and even make it mandatory as a requirement for attending semester examinations. He even suggested that class attendance must be considered mandatory in order to increase attendance rate.

Absenteeism is one of the common problems observed by teachers today. There are many attempts that researchers have defined absenteeism. The definition depends upon the cultural setting of the students.

CHAPTER THREE

METHODOLGY

3.0 INTRODUCTION

This chapter outlines the methodology used in conducting our study on the attendance management system. We will delve into the process of designing the attendance management system, collecting of data, engaging with participants, conducting analysis and adhering to ethical considerations. Additionally, we will discuss the rationale behind selecting our study area. We will begin by providing a detailed overview of our research focus.

Next, we will explain the methods employed for data collection. This encompasses techniques such as observation, interviews and questionnaires. We will elaborate on our sampling strategies and justify the selection criteria for our participants.

This chapter sets the groundwork for our study on the attendance management system. By outline our methodology, we aim to provide clarity on the processes involved in gathering and analyzing data, ensuring transparency in our research approach.

3.1: Area of Study

This study was conducted in NAGONGERA SUBCOUNTY which is located in Tororo District along Tororo-Nagongera Road which is 20km away from tororo town in eastern Uganda.

3.2 Population and Sampling

This study involved 8 respondents from whom data was collected they included the lecturer who is the Head of department of Computer studies Dr Lukgamuzi Andrew, A Student learning Computer engineering third year at the main campus of Busitema University Kakomo Rayan. This were good source of finding out what current situation they are facing during attendance.

3.3 Data collection Method

3.3.1 Observation

This method was used to get firsthand information by seeing the format of the use of papers. This proved to have many challenges in that it comes a time where by lecturers who use attendance for viewing the metrics of students attendance take some times to give us students the sheets for registering in that their comes a time these lecturers can bring a lot of attendance sheets for signing like 10 this consumes a lot of students time.

3.3.2 Focus group discussion

This involved selecting specified group of people to discuss specific topics and understand the participants' views. Here the researcher formed a group of discussion between the lecturers and students. This helped to get the necessary requirements and overviews about the current attendance management system.

3.3.3 Document Review

A thought review of the document was done in the department of computer studies with the intent to study how things are done and discover where improvement is necessary. A number of documents were reviewed including registers for the classes handled. This method was chosen because of its inexpensiveness because the data is already there, it permits examinations of trends over the past and there are few biases about information.

3.4 Data analysis

After the interview were carried out together with questionnaires and interview guides, the data collected from the field was entered in an analysis tool (excel) and thereafter coding done to represent descriptive data in terms of numbers. Numbers from 1-5 were used where by 1,2,3,4,5 represented strongly, disagree, average, agree, and strongly agree respectively.

After data was coded and errors corrected, analysis starts. Therefore, conclusions and system specifications were made based on the outcome of data analysis.

3.5 system analysis

At this stage the researcher employed the following tools to analyze the system. Data flow diagrams (DFDs) were used in modelling of information in the proposed system and showing the movement of information from one point to another. Additionally, under DFDs, the context Diagram were 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 (ERDs) were used to show the relationships between different entities and their associated attributes in the system.

3.6 System Design

The system was designed basing on the web-based environment.

TOOLS USED

- Visual studio code this was used to design the user interface (front end)
- WAMP SERVER the server used help connect to the database
- Hypertext markup language (HTML)/Cascading style sheets (Bootstrap CSS). These were languages that were used to develop the front end.
- Hypertext Preprocessor (PHP). This language was used to act as the middle ware between the front end and back end.
- MySQL database. this language acted as the back end for storing students, faculties, lectures and lecturer's information
- Windows 10 Pro operating system. This was the operating system that was used to run on the researcher's laptop
- Laptop

At the same time test plans were prepared, test plan describes the various tests which will be carried out on the system after completion of development thus achieving objective iii which is to design a new location-based student attendance system. system design was done in two different levels, that is, logical and physical designs.

Logica design

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

Physical design

The physical design relates the actual input and output process of the system. This is laid down in terms of how data is input into the system, how it is verified/ authenticated, processed, and how it is displayed as output

Input

At this stage, system interface (data entry user input) forms were designed using visual studio code while MYSQL was used to design the database and there after a logical connection was made using Hypertext Preprocessor (PHP)

OUTPUT

System output are in form of structural data like reports that are retrieved from the system database basing on the criteria set.

There are a number of tools that were used to represent facts from the collected data, they include the following data flow diagram, context diagram and user case diagrams.

3.6.1 Data flow Diagram

A data flow diagram is a graphical representation of the flow of data through an information system it can as well be used for the visualization of data processing

3.6.2 Context Diagram

This is a visual representation of the flow of information or activities within the system or process. It's a geographical tool that helps to identify and organize the various steps and relationships between them, making it easier to understand and analyze the system or process

3.6.3 use case Diagram

A user case diagram is a representation of a user's interaction with the system that shows the relationship between users and different cases in which the user is involved. Its used to verify the type of users of the system and the different user cases

3.7 SYSTEM DEVELOPMENT

The major development approach employed for this project was the structured system analysis and design methodology.

SSADM follows the waterfall lifecycle model starting from the feasibility study to the physical design stage of development. One of the main features of SSADM is the intensive user involvement in the requirement analysis stage. The users are made to sign off each stage as they are completed assuring that requirements are met. The users are provided with clear, easily understandable documentation consisting of various diagrammatic representations of the system.

SSADM breaks up a development project into stages, modules, steps and tasks. The first and foremost model developed in SSADM is the data model. It is a part of requirements gathering and consists of well-defined stages, steps and products. The techniques used in SSADM are logical data modelling, data flow and entity behavior modeling.

The specific methodology to be employed was the Rapid Application Development (RAD). It is based on prototyping and iterative development with no specific planning involved.

It focuses on gathering user requirements through meetings or focus groups, early testing of the prototype by the user using iterative concept, reuse of the existing prototypes (components), continuous integration and rapid delivery. In the RAD model, the functional modules are developed in parallel as prototype and are integrated to make the complete product for faster product delivery.

A prototype is a working model that is functionally equivalent to a component of the product.

Therefore, the most important aspect for this model to be successful is to make sure that the prototype developed are reusable.

3.8 TESTING AND VALIDATION

Both unit testing and integration testing were performed on the location-based students management system to clarify the specifications of the system to reveal possible faults and establish confidence in the system.

Unit testing focused on one function at a time in that whenever the researcher designed a function, it would be tested instantly before proceeding to design another function.

After all the modules had been assembled to form a full system, integration testing was performed. The goal of integration was to ensure that all of the systems components worked together and could be combined to make a fully functional system.

In the end, user testing was performed. This involved the potential users of the system to test the system if it met their requirements.

The researcher performed software validation to determine whether the software product satisfies of fits the intended use, that is whether software met the user requirements, not as specification artifacts or as the needs of those who would operate the software only, but as the needs of all stake holders(such as students, lecturers, Head of department and administrators)

CHAPTER FOUR

FIELD STUDY AND SYSTEM DESIGN

4.1 INTRODUCTION

This chapter presents the study, design of the current system, system requirements (functional and non-functional requirements) and system design (system architecture, context diagram, data flow diagram, ERD, use case Diagram)

4.2 BACKGROUND INFORMATION OF THE EXISTING SYSTEM

At Busitema University, every student is expected to sign on attendance sheet every time he or she attends a lecture. This is usually done in lecture room thereafter those attendance sheets are collected and kept in the Administrative offices. Manual computation is sometimes done to establish the frequency of attendance but in most case the whole exercise does not hold much bearing on academic performance of students.

4.3 WEAKNESS OF THE EXISTING SYSTEM.

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

There is much time and labor wasted in recording every individual student particular

Generation of the overall reports is tedious because of the information stored in different files. To visit each individual file, noting down the required information in order to come up with the final reports is extremely hard.

The existing manual system is insecure because an unauthorized person may locate a file and carryout modification on the data without permission

In the current manual system, it is hard to back up copies of data in case of natural hazards like fire break down, floods and earthquakes this may result in complete loss of important information

4.4 SYSTEM REQUIREMETS

These requirements are classified as functional and nonfunctional requirement.

4.4.1 FUNCTIONAL REQUIREMENTS

- These are specific functions, tasks or behaviors the system must support. They include the following.
- The system should allow the management to register and store a particular students' class attendance details.
- The system should also capture both lecturer's location and student location and store them in the database for distance measurement.
- The system enables the management to view and search a particular file within a short time
- The system should authenticate users
- 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 reports.

