DECLARATION

I, ARMEL **TCHOUMDJIN MBIATAT** hereby declare that this work entitled **"Students (secondary school case of: Saint Jean Baptiste College in Bangangte-Cameroon) Marksheet Management system."** is our original work and has never been presented elsewhere for any academic qualifications in any other university or any other award, except where stated by reference or acknowledgment.

ARMEL TCHOUMDJIN MBIATAT

Date: .... /...... /.........

Signature: ....

APPROVAL

I, RUTARINDWA Jean-Pierre hereby certify that the dissertation titled **"Students (secondary school. case of: Saint Jean Baptiste College in Bangangte-Cameroon) Marksheet Management system."** was done and submitted by **ARMEL TCHOUMDJIN MBIATAT** under my supervision.

RUTARINDWA JEAN-PIERRE

Date: .... /...... /.........

Signature: ....

DEDICATION

Before everything, I express my gratitude to Almighty God. He always gives me strength, knowledge, & wisdom in everything I do.

I would like to dedicate this piece of work to my sponsor Dr DJEUNDJE BIATAT VIANI AIME who have been my constant source of love, support, and inspiration throughout my academic journey. I appreciate your encouragement so much!

And finally, I dedicate this research project to MY LOVELY MOTHER NICAISE, KETCHAMI CYRILLE, NKOUENDJI CHARLES, MBIATAT MARLYSE, BARAKA MWALUNGWE, KETCHIAMEN ROMARIC, MAEL YOHANN, BARAKA CHIZA ANICET, GLOIRE NDAYSABA, GABRIEL BUHENDWA, FAMILY KETCHANKEU, NANA GABI, FAMILLE MWALUNGWE, CLASSMATES AND EVERYONE who contributed to the success of my work project. I would like to thank my supervisor and head of the department, Mr RUTARINDWA JEAN-PIERRE who contributed a lot of support to ensure this research was successful.

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ABBREVIATIONS AND ACRONYMS

API: Application Programming Interface

ATD: Advanced Technology Development

CSS: Cascading Style Sheets

DFD: Data Flow Diagram

ER: Entity-Relationship

ERD: Entity Relational

HTML: Hypertext Markup Language

ICT: Information and Communication Technology

MMS: Marksheet Management System

PHP: Hypertext Preprocessor

PS: Problem Statement

RDBMS: Relational Database Management System

SMMS: Students Marksheet Management System

SQL: Structured Query Language

UML: Unified Modelling Language

ABSTRACT

The advancement of digital technology has transformed various sectors, including education, where manual systems are gradually being replaced by automated solutions for increased efficiency and accuracy. This project focuses on the development of a **Student Marksheet Management System for Saint Jean Baptiste College in Bangangté**, a secondary school in Cameroon. The primary goal is to streamline the process of marksheet management, which includes the entry, calculation, storage, and retrieval of student academic records.

Currently, many secondary schools in Cameroon, including Saint Jean Baptiste College, rely heavily on manual processes for handling students' marksheets. These traditional methods are prone to errors, time-consuming, and often lead to delays in report generation. As the student population grows, the challenges in managing large volumes of academic data manually also increase. This system is intended to solve these problems by offering a centralized, automated platform that will improve the accuracy, speed, and security of managing student marksheets.

The system will be developed using a modular approach, with specific roles and permissions assigned to different users. Form teachers will have the responsibility of inputting and managing student marks, while the principal will oversee the marksheet approval process. The system will also incorporate data security measures to protect sensitive student information and provide backup functionalities to prevent data loss.

By automating the marksheet management process, this system will enhance the overall efficiency of academic operations at Saint Jean Baptiste College. It is expected to minimize human errors, reduce the administrative workload, and ultimately lead to better academic performance tracking. This project serves as a step towards modernizing education in Cameroon, making student evaluation more efficient and reliable.

Key words: Student, Marksheets, Saint Jean Baptiste College, Head / Form Teacher, Principal, Marks, Module, …

CHAPTER 1: GENERAL INTRODUCTION

1.0. INTRODUCTION

Traditionally, secondary schools in Cameroon (for example the case of Saint Jean Baptiste College in Bangangte) have relied on paper-based systems to manage student marksheets. This can be time-consuming, prone to errors, and difficult to access for parents, teachers, and administrators. This system offers a centralized platform on which the principal of the College creates the account of each Form Teachers with an identifier and password. the Form Teachers of each class can enter grades, modify grades, establish the list of students enrolled in their class, monitor student progress and generate complete reports. A Student Marksheet Management System (SMMS) offers a digital solution to streamline this process. This introduction encapsulates the essence of implementing such a system in secondary schools across Cameroon, promoting effective educational administration and student success. (Nganji, The Role of ICTs in Selected Secondary Schools in Fako Division, Cameroon, 2022)

1.1. BACKGROUND OF THE STUDY

Across the board in educational management, digital solutions toward the management of student records and academic data have widely been adopted. The move from the traditional paper-based system to the digital platform comes with several advantages, such as efficiency, accuracy, and accessibility of information. More specifically, a Marksheet Management System is very useful in secondary schools, where huge amounts of data related to the students have to be maintained efficiently. (Nganji, The Role of ICTs in Selected Secondary Schools in Fako Division, Cameroon, 2022)

It is evident from various studies that MMS has played a huge role in enhancing education administration and massively changed the life and scenario of students at large. For example, a study by Sharma and Batra, 2013 has lectured that MMS reduces administrative workload upon teachers so that they can pay more attention to teaching-learning activities. A study by Khan, 2015 also established that MMS improves data accuracy, therefore supporting effective and timely decision-making by school administrators. (Nganji, The Role of ICTs in Selected Secondary Schools in Fako Division, Cameroon, 2022)

There is more to MMS in terms of administrative convenience; as a tool, it puts forward transparency and accountability among education institutions. This is in the form of real-time information accessibility regarding student performances, which is accessed at any single time by the relevant stakeholders, namely, the teachers, parents, and administrators. The transparency will lead to a shared kind of environment for the students to succeed in. (KOLLE, https://schola.cm/old/blog/why-an-online-school-management-system-unlocking-the-future-of-education, 2024)

On the part of Cameroon, in most of its secondary schools, problems exist concerning the efficient management of students' records. The quality and accountability needed in educational outcomes are therefore necessary but time-consuming; as such, an administration that makes use of digital solutions is seriously needed. One of these secondary schools in Cameroon is Saint Jean Baptiste College, Bangangte, serving as a relevant case study to explore the MMS implementation and impact in such a setting. (KOLLE, https://schola.cm/old/blog/why-an-online-school-management-system-unlocking-the-future-of-educ, 2024)

Saint Jean Baptiste College of Bangangte, like all other schools in Cameroon, finds it tiring to manage student mark sheets manually. Needless to say, this results in inefficiency, inaccuracies, and delays in obtaining critical academic information. The College expects these changes in its MMS to be adequately instrumental in improving the quality of the educational experience in this school, both for the students and the teachers. (KOLLE, https://schola.cm/blog/why-an-online-school-management-system-unlocking-the-future-of-education, 2022)

A very major step toward modernizing educational management in secondary schools would be the adoption of a Marksheet Management System, an example being Saint Jean Baptiste College in Bangangte, Cameroon. This case study will enable us to derive very valuable insights into the implementation process, challenges encountered, and the impact of digital solutions on educational administration and the fate of students.