4.4.2 NON-FUNCTIONAL REQUIREMENTS

- The system should be able to authenticate user and provide for different levels of access to avoid unauthorized access.
- The system should be able to perform in a standard relative 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 of information by both skilled and unskilled users.
- The system should be cost effective with more less effect on its implementation and maintenance.
- The system should be portable and light in order not to affect the throughput

4.4.3 MINIMUM HARD WARE AND SOFTWARE REQUIRMENTS

HARD WARE REQUIRMENTS

HARD WARE	MINIMUM SYSTEM REQUIREMNT
PROCESSOR	INTEL® CORE™ i3-7020U
CYCLE SPEED	2300 Mhz
SYSTEM TYPE	X64-BASED PC
MEMORY/RAM	4GB RAM
HARD DISK SPACE	120GB

SOFTWARE REQUIRMENTS

SOFTWARE	MINIMUM SYSTEM REQUIREMNTS
OPERATING SYSTEM	WINDOWS 10 PRO
DATABASE MANAGEMENT SYSTEM	MYSQL
FIREWALL/ANTIVIRUS	AVAST, KASPERSKY AND ANY OTHER

4.5 SYSTEM DESIGN

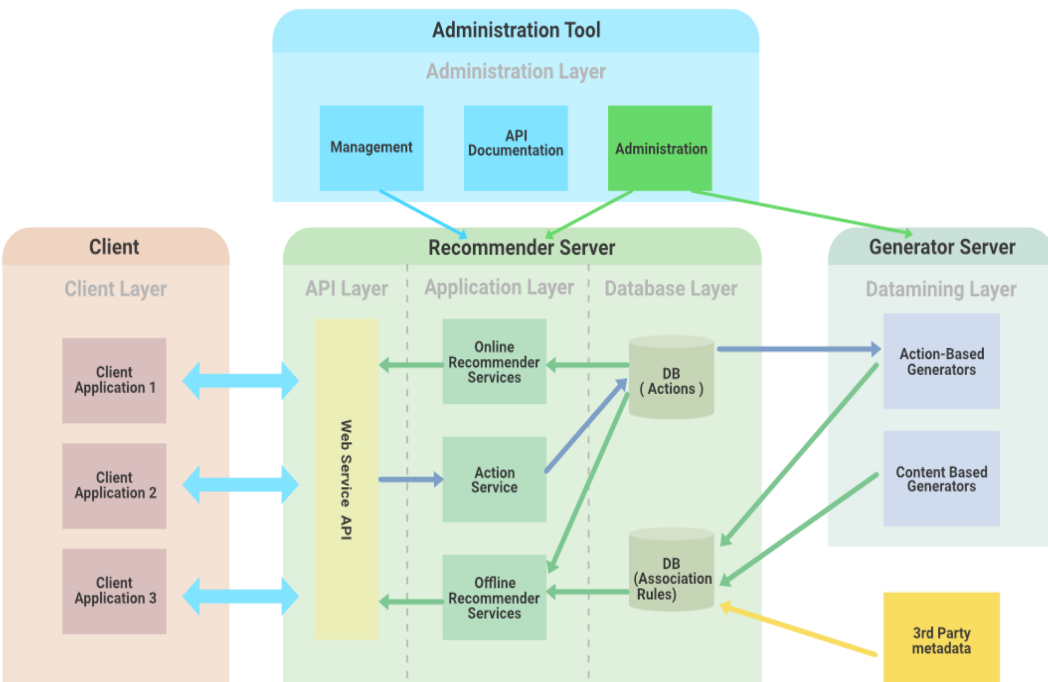
4.5.1 INTRODUCTION

System design gives the details of how the system will meet the information requirement determined in the system analysis. Connolly, et al defines system as the process of creating a design for a database that will support the enterprise operation s and objectives. From the system study, it was found out that its necessary to create a system with a central database that contains information about all processes of students' records to keep track of activities involved. Two techniques were used to design the system logical design and physical design.

4.5.2 ARCHITECTURE

Web based system has the architecture that contains internet, web browser and database shown below. The information flows from the internet to the server by use of wireless and non-wireless.

web browser sends request to the server and server provides feedback through the web browser. The server retrieves information from the database where its stored and provides to the server back when needed and client gets information from the server as illustrated below



4.5.2 Design Objectives

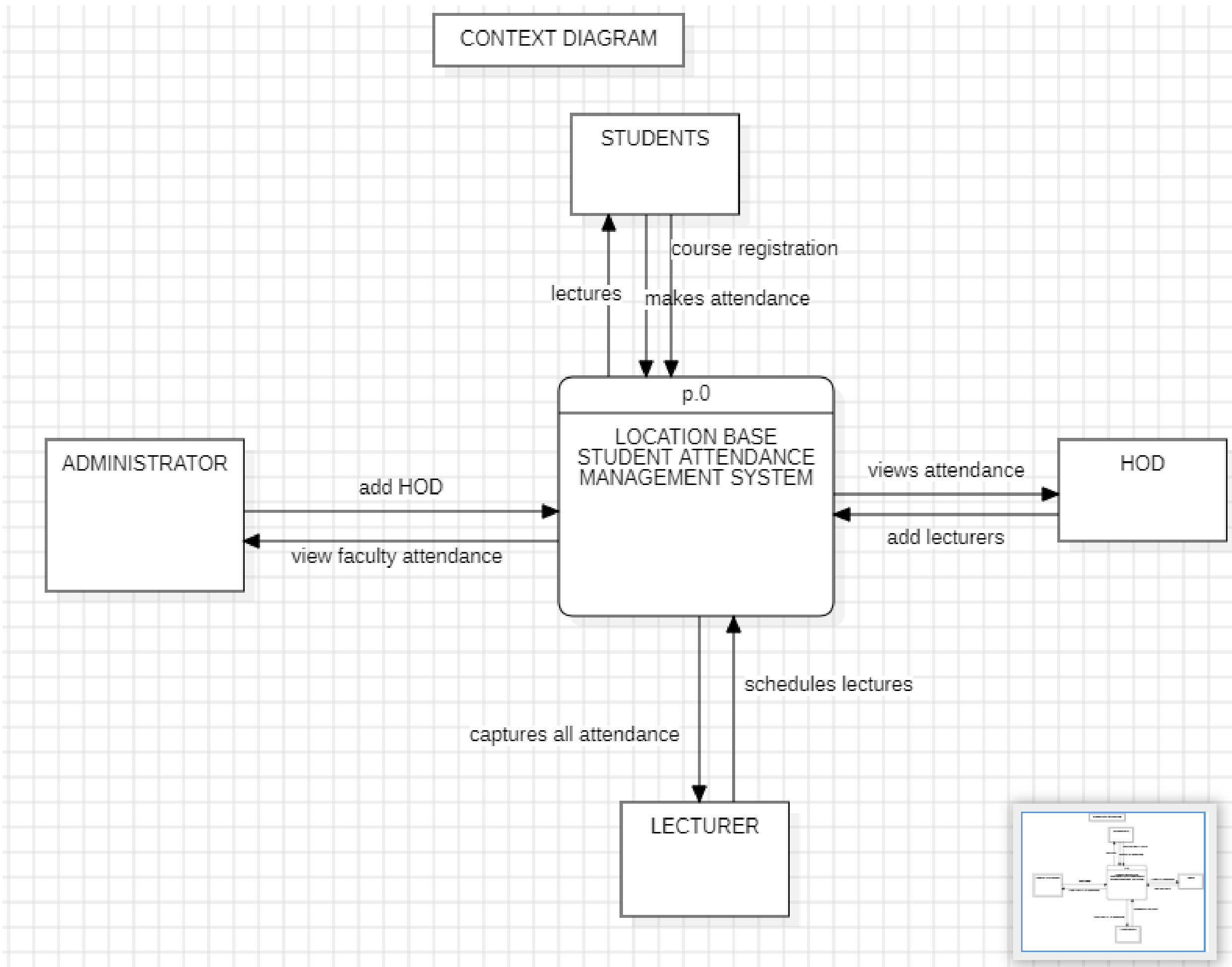
The system design meets the following objectives;

Produces the system that overcomes the inefficiency identified during the system study ad optimally uses computer resources.