1.2. PROBLEM STATEMENT (PS)

Saint Jean Baptiste College in Bangangte faces challenges with the manual management of student marksheets, leading to inefficiencies and inaccuracies in maintaining academic records. The absence of a digital marksheet management system limits real-time data entry, accessibility, and analysis, hindering administrative functions and impacting student

performance. Therefore, a digital solution is needed to improve the efficiency of marksheet management and enhance the overall school administration. (KOLLE, https://schola.cm/blog/why-an-online-school-management-system-unlocking-the-future-of-education, 2022)

1.3. OJECTIVES OF THE STUDY

1.3.1. GENERAL OBJECTIVE

The general objective of this study is to design and implement a student marksheet management system at Saint Jean Baptiste College in Bangangte.

1.3.2. SPECIFICS OBJECTIVES

i.   To create a database that holds data from the platform.

ii.   To develop a platform that facilitates users to make online registration.

iii.   To develop a system that facilitate generating marksheet in efficient way.

iv.   To generate a report for each level to school.

v.   To make a security measure.

1.4. RESEARCH QUESTIONS

i.   What data entities are to be stored in the database, for instance, Students, Courses, Grades?

ii.   Does SMMS have a database that holds data from the platform?

iii.   Does online Student Marksheet Management System generate marksheet efficiently?

iv.   What are the existing practices in educational data handling that go on in the Cameroonian secondary school?

v.   What are some of the ways in which SMMS could be integrated into the school information system?

1.5. SCOPE OF THE STUDY

1.5.1. CONTENT SCOPE

This research work will look into the content aspect, which is the implementation of a Marksheet Management System at Saint Jean Baptiste College in Bangangte; develop, deploy, and evaluate the MMS in the school.

1.5.2. GEOGRAPHICAL SCOPE

Saint Jean Baptiste College of Bangangte is a Catholic confessional college located in the western region of Cameroon, department of NDE and in the district of Bangangte. This college provides an appropriate case study due to its diverse student body and well-established educational practices.

1.5.3. TIME SCOPEs

The study purposefully focuses on the implementation and impacts of the marksheet management system over the last five years, 2020 to 2024. That was a window of time chosen with the motive of including in their ambit a comprehensive analysis of recent trends and developments, to make sure that data to be used shall be proper and reflect current practices.

1.6. SIGNIFICANCE OF THE STUDY

This study on implementing a Student Marksheet Management System (SMMS) at Saint Jean Baptiste College in Bangangte has the potential to benefit several groups:

1.6.1. Personal Interest

This study is particularly significant to me on a personal level because of my commitment to improving the educational systems in Cameroon, particularly in secondary schools. The use of manual and paper-based methods for managing student marksheets has long posed challenges, including errors, inefficiencies, and limited access to important academic data. My interest in digital transformation, especially in the context of education, drives this research on the implementation of a **Students Marksheet Management System (SMMS)** at Saint Jean Baptiste College in Bangangte

Having observed firsthand the shortcomings of the current system, I am motivated to explore how technology can simplify and enhance the processes of recording, managing, and sharing student grades. The integration of such systems not only reduces administrative workload but also promotes transparency and accountability among students, teachers, and parents. This aligns with my passion for using technology to solve real-world problems, particularly in developing regions like Cameroon, where the potential for improvement through digital solutions is immense.

1.6.2. Institutional Interest

For Saint Jean Baptiste College, implementing a **Students Marksheet Management System (SMMS)** would help the school manage student records more efficiently. Currently, the paper-based method is slow and prone to mistakes. A digital system would make it easier for Head / Form Teachers and administration staff to handle grades, generate reports faster, and ensure data accuracy. It would also allow parents to access to the list of all classes of the college, to know who is the Head / Form Teacher of each class. This would improve the school's reputation and show its commitment to modernizing education, aligning with the growing push for digital systems in schools across Cameroon.

1.6.3. Public Interest

The public interest in implementing a **Students Marksheet Management System (SMMS)** at Saint Jean Baptiste College is significant. It benefits the community by ensuring transparency and fairness in student assessments. For the broader public, such systems show that educational institutions are adopting modern solutions, improving overall education quality. This can inspire other schools in Cameroon to follow suit, contributing to the development of a more efficient and transparent education system across the country.

1.7. PROJECT METHODOLOGY

This project shall therefore be focused on the evaluation of the current paper-based system and assessment of the benefits which would accrue from the development and implementation of the Student Marksheet Management System (SMMS) at Saint Jean Baptiste College, Bangangte. The methodology is broken down as follows:

1.7.1. DATA COLLECTION TOOLS

i. **Document Review:** School documents such as teacher handbooks and student progress reports will be reviewed to understand the current marksheet system.

ii. **Observation:** Classroom and administrative office observations will help identify challenges with marksheet management.

iii. **Interviews:** Teachers, form teachers, and administrative staff will be interviewed to gather insights on the current system's issues.

1.7.2. SOFTWARE DEVELOPMENT METHODOLOGY

While we are more concerned with finding out if a Student Marksheet Management System is needful at Saint Jean Baptiste College in Bangangte, if the school resolves to embark on its

development in the nearest future, Agile methodology and most importantly Scrum will be a judicious approach. Here's why:

Agile/Scrum Methodology is recommended if the school decides to develop an SMMS. This approach allows flexibility, continuous feedback, and user-centered design.

- **Roles:** Includes a Product Owner (stakeholder representative), Scrum Master (project manager), and Development Team.
- **Sprints:** The project is divided into short cycles (2-4 weeks), where specific features are developed, tested, and reviewed by stakeholders to ensure the system meets their needs.

1.8. Limitation of the project

This project may face several limitations:

i. **Limited Technological Resources:** Saint Jean Baptiste College may not have the necessary infrastructure, such as computers, reliable internet, and software, to fully support the implementation of a digital **Student Marksheet Management System (SMMS)**. Upgrading these resources could be costly and time-consuming.

ii. **Resistance to Change:** Teachers, administrative staff, and other stakeholders accustomed to the paper-based system may resist adopting a new digital platform. Training will be required to ensure smooth transition, which might slow down implementation.

iii. **Data Security Concerns:** Shifting to a digital system raises concerns over data privacy and security. Protecting student information from unauthorized access or breaches is a key challenge that must be addressed.

iv. **Financial Constraints:** The cost of developing, implementing, and maintaining an SMMS could be a barrier, especially in a resource-limited school environment like that of Saint Jean Baptiste College.

v. **Technical Support:** Ongoing technical support will be required to manage the system and fix any issues. The availability of skilled personnel to provide this support may be limited.

vi. **Time Constraints:** Gathering data, conducting reviews, and implementing the system may take longer than expected, especially if the school's administration has other pressing responsibilities or limited availability.

1.9. Organisation of the Project

This project is organized into several key chapters to ensure a systematic approach to the research, development, and evaluation of the **Student Marksheet Management System (SMMS)** at Saint Jean Baptiste College.

Chapter 1: General Introduction

Provides an overview of the study, outlining the research objectives, significance, methodology, limitations, and structure.

Chapter 2: Review of Related Literature

Reviews existing studies and practices related to student marksheet management systems, focusing on both paper-based and digital methods. This chapter also highlights global trends and ICT integration in education, particularly in Cameroon.

Chapter 3: System Analysis and Design

This chapter analyses the existing paper-based marksheet management system *at* Saint Jean Baptiste College and outlines the design of a proposed **Student Marksheet Management System (SMMS)**. The analysis involves identifying the limitations of the current system and the functional requirements needed for the new digital system to be successful.

Chapter 4: System Implementation

The implementation of a Students Marksheet Management System (SMMS) in secondary schools, such as Saint Jean Baptiste College in Bangangté, involves several critical steps aimed at ensuring the system meets institutional needs, enhances efficiency, and improves the accuracy of student performance tracking. This chapter outlines the key phases in system implementation, including planning, design, training, deployment, and evaluation.

Conclusion And Recommendation

The current system for managing marks at Saint Jean Baptiste College is slow, full of errors, and takes too much time because it's done manually. This affects how well students are assessed and causes delays in administrative tasks. A digital system is needed to make things more accurate, faster, and easier, helping both school staff and communication with parents and students.

Main Recommendations:

1. **Switch to a digital system** for entering marks and creating reports.
2. **Train staff** to use the new system effectively.
3. **Store all student data in one place**, safely and securely.
4. **Add features to catch errors**, like missing or wrong data.
5. **Set clear roles**: teachers enter marks, and the principal supervises.
6. **Create an online portal** for parents and students to view progress.
7. **Regularly review the system** to keep improving it.

CHAPTER 2: REVIEW OF RELATED LITERATURES

2.0. INTRODUCTION

As in modern education system, students' record management, especially marksheet management, is crucial to make sure that all educational transactions run smoothly and effectively. In secondary schools like the Saint Jean Baptiste College Bangangte in Cameroon, this is mostly managed through traditional methods such as manual marksheet management. As a matter of fact, maintaining the marksheet-related activities by hand has always posed serious problems regarding delayed processing of results, lots of errors happening, and much hassle in their maintenance. The review of the literature related to the research work focuses on existing research and development in the marksheet management system and its significance, beneficial usage, and challenges in implementation at secondary educational institutions.

Despite obvious advantages, migration into digital marksheet management systems is not devoid of challenges. The generally cited barriers to the implementation, as obtained from the literature, include initial set-up costs, need for technical training, and data privacy and security. Adebayo and Yusuf (2021) have viewed that implementation requires careful planning with the necessary allotment of resources and continued support toward assurance of the suitability of the system to meet the specific needs of the institution.

2.1. DEFINATIONS OF IMPORTANT TERMS

2.1.1. Marksheet.

A marksheet is a record of the grades or marks a student has scored in his subjects over a certain period of time (Studyportals., (2024)).

2.1.2. Management.

The process of organizing and coordinating activities to achieve certain goals. In this aspect, it refers to the management of creating, maintaining, and utilizing marksheets (Koontz, (2023)).

2.1.3. Student Marksheet Management System (SMMS).

An SMMS will provide a web-based system for generating, storing, and managing student mark-sheets. It will help arrange the grades of students in an organized manner and present them with ease of access (Ali, (2018)).

2.1.4. Secondary School.

A secondary school is an educational institution wherein students receive education after primary school and before higher education, typically including grades 6 through 12 (Statistics., (2021)).

2.1.5. Digital Solution.

The term digital solution means a solution with the use of technology. Management of the marksheets with the help of software and online tools will fall under this category (Tapscott, (2021).).

2.1.6. Form / Head Teacher.

The form teacher is the teacher who is in charge of a particular class or year group with the general welfare and academic development within that group (Campbell, (2021)).

2.1.7. Administrative Burden.

Administrative burden is described as the quantity of administrative work and paperwork that teachers and school staff conduct (Moynihan, (2019)).

2.1.8. Data Accuracy.

Data accuracy: It is the level at which data correctly describes the real-world condition or event it represents. In marksheets, the grades will be recorded correctly (Redman, (2020)).

2.1.9. Data Privacy.

It refers to the safeguarding of the personal information of an individual against unauthorized access. This guarantees the grades of students and their personal information, in general, remain private (Solove, (2021)).

2.1.10. Data Security.

Data security refers to the measures taken to protect the digital information from unauthorized access, theft, or destruction. It secures the marksheets from every form of cyber threats (Whitman, (2022)).

2.1.11. Real time access.

Real-time access involves the ability to view or retrieve information immediately it is updated. In the context of this case, it provides students and teachers with immediate access to marksheets (Laudon, (2022)).

2.1.12. Educational Administration.

It refers to the management and leadership of an educational institution. Moreover, it involves such functions as planning, organizing, directing, and controlling activities of a school. In the light of the above definition (Bush, (2021)).

2.1.13. Transparency.

It means transparency in education that all the things relevant to the educational process and decisions should be crystal clear. In the process of managing marksheet, it would mean the grades are allocated which could be shown to the students or parents (Hood, (2020)).

2.1.14. Accountability.

Accountability incorporates a sense of answerability for actions or decisions taken and to be accounted for. In education, it means the teacher and schools are accountable for the learning outcomes of the students (Bovens, (2019)).

2.1.15. Implementation Process.

The implementation process in this context is a series of steps which are undertaken to put in place and commence using the marksheet management system in Cameroon secondary schools. It involves installing the system and ensuring it works accordingly (Fixsen, (2022)).

2.1.16. Stakeholders.

All those people who have interest in marksheet management system are stakeholders. Here, they will include the students themselves, teachers, school administrators, parents, and even the government (Freeman, (2022)).

2.1.17. Educational Outcomes.

Educational outcomes are the results from using the marksheet management system. Examples of such results are grades among students, how well they are learning, and their general performance academically (Astin, (2020)).

2.2. OTHER RELATED LITERATURES

2.2.1. Design a database to store data of the platform.

Designing a database for storing data for a Students Marksheet Management System in secondary schools in Cameroon requires the understanding and implementation of a number of core principles of database systems. Such principles are comprehensively covered by two key references: "Database System Concepts" by Silberschatz, Korth, and Sudarshan; and

"Fundamentals of Database Systems" by Elmasri and Navathe. These books have allowed me sufficient insight into the design, implementation, and management of database systems-being called for in creating a robust database for this platform (Silberschatz, (2019)).

Database System Concepts by Silberschatz, Korth, and Sudarshan's book, which was published in 2010, is a widely acclaimed textbook about database systems, varying in topic. It gives an overview of database design, emphasizing data modelling and how data should be persisted using DBMS. Now, in the case of a marksheet management system, the designing of a database would be inclusive of a variety of data types ranging from student information to grades, subjects, and attendance records. The book has also described different types of database models, such as relational, object-oriented, NoSQL databases, together with their advantages. In this system, a relational database would serve best because it can maintain the integrity of the data and enforce relationships among different entities. For instance, information about students and their marks is kept in separate entities. Basically, data integrity and consistency, as illustrated in the book, are key ingredients of the database to ensure that the accuracy and reliability of the data stored therein are guaranteed for a long period; this principle is quite essential in education because accurate records form the core or backbone of education.