Allows accurate input of correct and valid data in the database

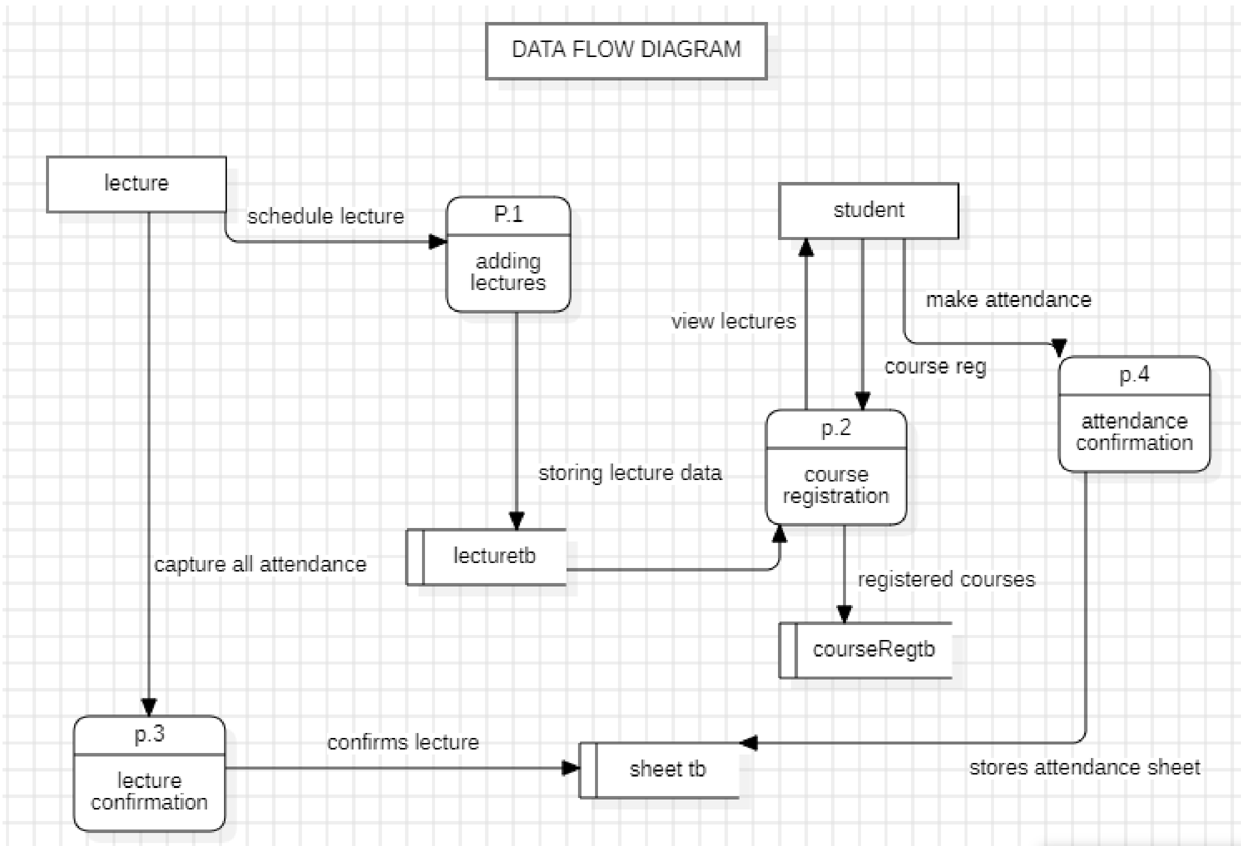
4.5.3 CONTEXT DIAGRAM OF THE NEW SYSTEM

Context diagram is visual representation that illustrates the interactions between a system being developed and external entities such as users, other systems, or organizations. It makes it easy to understand and analyze the system.



4.5.4 DATA FLOW DIAGRAM

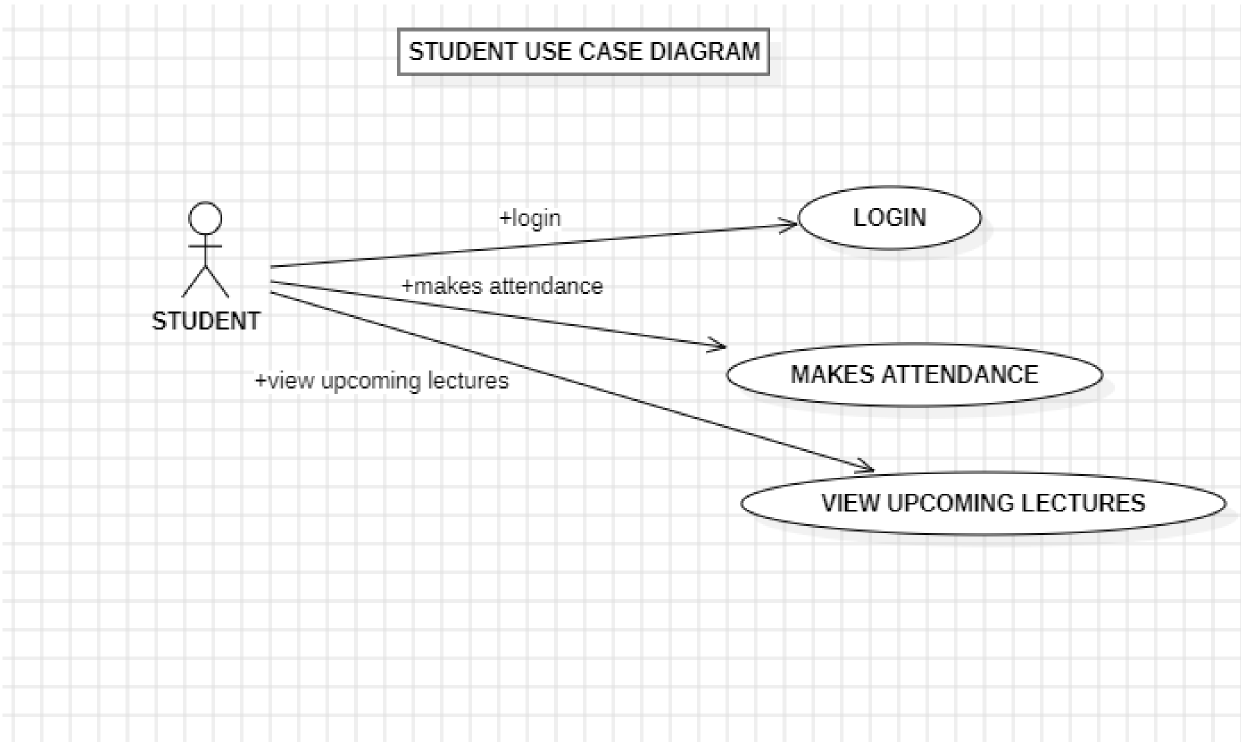
A dataflow diagram is a graphical representation of the flow of data through an information system and be used for the visualization of data processing. DFDs are particularly useful for understanding system process, identifying data sources and destinations and defining data transformations as illustrated below