On the other hand, the basic source is "Fundamentals of Database Systems" by Elmasri and Navathe 2015, which discusses the very basics of database systems. The data modelling techniques discussed in this textbook are necessary to construct an accurate database that mirrors the actual data and relationships of the marksheet management system, such as Entity-Relationship (ER) modelling and Unified Modelling Language (UML). For instance, an ER model helps to conceptualize how students would relate to their respective classes, teachers, and marks obtained. Elmasri and Navathe also provide the different stages of designing a database from conceptual to logical and physical design with an organized manner of devising a database system. This helps in making the database scalable, efficient, and capable of handling a lot of data that is necessary to handle such a system. This keeps the academic records in track for several students over a couple of years. Additionally, it covers the implementation of databases through Structured Query Language, SQL, which is needed to create, manipulate, and query a database. These are the main concepts to be understood for setting up a database that will tune the data needs of the marksheet management system and support different functionalities of the same as shown by Elmasri & Navathe (Elmasri, (2021)).

2.2.2. To develop a system application which facilitates users to make online registration.

The system application design for online registration of secondary school students in Cameroon is tasking and requires several understanding and implementations of key principles of software engineering. References that shall cover these principles include, but are not limited to, "Software Engineering: A Practitioner's Approach" by Pressman and "Software Engineering" by Sommerville. Such textbooks give detailed insights into design, implementation, and management concerns of the system applications being developed, such as an online registration system (Pressman, (2019)).

Software Engineering: A Practitioner's Approach by Roger S. Pressman, is an internationally renowned textbook covering a wide range of principles and practices in software engineering. It emphasizes adopting a structured approach toward the process of developing software and leads practitioners through several stages concerning the software development life cycle. It applies to the development of the online registration system since it provides discussions concerning the importance of user interface design and implementation of the functionalities that will make the process easy for users. Pressman provides techniques in gathering the user requirements into functional design. This includes intuitive navigation, ensuring accessibility, and form validation to evade some error occurrences during the registration process. Due to their following guidelines provided by Pressman's book, developers will be able to create an online registration system that is user-friendly and efficient, catering to the needs of students, parents, and school administrators effectively (Pressman, (2019)).

On the other hand, "Software Engineering" by Ian Sommerville (2016) is another core reference that details the software life development cycle. Sommerville's book details major areas such as engineering the requirements, system design, and implementation in developing any system application. Precisely, an online registration system involves discussion on the requirement analysis of users and designing systems that are functional and friendly to the end-users. This involves the development of wireframes and prototypes to visualize the user interface, and iteratively refine the design based on user feedback. Furthermore, Sommerville discusses techniques that guarantee system reliability and performance, such as load testing to handle multiple users who would like to register at the same time, and making sure data is secure through the protection of sensitive information about students. By observing the guidelines pointed out by Sommerville through his book, the developers can devise an online

registration system which is robust, scalable, secure, and easy to operate as documented (Sommerville, (2020)).

2.2.3. In developing a system application that may allow various users to generate reports about marks management.

The development of a system application that allows various users to report on the management of marks of students in secondary schools in Cameroon involves a thorough understanding and implementation of a number of core principles in database and data warehouse systems. Two such references that would be very useful to deal comprehensively with these principles are "The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modelling" by Kimball and Ross, and "Database Systems: A Practical Approach to Design, Implementation and Management" by Connolly and Begg. These texts would go a long way in providing detailed information on the design, implementation, and management of such systems to efficiently generate reports (Kimball, The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modelling (3rd ed.)., (2018)).

The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modelling" is a seminal book written by Ralph Kimball and Margy Ross in 2013 that describes how to go about designing data warehouses and reporting systems. It lays the basis for the practical guide in designing systems for marks data management and reporting. It places great emphasis on the importance of dimensional modelling as the technique for designing such data in an intuitive way to users and for query performance. In the context of managing mark sheets, this will create star schemas or snowflake schemas by shaping information into fact tables, for example, marks, and dimension tables, for example, students, subjects, teachers, and time. This kind of schema will enable users to pull out many different kinds of reports, such as reports on the performance of students, the performance of classes, and analyses on various subjects. In Kimball and Ross's book, the methodologies enable developers to design a data warehouse that supports the reporting of detailed and summarized formats, thereby deriving knowledge from the marks data. On the other hand, another important source designating the design and implementation of database systems, including report generation, is "Database Systems: A Practical Approach to Design, Implementation, and Management" by Thomas Connolly and Carolyn Begg, published in 2014. This book gave insight into developing applications that would present detailed reports to various users. Connolly and Begg go further to discuss different techniques of designing databases, including normalization, which

ensures the data are consistent with minimal redundancy. They also include the use of SQL for querying and reporting purposes. In a marksheet management system, SQL can be used to write complex queries in order to extract and aggregate information based on certain criteria, such as getting a report of students who have scored above a certain threshold in some subject or finding trends in student performance over time. Moreover, the book discusses how the use of DBMS with extended reporting capabilities, like views and stored procedures, allows the end users to create reports more simply (Connolly, (2022)).

2.3. Definition of research key concepts.

XAMPP

A cross-platform Apache distribution that includes MySQL, PHP and Perl. The application provides an instance of a local web server that is used during testing and development of websites before publishing (Friends., (2024)).

API (Application Programming Interface)

Allow communication across various software applications by facilitating different functionalities like payment gateways and shipping services (GeeksforGeeks., (2023)).

HTML (Hyper Text Markup Language)

This is the standard for the markup language in designing web pages by describing the structure of the content with the use of tags and attributes (W3Schools., (2023)).

CSS (Cascading Style Sheets)

This is a style sheet language that is used to describe the presentation of web pages for user experience by design, layout, and other visual characteristics (Docs., (2024)).

JavaScript

A high-level programming language adds behaviour to web pages such as responding to form input and performing page updates in real time (Mozilla., (2023)).

PHP (Hypertext Preprocessor)

Server-side scripting for creating dynamic Web applications, interacting with databases, managing session variables, etc… (PHP.net., (2024)).

SQL (Structured Query Language)

A standard language for accessing, managing, and changing relational databases (Oracle., (2023)).

MySQL

Free, open-source RDBMS that is acclaimed for its speed and reliability in web-based applications (MySQL., (2024)).

Database Key Concepts

Databases are about ensuring that data is stored efficiently and effectively managed. In designing and managing effective databases, there are key concepts that need to be understood. Some of the basic concepts are discussed as follows.

Table: A tabular presentation of information, with rows and columns.

Rows: Individual records or entities.

Columns: Attributes or fields of data.

Key: It is a unique identifier of a record that is in a table.

Primary Key: Every row in a table has a unique identifier as its key.

Foreign key: A column in one table refers to a primary key of another table, thereby linking the two tables.

Relationships: It is a link between tables wherein there is some sharing of data.

One-to-One: One record in Table A will lead to only one related record in Table B.

One-to-Many: A record in Table A will lead to many related records in Table B.

Many-to-Many: More than one record in table A is associated with more than one record in table B (necessitates a junction table).

Data Consistency: The assurance of the data being kept within the database being accurate and reliable.

Data Integrity: Assurance of accuracy and consistency of the data through constraints and rules.

Entity Integrity: Every table should have a primary key, and it ought to be unique.

Referential Integrity: Consistency between related tables that is maintained by foreign key constraints.

2.4. Review of other related literatures

2.4.1. Digital Transformation in Education

Among the general global trends that have been considered is the transition from traditional, paper-based systems to digital solutions in educational institutes. Works such as Yadav and Singh 2019 have shown how digital transformation can enhance educational administration by increasing efficiency and accuracy in the maintenance of records. In this light, the adoption of digital marksheet management systems is an advancement of this general trend, which aims at smoothening the process and reducing administrative headaches (Yadav, (2019)).

2.4.2. Benefits of Digital Marksheet Management Systems

Literature identifies various advantages of digital marksheet management systems in schools. According to Mahapatra and Patra, it reaps adequate dividends like :

- **More Efficiency:** The automation of some processes reduces the time and energy of teachers in maintaining students' records.
- **Higher Accuracy:** Chances of human error while entering data or setting calculations reduce to a large extent in case of digital systems.
- **Better Accessibility:** It provides immediate access to data related to student performance by teachers, administrators, students, and parents (Mahapatra, (2020)).

2.4.3. Case Study: Digital Systems at School

Several case studies show the actual implementations of the digital marksheet management systems and what would be the resultant benefits of such systems. For instance, Okoro and Eze (2020) investigated the impact of the introduction of this system in secondary schools across Nigeria, while Rahman (2018) analysed its adoption in schools in India and was able to find improvements in data management and stakeholder communication.

2.4.4. Issues That Arrest the Implementation of Digital Systems

While these benefits seem eminent, several factors can arrest its successful implementation. According to Adebayo and Yusuf, 2021, such challenges include: (Adebayo, (2021))

- **Initial Setup Costs:** High costs of investment in hardware, software, and training.

- **Technical Training:** The need for proper training for staff on how to efficiently use the new system.
- **Data Privacy and Security:** Ensuring that student data is maintained free from unauthorized access or breach.

2.4.5. Impact on Educational Outcomes

It also follows from the research that when students' data are well managed through the use of digital systems, educational outcomes increase. Sharma and Batra (Sharma, (2013)) identified that increased accuracy and accessibility of data promote effective academic planning and interventions that have culminated in improved performance among students. In that connection, Tella (Tella, (2017)) has underlined that the transparency of academic records promotes a collaborative environment among teachers, students, and even parents, which develops overall success among students.

2.4.6. Technology Adoption in Cameroonian Schools

In Cameroon, the inclusion of digital interventions into education is, hence, still an emerging process. Nkwenti explained that the use of ICT can better the management of education in schools across Cameroonian society. The role of governmental backing and the construction of supporting infrastructures were, therefore, cited to be very strong in supporting wider receptions of these digital systems (Nkwenti, (2017)).

2.4.7. The Role of Stakeholders

Any marksheet management system involves different stakeholders for its successful implementation. According to Khan, "For effective usage and acceptance of the digital system, collaboration among teachers, administrators, students, and parents is very important. The stakeholder training and ongoing support structure is an integral part of it" (Khan, (2018)).

2.4.8. Future Directions

It is now estimated that future management of mark sheets in secondary schools will portray an increasing integration of advanced technologies. Recent trends, as pointed out by Patel (2022), further indicate how the integration of artificial intelligence and machine learning

would further enhance data analysis and predictive analytics for high-scale insights into student performance and possible intervention points (Patel, (2022)).

2.5. CONCLUSION

Literature reviewed has also emphasized that the benefits that accrue from the digital marksheet management systems at secondary school levels would relate to efficiency in the management of student data, data accuracy, and access to information.

While other challenges have to be addressed for the successful implementation: initial costs, technical training, and data security. These will undoubtedly accrue to the secondary schools in Cameroon, of which Saint Jean Baptiste College in Bangangte is one, in terms of educational management and student performance. The underlying insights that have been offered about the implementation and optimization, courtesy of existing research in the area, make very useful recommendations and hence provide a ground for future endeavours in improving technology in education.

CHAPTER 3: SYSTEM ANALYSIS AND DESIGN

3.1 Introduction

The Student's Marksheet Management System for secondary schools in Cameroon can be developed with an overall approach in the system analysis and design process. This chapter gives an overview of methodologies and techniques adopted to analyse requirements and design the system. Analysis includes understanding the users' needs, identification of functional and non-functional requirements, and modelling of the system processes and data flows. System design shall then focus on the development of a blueprint that shall enable such a system to meet these identified requirements and have a system performing efficiently and effectively.

3.2. Current System Analysis

3.2.1. Problem of the Current System

The existent system for managing student marks in secondary schools in Cameroon faces some significant challenges that have limited its efficiency and effectiveness. Major problems emanate from its manually intensive processes, contributing to operational inefficiencies and data management issues. For proper analysis, these problems must be thoroughly understood to satisfy the requirements for a new, improved system.

Manual Record-Keeping

In many schools, student marks management still happens by using manual record-keeping methods. Teachers and administrators write and store the academic performance of students in various paper-based systems. Such methods are prone to errors due to illegible handwriting, incorrect data entry, or even loss and damage to the physical records. This limits easy retrieval of data and its organization. Delays in report generation and hence decision-making are very common.

Inefficient Report Generation

Manual systems, as they are presently constituted, often lack the dexterity in generating detailed and personalized reports efficiently. Much precious time is frittered away by teachers and administrators compiling data on the report needed for students, parents, and educational authorities. Due to the lack of automatic report generation capabilities, timely insight into performance and trends in student information cannot be accessed to support informed decisions.

Inaccuracy and Inconsistency in Data

Most of these processes being manually operated, inaccuracies and inconsistencies are experienced. The discrepancies result from multiple entry of data, transcription errors, and failure of a validation mechanism. Faulty and incorrect data diminish the authenticity and accuracy of the report in measuring the progress of the students.

Limited Accessibility

The current system is limited by physical records and non-integrated digital systems. This difficult accessibility of student marks and any related information makes the process challenging. The inaccessibility of academic records on time is common when teachers, students, and parents are compelled to be physically present to retrieve information. Such inaccessibility ensures delays in response to academic queries, hence diminishing the overall user experience.

Security and Privacy Concerns

Managing student data manually is very insecure; the physical records are susceptible to unauthorized access, misplacement, and damage, while digital systems are unsecured against data breaches and other forms of cyber threats. Confidentiality and integrity of student data can hardly be guaranteed in the present system.

Resource-Intensive

The manuals used in the current system are costly in terms of both resources and time for both teachers and staff. The administrative workload regarding marks management, report generation, and record keeping run contrary to the core mandate of education handled by staff.

3.3. New System Analysis

3.3.1. Introduction

The new system shall replace the existing one with a totally integrated and automated solution that improves data accuracy, enhances report generation, and provides secured, easy access to student information. It shall introduce data entry automation, real-time data integration, more advanced reporting capability, and stringent security. It will reduce the administrative burden on teachers and other support staff, provide current information on student performance, and also help in decision-making at the institutional level.

Functional Requirements

1. User Authentication and Authorization:

- The system shall provide secure methods of logging into the system for different users, like administrators, teachers, students, and parents.
- Role-based access control shall ensure that users cannot utilize the functionalities and data except as relevant to their roles.

2. Student Information Management:

- Student Record Creation, Update, and Delete: The system shall provide for the creation of student records and updates and to be allowed for deletion also.
- Mandatory fields include address, enrollment, and academic record for students.

3. Marks Entry and Management:

- Teachers need to add and update marks in different subjects and assessments.
- The system should allow the entry of marks for different assessment types like exams, quizzes, assignments, etc.

4. Report Generation:

- The system should have report generation tools for generating host reports, such as individual student report cards, performance summaries of classes, and subject-wise analyses.
- Reports need to be customizable and exportable in different forms and formats, including PDF and Excel.

5. Automated Calculations:

- The system must automatically calculate total marks, averages, and grades based on predefined criteria.
- It should consider the class ranking calculations along with the relevant aggregates.