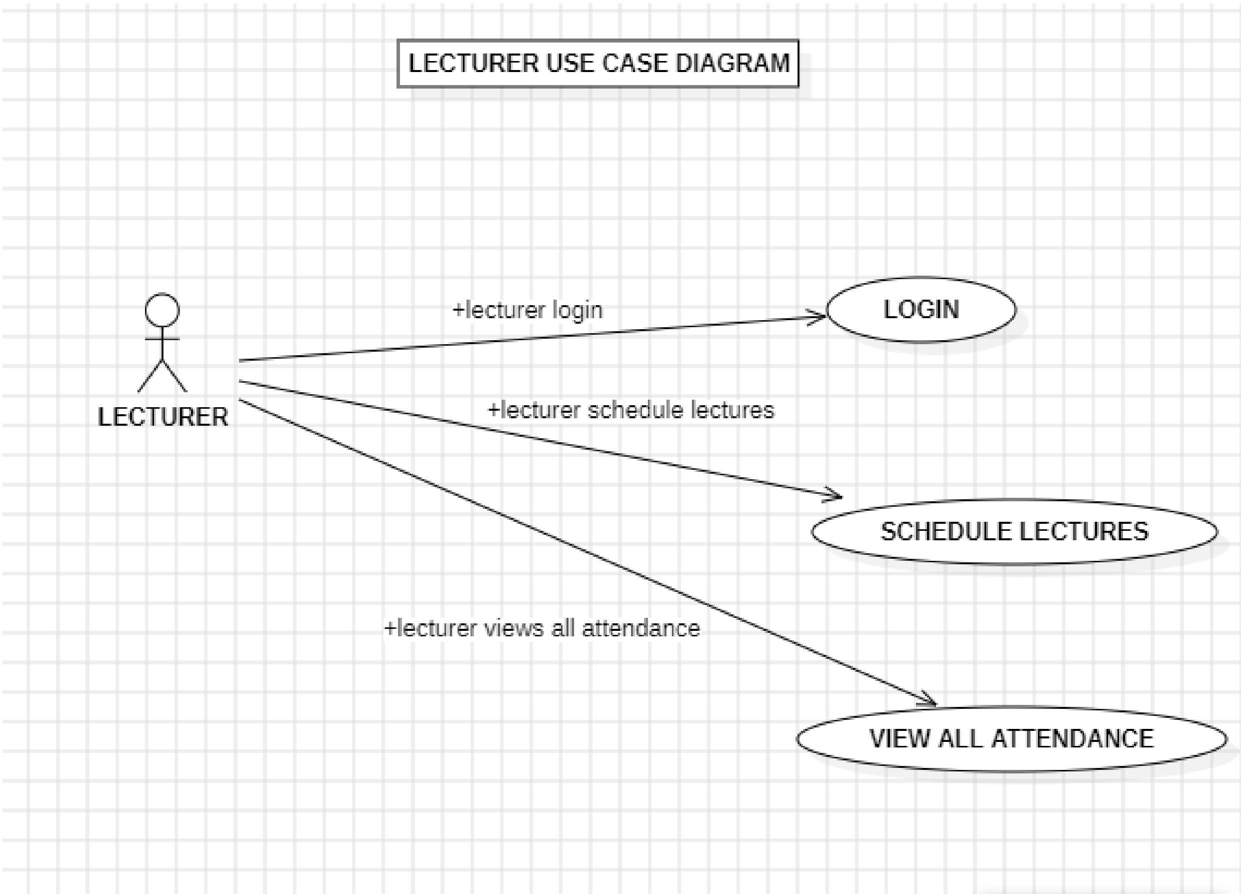
4.5.5 USE CASE DIAGRAM

A use case diagram is a type of behavioral diagram in unified modeling language(UML) that represents the functionality of a system from the users' perspective. It illustrates the interactions between users (referred to as actors) and the system to accomplish specific tasks or goals

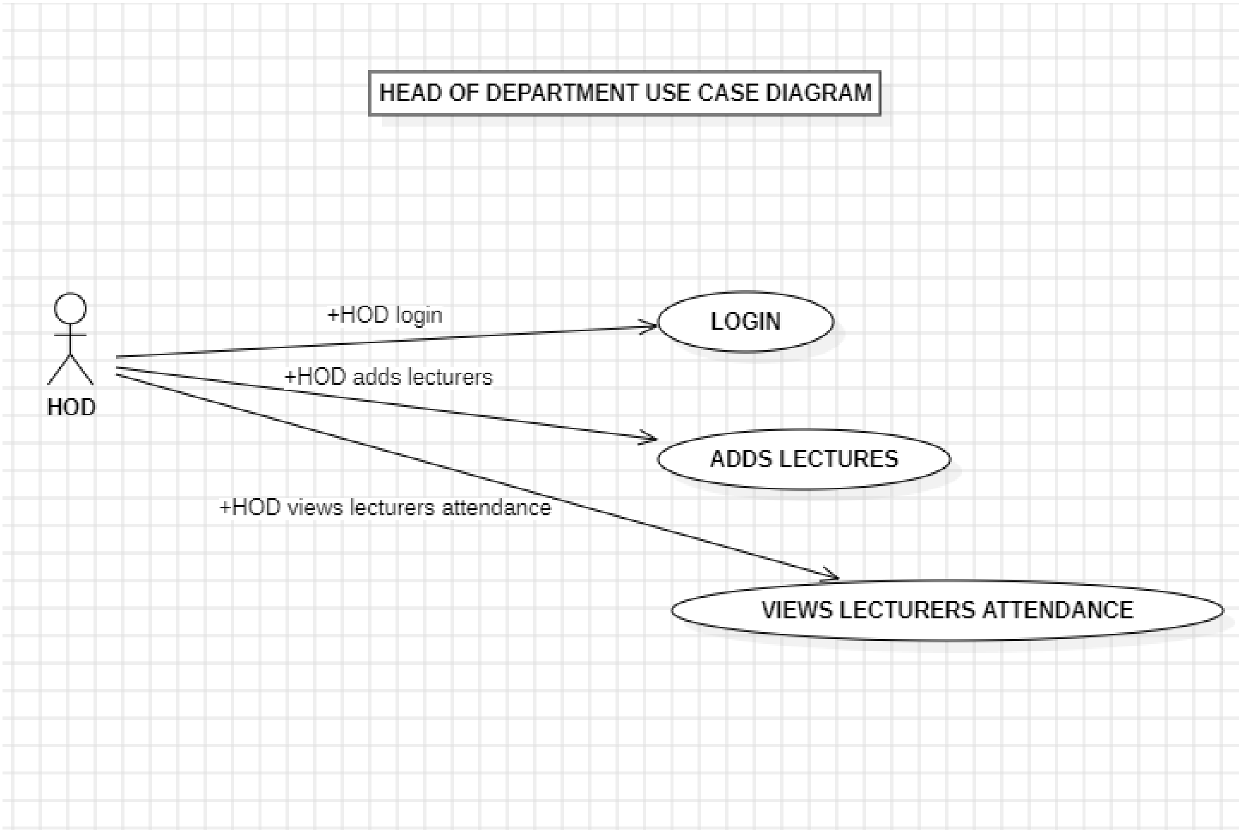
STUDENT USE CASE



LECTURER USE CASE



HOD USE CASE

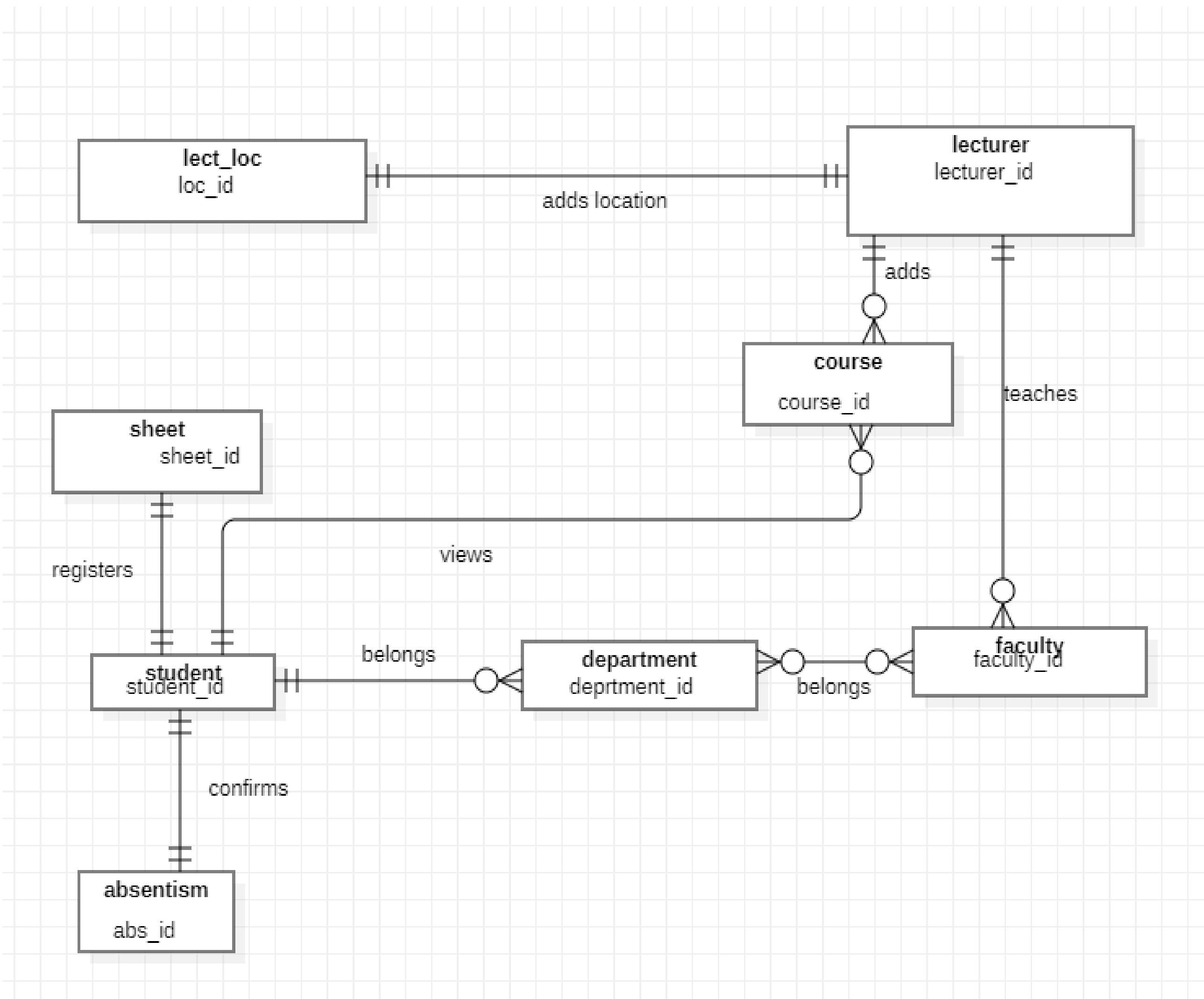


HEAD OF DEPARTMENT USE CASE DIAGRAM
HOD
+HOD login
LOGIN
+HOD adds lecturers
ADDS LECTURES
+HOD views lecturers attendance
VIEWS LECTURERS ATTENDANCE

4.5.6 ENTITY RELATIONSHIP DIAGRAM

An entity relationship diagram (ERD) is a type of flowchart that illustrates how entities such as people, objects or concepts relate to each other within a system

ENTITY RELATIONSHIP DIAGRAM



4.6 TABLE MAPPING

The entities in the table are described as follows.