6. Notification and Alerts:

By utilizing this system, the principal of the college will be able to invite all Forms Teachers into important meetings of the college staff, and all the Forms Teachers will instantly receive the invitation in the mailbox.

7. Data Import and Export:

The system should support the importing and exporting of data to and from external feeds for data migration and integration with other systems.

8. User Interface:

- The system should be intuitive and easy to use for all users.
- It should contain dashboards and easy navigation to reach various functionalities.

Non-Functional Requirements

1. Scalability:

The system should be able to scale to support a higher number of users and data in the future.

2. Performance:

- It is highly desirable that the system should work with good efficiency and carry out all the operations related to entry, retrieval, or reporting at a fast pace.
- It should allow concurrent usage without any considerable reduction in performance.

3. Security:

- The system should provide tight security in order to avoid unauthorized access, data breach, and other sorts of security threats.
- It shall provide encryption regarding sensitive information along with routine checks through security audits.

4. Reliability:

- The system should be highly reliable and available with less or no downtime.
- System would include backup and recovery mechanism in order to avoid data loss.

5. Usability:

- System should be user-friendly with clear instructions and supporting users.
- It should therefore include accessibility features to cater to persons with disabilities.

6. Maintainability

- The system shall be easily maintainable and updated
- It shall be fully documented for use by developers and system administrators.

7. Compatibility

- The system shall have a broad compatibility base with devices and browsers.
- It shall have support for the integration with other educational and administrative systems already in use at the schools.

3.3.3 Functional Diagram

A functional diagram usually takes the form of a DFD or a Use Case Diagram. It illustrates the different components of the system, their interactions, and how data flows through the system. The main functions and processes within the Students Marksheet Management System are represented by a DFD, together with the flow of information between these processes and external entities.
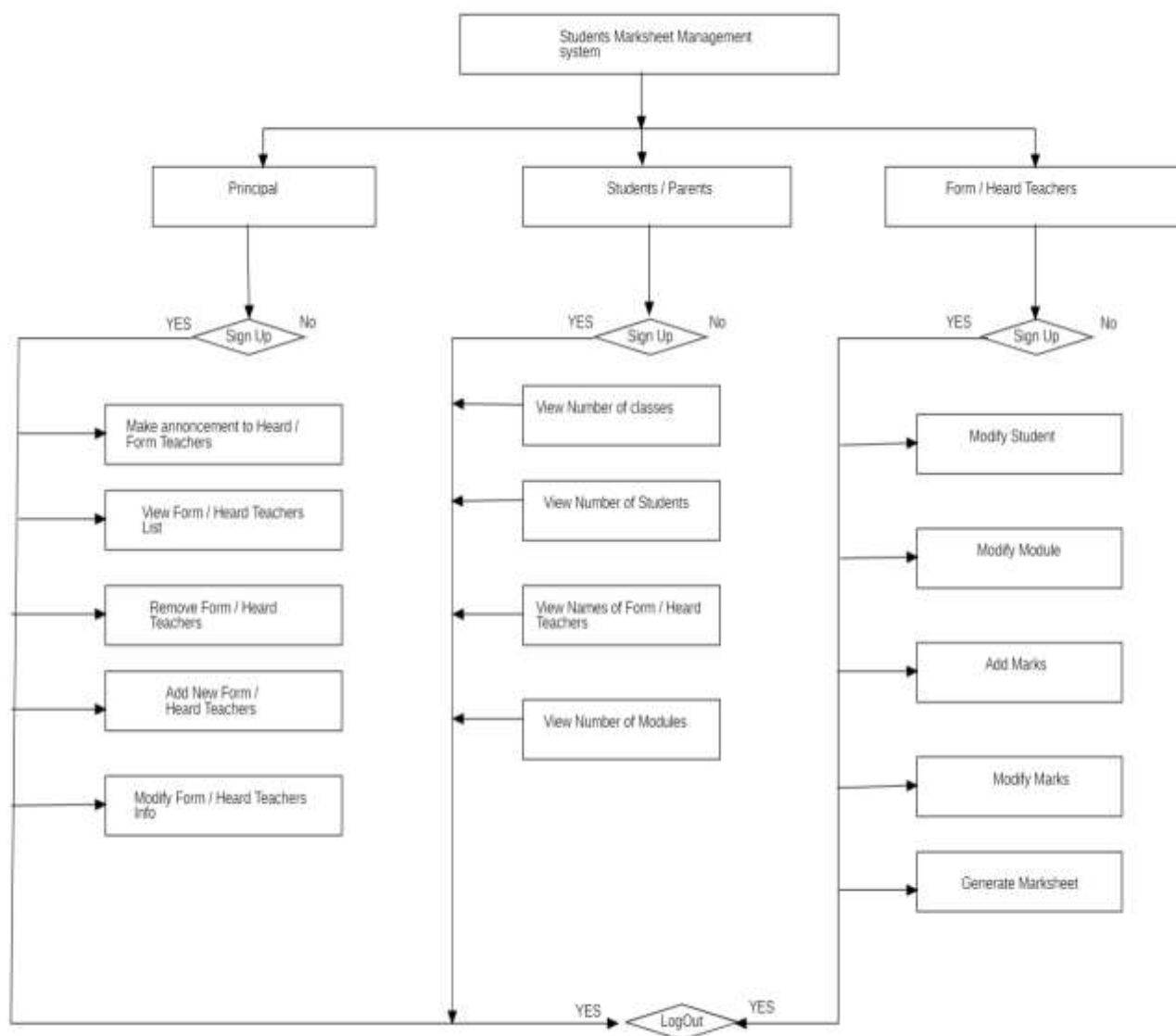
FIGURE 1: FUNCTIONAL DIAGRAM

Description of Diagram

1. Principal:

    i.   **Manage Form Teachers:** Add/remove form teachers and assign

    ii.   **View Reports:** Generate and view reports.

    iii.   **Manage System Settings:** Configure settings and permissions management

2. Form / Head Teacher:

    i.   **Students Management:** Add/Remove students, entering marks, managing modules

    ii.   **Student Performance:** View and analyze performance.

3. Student:

    i.   **Marks View:** View their marks

    ii.   **Modules View:** View the modules they are enrolled into.

3.3.4 Methodological Approach

3.3.4.1 Data Collection Techniques

1. Observation:

    i.   **Description:** On-site observation of present marksheet management processes in the school environment.

    ii.   **Problems:** May be very time-consuming. Observations may not always depict the whole picture if it is not comprehensive.

2. Document Analysis:

    i.   **Description:** The study of existing records, reports and documents concerning marksheet management

    ii.   **Problems:** Some documents may no longer be current or up to date, missing, or inaccessible.

3.3.4.2 Software Development Methodology

Selection of suitable software development methodology guarantees the successful realization of Marksheet Management System for secondary schools in Cameroon. Various

available methodologies are discussed below, and justification is to be provided for the choice of the most suitable one towards this project.

1. Software Development Methodologies

Several software development methodologies exist, characterized by differing strengths and weaknesses. The common ones include:

i.   Waterfall Model: In this, the design process is linearly sequential. It takes a structured approach wherein each phase of the development depends upon the deliverables of the previous phase.

ii. Agile Methodology: Iterative development in which emphasis is laid on being flexible to changes and collaboratively working with customers. Development in short cycles known as sprints, continuous feedback.

iii. Rapid Application Development: It is a methodology concerned with quick prototyping and iterative development. Concerned with swift development and user feedback.

iv. Spiral Model: This is a combination of design and prototyping in a cyclical fashion, and it is suitable for large and complex projects.