Table	Action	Rows	Type	Collation	Size	Overhead
absentism	Browse Structure Search Insert Empty Drop	0	MyISAM	latin1_swedish_ci	2.2 KiB	192 B
course	Browse Structure Search Insert Empty Drop	4	InnoDB	latin1_swedish_ci	16.0 KiB	-
coursereg	Browse Structure Search Insert Empty Drop	6	MyISAM	latin1_swedish_ci	2.2 KiB	-
department	Browse Structure Search Insert Empty Drop	7	MyISAM	latin1_swedish_ci	2.2 KiB	-
faculty	Browse Structure Search Insert Empty Drop	3	MyISAM	latin1_swedish_ci	2.1 KiB	-
lecturer	Browse Structure Search Insert Empty Drop	3	InnoDB	latin1_swedish_ci	16.0 KiB	-
lect_loc	Browse Structure Search Insert Empty Drop	2	InnoDB	latin1_swedish_ci	16.0 KiB	-
lect_type	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	16.0 KiB	-
program	Browse Structure Search Insert Empty Drop	3	InnoDB	latin1_swedish_ci	16.0 KiB	-
semster	Browse Structure Search Insert Empty Drop	2	InnoDB	latin1_swedish_ci	16.0 KiB	-
sheet	Browse Structure Search Insert Empty Drop	2	InnoDB	latin1_swedish_ci	16.0 KiB	-
student	Browse Structure Search Insert Empty Drop	2	MyISAM	latin1_swedish_ci	2.5 KiB	296 B
studentdept	Browse Structure Search Insert Empty Drop	3	MyISAM	latin1_swedish_ci	2.0 KiB	-
systemusers	Browse Structure Search Insert Empty Drop	2	MyISAM	latin1_swedish_ci	2.4 KiB	236 B
14 tables	**Sum**	**39**	**MyISAM**	**latin1_swedish_ci**	**127.7 KiB**	**724 B**

4.6.1 Data dictionary for tables

Table descriptions

LECTURER TABLE

This is the table that has the lecturer's details the faculty and departmet that he teaches along with his Login credentials

Lecturer_id (pk)	Lecturer_email	Lecturer_password	Lecturer_username	Faculty_id (FK)

STUDENT TABLE

This table has details for the student that allows him to login.

Student_id (PK)	Student_name	Student_regno	studentno	Faculty_id (FK)	Student_password

LECT_LOC TABLE

In this table it captures the lecturers attendance which alerts students on the available lecturers

Loc_id(PK)	Course_id(FK)	latitude	longitude	status	Loc_date

SHEET TABLE

In this table it captures student's attendance only those who are present

Sheet_id(pk)	Student_Regno	Course_id(fk)	Sheet_date

ABSENTEEISM TABLE

This table captures all students who try to make attendance when the time has passed

Abs_id (pk)	Student_Regno	Course_id(fk)	Abs_date

CHAPTER FIVE

SYSTEM IMPLEMENTATION AND TESTING

5.1 SYSTEM IMPLEMEATION

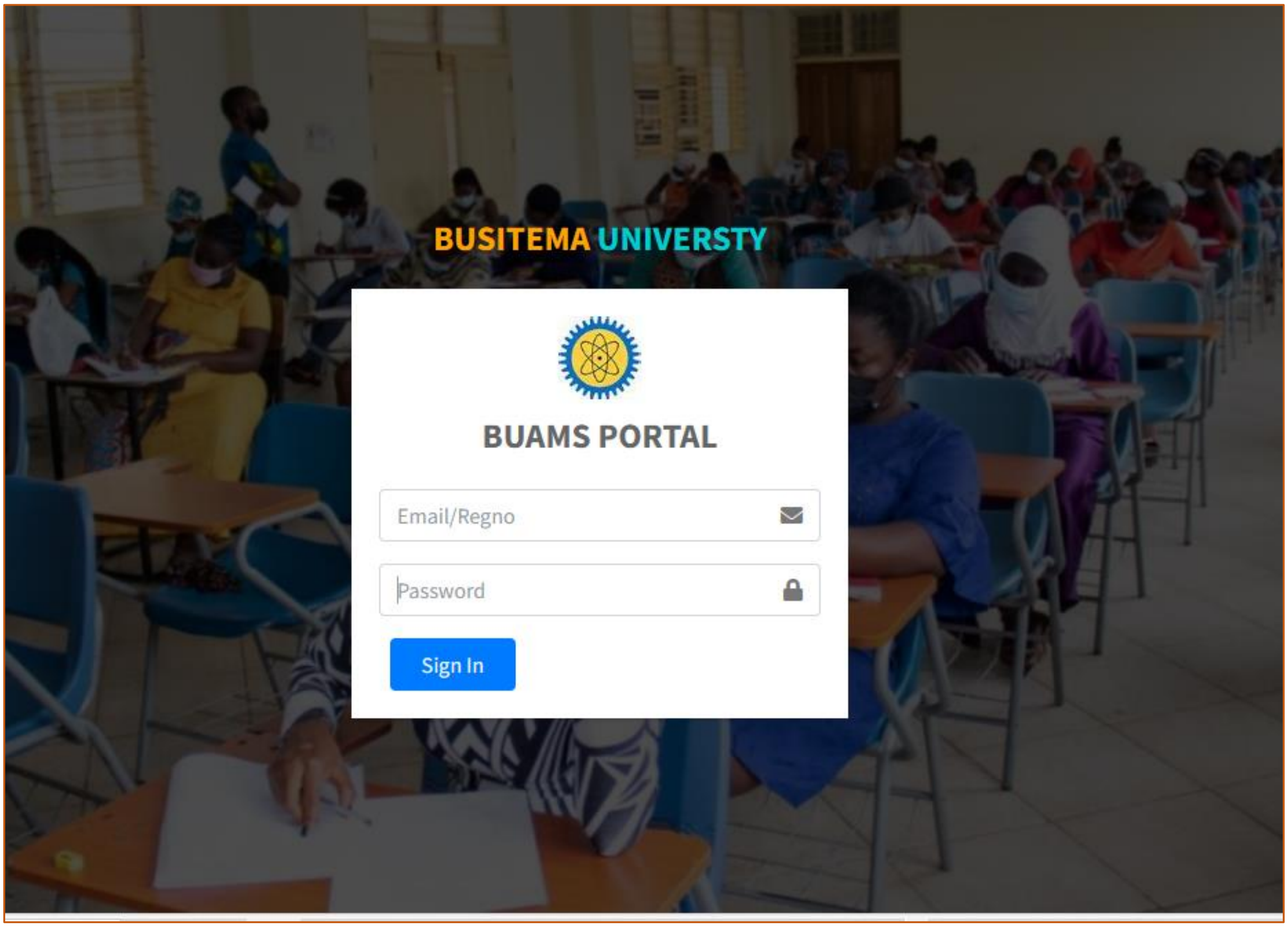
The system was designed basing on web-based environment. Visual studio code was used to design the user interface (front end) while MYSQL as DBMS was used to design a database for storing data there after a logical connection was established.

5.2 SYSTEM FUNCTIONALITY

5.2.1 LOGIN PAGE

This is the first form that comes first when the program is launched. Its mainly for security and authentication purposes. When loading the system, one should go to the web browser and type http://localhost/attendance to open the login page as illustrated below

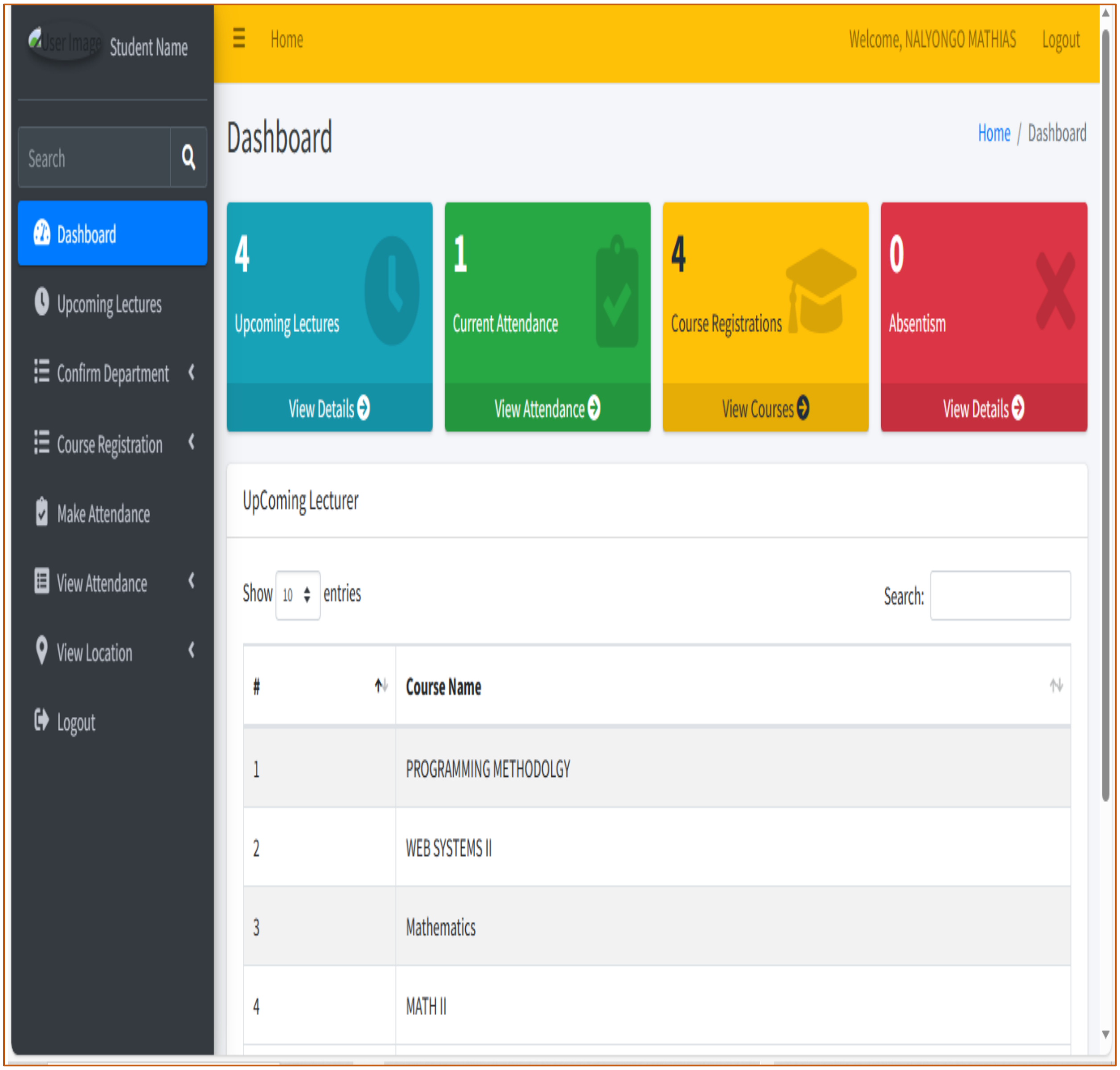
LOGIN IMAGE


BUSITEMA UNIVERSTY
BUAMS PORTAL
Email/Regno
Password
Sign In

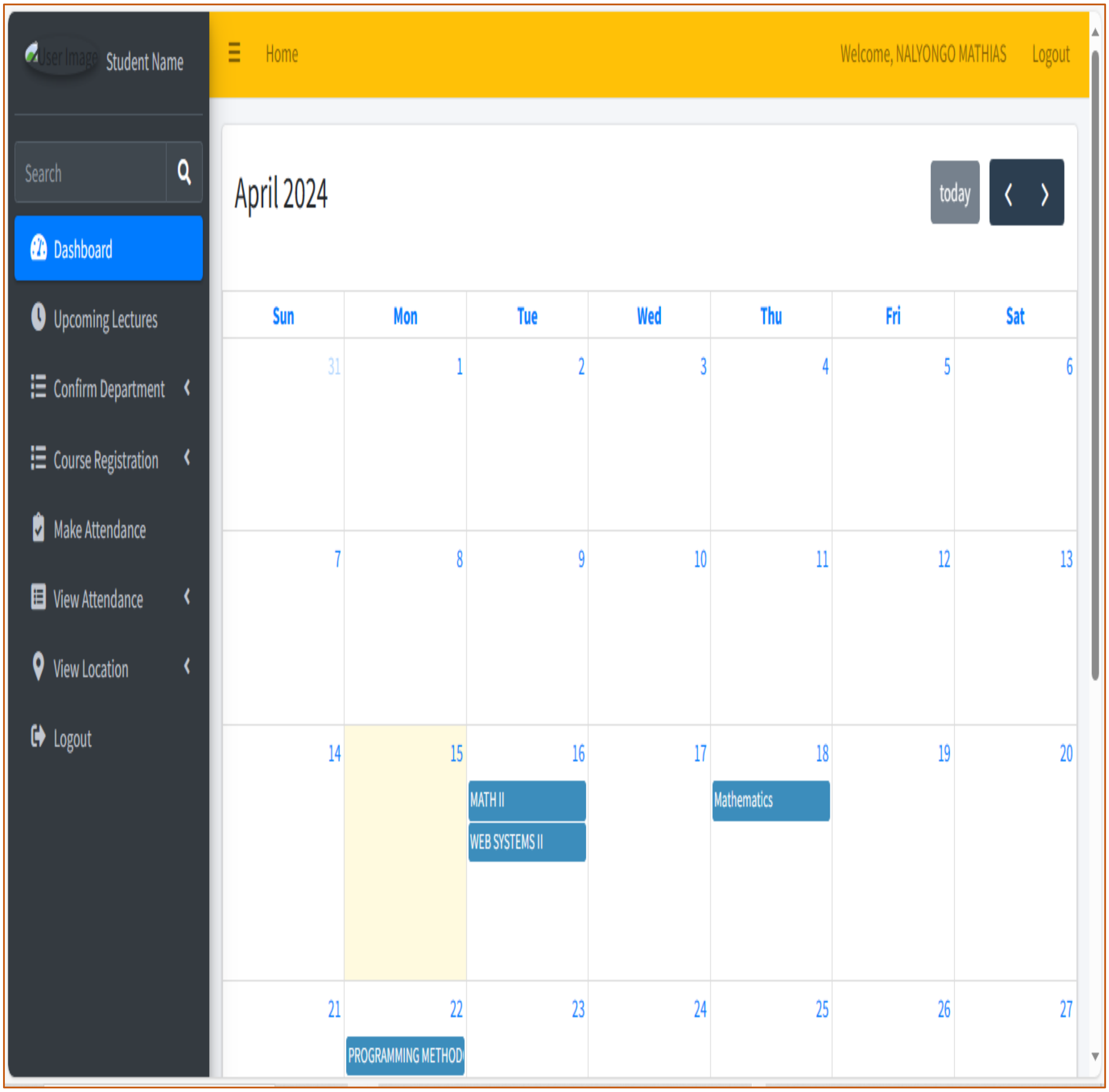
5.2.2 STUDENT DASHBOARD

This is where the student views all the activities in the system and it has upcoming lectures, current attendance, course registration and absenteeism records.