2. Methodology Selection

Agile methodology is best suited for the Marksheet Management System. This is for the following reasons:

i.   Flexibility: Most educational institutions have constantly changing requirements, and Agile adapts to that change best.

ii. Iterative Development: Marksheets can be built iteratively; this would imply that there is the possibility to test versions and receive feedback early on.

iii. Customer Collaboration: Teachers, students, and administrators can provide their input continuously.

iv. Rapid Development: Early and quick iterations facilitate the delivery of the system in an effective manner.

v.   Risk Management: Agile represents an iterative approach; therefore risks can be identified and reduced much earlier.

3.3.4.3. System Design Methodology

For system design, Structured System Analysis and Design Methodology, known as SSADM, was adopted. This methodology has its appropriateness for a system that requires well-defined and clear processes.

Following are some of the tools used during SSADM:

Dataflow Diagram (DFD): The diagram to be drawn which would present the flow of data in the system at various levels.

Level 0 and 1: Context DFD

a. Level 0 DFD: Context Diagram

External Entities:

   i.   **Principal**

  ii.   **Form Teacher**

System:

 Students Marksheet Management System

Data Stores:

   i.   Form / Head Teacher Database

  ii.   Student Database

 iii.   Marks Database

 iv.   Module Database

This diagram represents the workflow of a **Students Marksheet Management System**:

- **Form/Head Teachers** are responsible for adding students, modules (subjects), and marks to the system.
- The **Principal** can add or manage Form/Head teachers and publish announcements through the system.
- **Students/Parents** can view class information and access student marksheets.
- The system centralizes student data, allowing for efficient management of marksheets and communication between teachers, the principal, and parents.

LEVEL 0
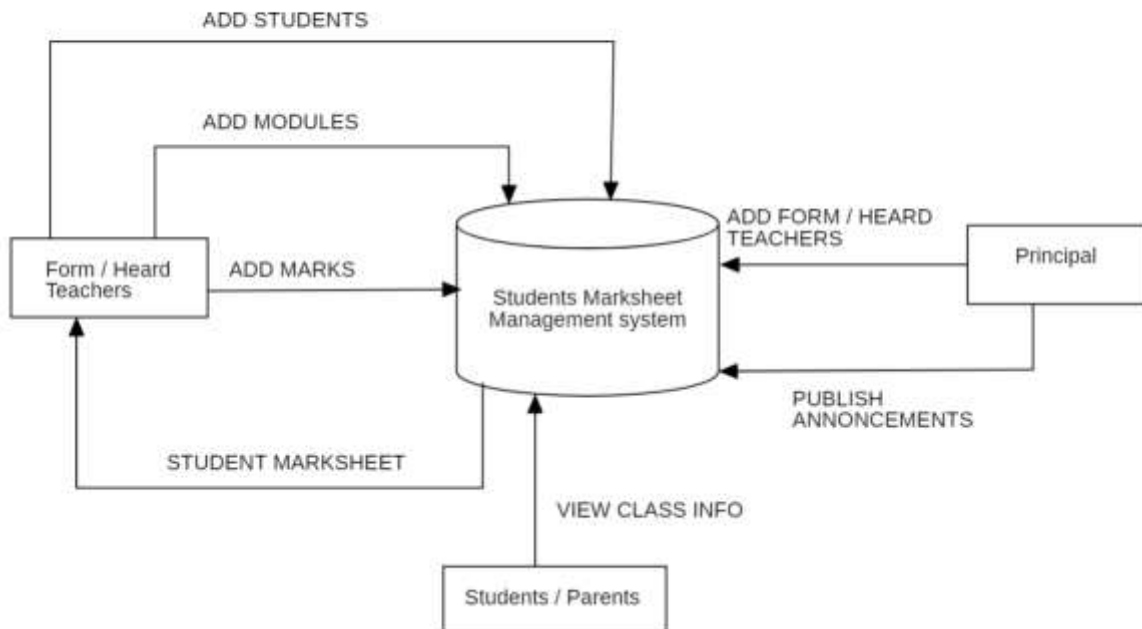
FIGURE 2: DATAFLOW DIAGRAM (DFD) LEVEL 0

b. Level 1 DFD: Break up of Main Processes

Processes:

  i.   **Principal Management**
  ii.   **Form Teacher Management**
  iii.   **Student Management**
  iv.   **Marks Management**
  v.   **Module Management**

Level 1
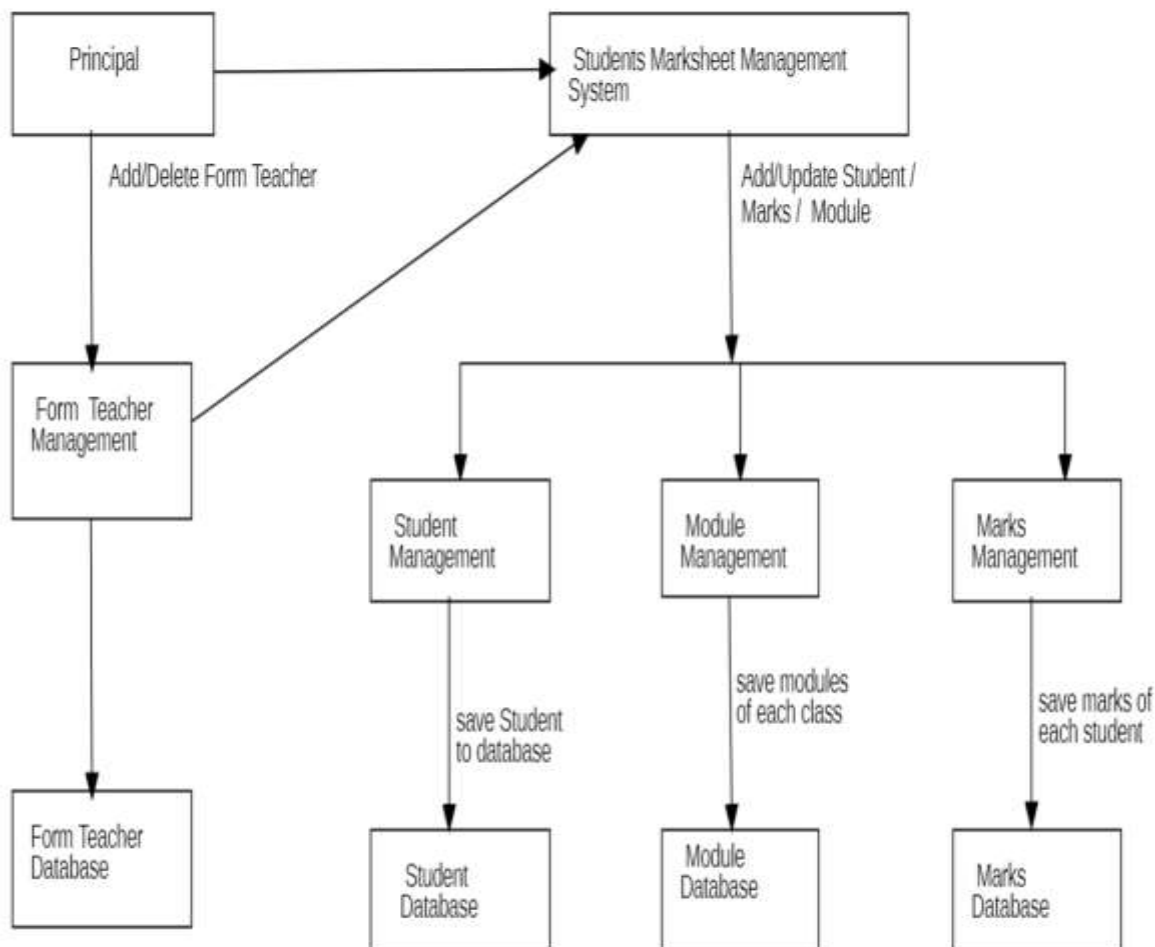
FIGURE 3: DATAFLOW DIAGRAM (DFD) LEVEL 1