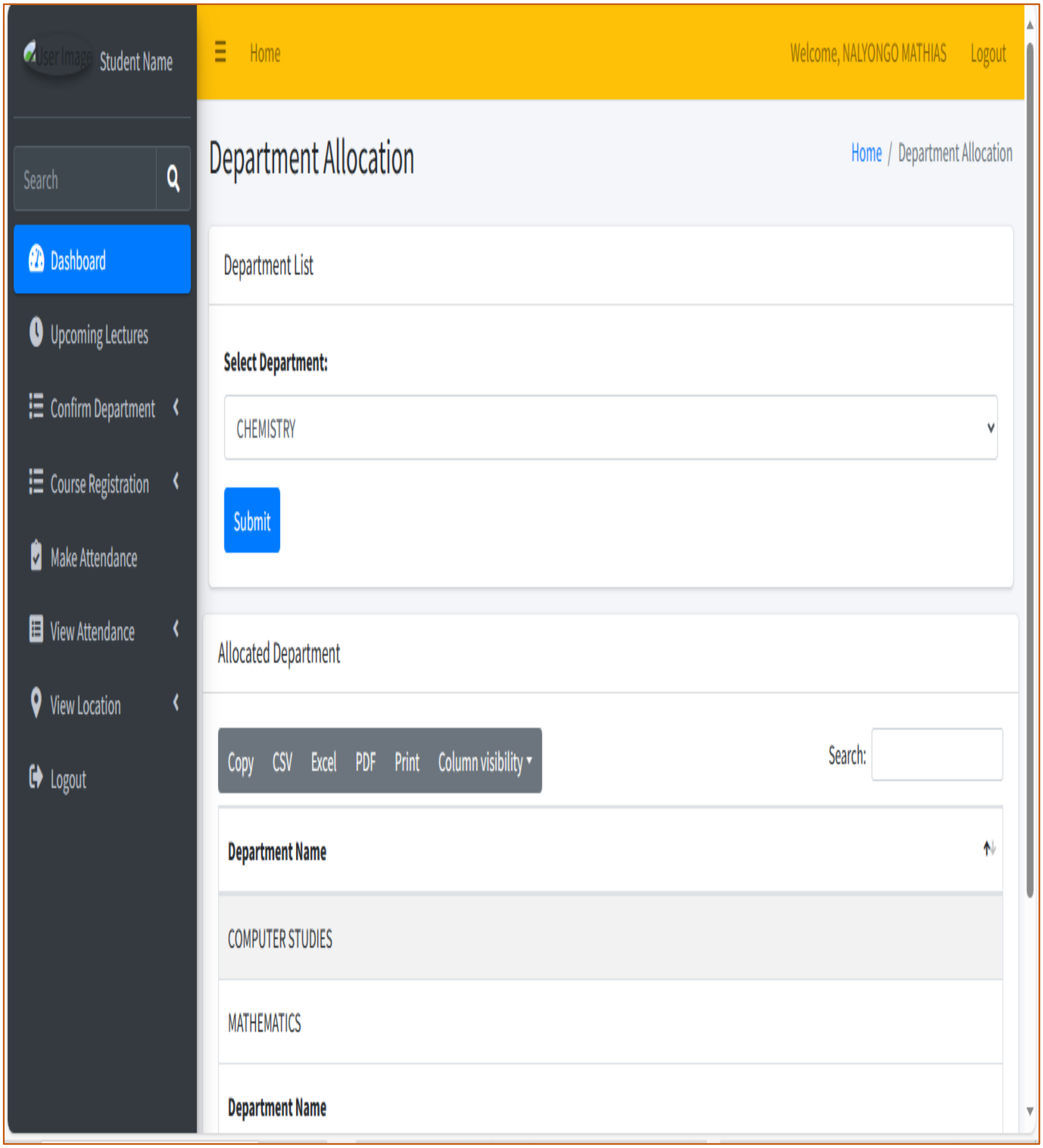
Dashboard image



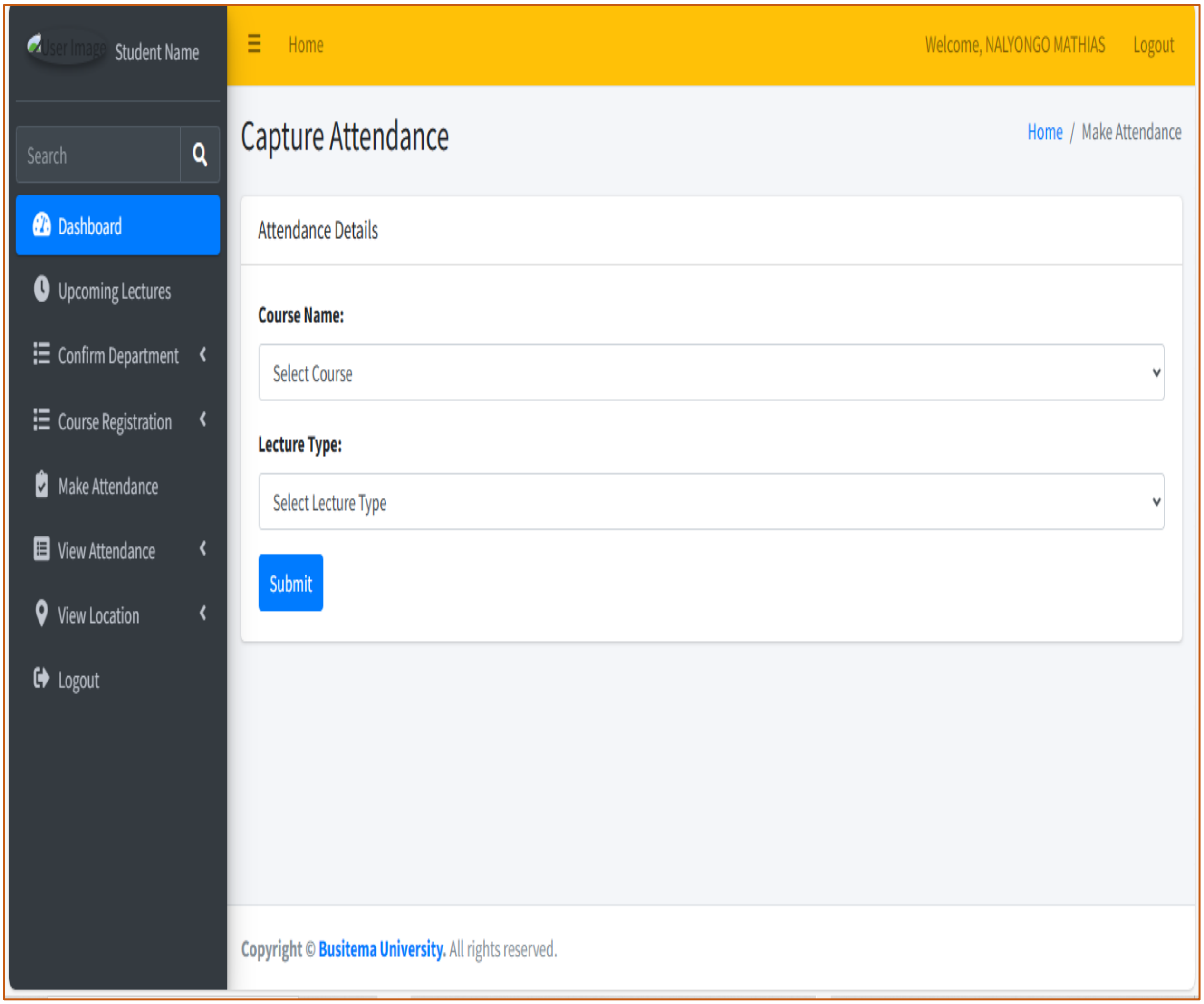
5.2.3 UPCOMING LECTURE



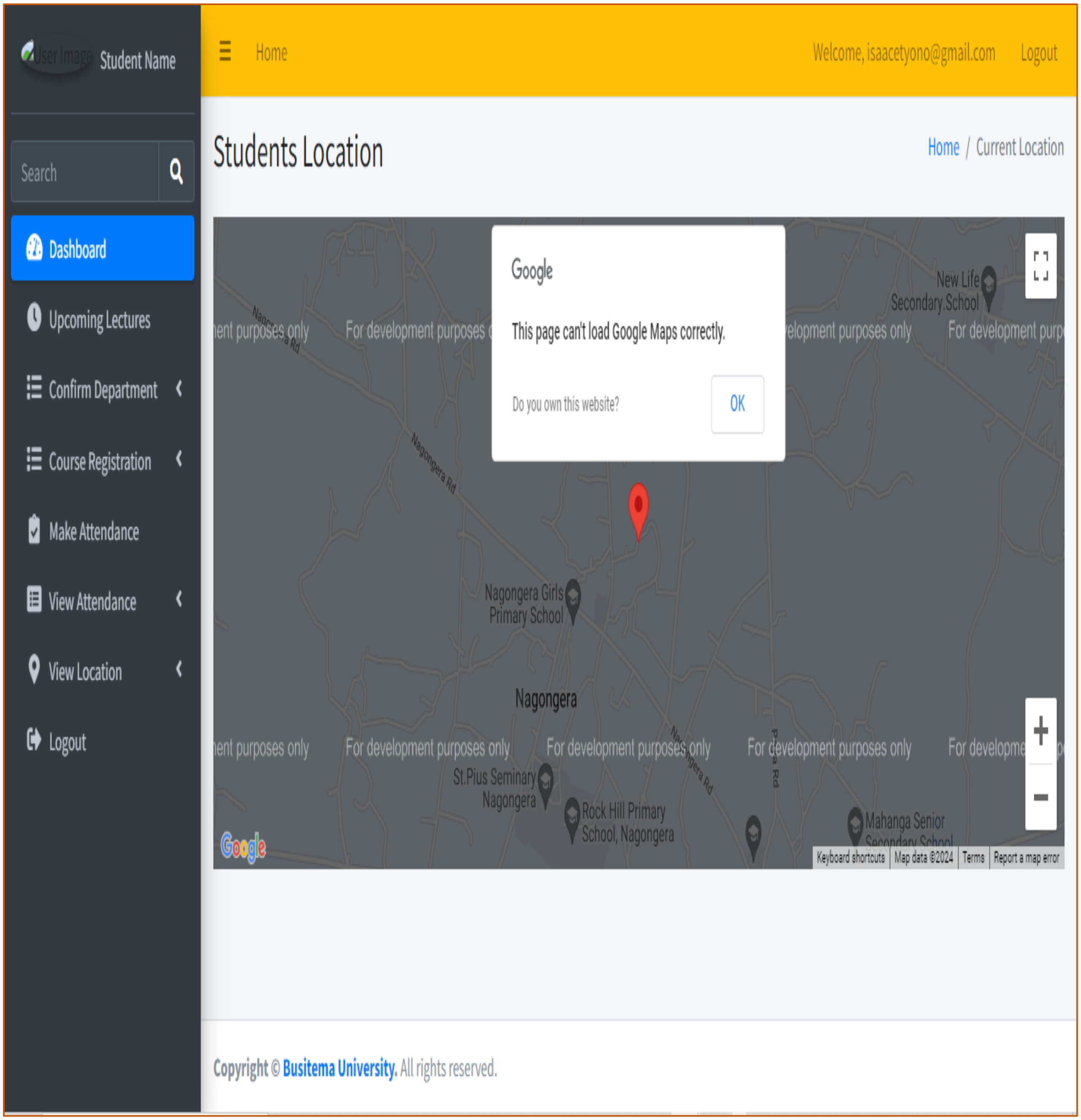
5.2.4 DEPARTMENT REGISTRATION



5.2.5 ATTENDANCE PAGE



5.2.6 STUDENT LOCATION



CHAPTER SIX

DISCUSSIONS, CONCLUSION, & RECOMMENDATIONS

6.0 INTRODUCTION

This chapter looks at the summary of the findings, conclusions and recommendations of the study on designing students' attendance management system.

6.1 DISCUSSIONS

In discussing the findings, it's evident that the challenges faced during the research process, such as difficulty in obtaining information and resource constraints, are common in academic endeavors. Despite these challenges, the potential benefits of the proposed LBSAMS are significant, including improved efficiency and effectiveness in attendance management. However, further discussion may be warranted to address specific issues raised during the research and to explore potential solutions to overcome these challenges in future projects.

6.1.1 Challenges encountered

- It was difficult to get information from respondents who were not aware the importance of a system to be developed.
- Resources such as time were not enough since the researcher had to attend other duties assigned to him such as attending lectures. This could not allow him to fully exhaust the required information for the research
- Some respondents could not release some information that was critical to the design of this system to the researcher
- Financial resources, the researcher being a private student, he could not get enough funds for buying papers and pens, binding compact disks and flash disks to facilitate the research work

6.2 CONCLUSION

The study was undertaken to find ways of improving student attendance management at Busitema university. Basing on the findings and analysis, LBSAMS is a venture worth to invest in. once taken seriously and embraced, there are a lot of benefits that can realized therein. Both the staff and the clients it is serving will benefit from it. For example, staff/management will no longer hustle to create reports. Search a particular file thus saving time and easing work.

6.3 RECOMMENDATION

A more comprehensive study to exploit the full benefits of the new technology in the education sector is highly recommended. This may be able to unveil more gaps and therefore improve on the system more than this study has been able to do. The management of Busitema University should step in to have all departments automate their systems by providing the necessary funds for such projects. With several systems made available to the different departments of the station, operational activities would be made much easier

APPENDICES

Student Feedback Questionnaire: Manual Attendance System Evaluation

Personal Information (Optional):

Name: DIMBU FRANK

1. Current Attendance Method: a. How is attendance currently taken in your classes? - Paper sign-in sheets - Roll call by the instructor - Other (please specify): ______________________

2. Experience with the Current System: a. How satisfied are you with the current manual attendance system? - Very satisfied - Satisfied - Neutral - Dissatisfied - Very dissatisfied

3. Accuracy: a. Do you believe the manual attendance system accurately reflects your attendance? - Yes - No

4. Time Efficiency: a. Do you find the manual attendance system time-efficient? - Yes - No

5. Transparency: a. Do you feel that the manual attendance system is transparent in recording attendance? - Yes - No

6. Issues Encountered: a. Have you encountered any issues or challenges with the current manual attendance system? If yes, please specify.

8. Preference for Change: a. Would you prefer switching to a location-based attendance management system over the current manual system? - Yes - No - No preference

9. Overall Satisfaction: a. Overall, how satisfied are you with the current manual attendance system? - Very satisfied - Satisfied - Neutral - Dissatisfied - Very dissatisfied

References

Ancheta, R., Daniel, M., & Ahmad, R. (2021). EFFECT OF CLASS ATTENDANCE ON ACADEMIC PERFORMANCE. *European Journal of Education Studies*, *8*. https://doi.org/10.46827/ejes.v8i9.3887

Black, M. (2024). The evolution of time and attendance systems and impact on modern organisations.

Edwards, D., & Mullis, F. (2003). Classroom Meetings: Encouraging a Climate of Cooperation. *Professional School Counseling*, *7*.

Ellis, G. C. D. a. L. V. (1995). The Effects of Attendance on Student Learning in Principles of Economics. https://www.jstor.org/stable/2117945

Hassan, S., & Zubair, M. (2015). *Web-based Attendance Management System*

Nawaz†, T., , A. A., & , Z. K. Fully Automated Attendance Record System using Template

Matching Technique https://d1wqtxts1xzle7.cloudfront.net/5702326/108003-7474_20IJET-IJENS-libre.pdf?1390842598=&response-content-disposition=inline%3B+filename%3DFully_Automated_Attendance_Record_System.pdf&Expires=1713190163&Signature=F~XgHDe2pSToKJksQxP1do5apahoY~WAIm~FpFRBKJSMbyMorucHjSk4~I894p4xGdY18qXMdRrNDJgCFOeZZ-GUmAwxFw9yYxUsGU2kvc3XqA5wIDbYbCNdjjJPiMux~ch26FxYwNWXEXtbjhKiKHYsaXvUZkW9swy4hIzuwdEph9gvn5L9VpLihTUT7n2~r2gMsjt7FkbVoR6Ivxwa32l6ZPvekiuHp6UOHRfWaCywyk4lvy9b6ZtRx4Xj1WiYN182LuifVAkbSWsiMzzSoyhN-feHdZbz~NEOPpbMS4fjdo5yriyY77LWSV3jyXT7TSgPEqSoIKEe0CuVvbFAsw__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

REDCORT. (2024). *History Of Time And Attendance Systems*. https://www.redcort.com/its-about-time/history-of-time-and-attendance-systems

Saputra, K., Furqan, M., Abidin, T., & Yunardi, D. (2019). GOOGLE MAPS AND MAPBOX API PERFORMANCE ANALYSIS ON ANDROID-BASED LECTURE ATTENDANCE APPLICATION. *Jurnal Natural*, *19*, 64-68. https://doi.org/10.24815/jn.v19i3.14459

schroeder, B. a. G., Garth A. (2010). A large-Scale Study of Failure in High-Performance computing systems. https://ieeexplore.ieee.org/abstract/document/4775906

Shailendra, Army Institute of Technology, P., Maharashtra, IN, & Wadar, M. S. M. A. K. V. S. A. P. S. (2015). Attendance management system. https://ieeexplore.ieee.org/abstract/document/7124938/authors#authors (IEEE)

TUDIP. (2022). WHAT IS GOOGLE APIs and its Importance for Business. https://tudip.com/blog-post/apis-in-google/