Entity Relationship Diagram (ERD): Exhibits and explains all the entities found in the proposed Database, their relationships and attributes.

i. **Principal**: Contains details about the principal (ID, name, email, password) and links to the assigned tutor.

ii. **Users**: Represents general users in the system, including first name, last name, email, and passwords.

iii. **Courses**: Stores information about courses, such as course ID, name, and coefficient.

iv. **Classes**: Represents class information with class ID and name.

v. **Form Tutors**: Contains information about form/lead teachers (tutors) and links them to specific classes.

vi. **Marksheet**: Stores marksheets for students, including scores, student IDs, course IDs, trimester, class, and user.

vii. **Trimester**: Keeps track of the academic trimester names.

viii. **Students per Class**: Tracks student details (ID, registration number, names, parent address, date of birth) and associates them with their respective classes.
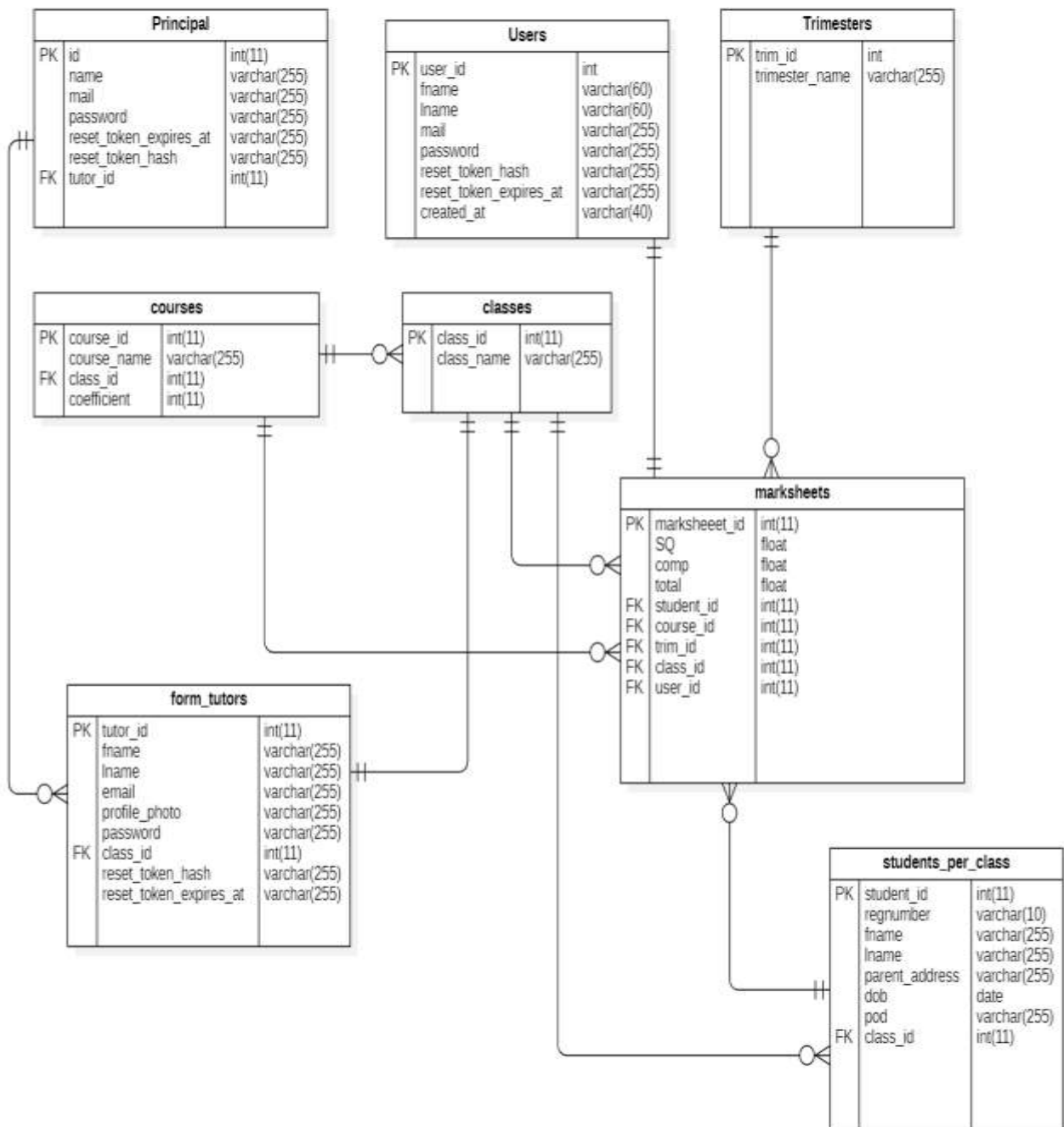
FIGURE 4: ENTITY RELATIONSHIP DIAGRAM (ERD)

Entity Relationships:

i. Principal ↔ Form / Head Tutors / Teachers: one principal can have many form tutors, and every form tutor is responsible to exactly one principal.

ii. Form / Head Tutors / Teachers ↔ Classes: each form tutor is allocated exactly one class, and every class is under exactly one form tutor.

iii. Classes ↔ Courses: a class can have multiple courses, but every course is part of only one class.

iv. Classes ↔ Students: One class can have many students, but one student belongs to only one class.

v. Classes ↔ Marksheets: One class can have many marksheets, but one marksheet is linked to only one class.

vi. Courses ↔ Marksheets: Every course can have many marksheets, but one marksheet is linked to only one course.

vii. Student ↔ Marksheets: One student can have many marksheets, but one marksheet is for only one student.

viii. Trimesters ↔ Marksheets: One trimester can have many marksheets, but one marksheet is for only one trimester.

Data Dictionary: List all attributes found in every table created in the database. For each field, the name, data type and specific constraints are provided.

FIGURE 5: DATA DICTIONARY

CHAPTER 4: SYSTEM IMPLEMENTATION

4.1. Implementation and Coding

4.1.1. Introduction

Implementation and coding of the system are crucial in realizing a 'Students Marksheet Management System' for secondary schools, such as Saint Jean Baptiste College in Bangangte in Cameroon. At this stage, translation of the system's design to actual functional software will be concretized according to the peculiar needs of the school.

4.1.2. Tools and Technologies Used

The development of a mark sheet management system for Students at Saint Jean Baptiste College in Bangangte depends on the choice of appropriate tools and technologies to ensure that the system would be efficient, scalable, and user-friendly. Below is highlighted an overview of the key tools and technologies used in this application:

Programming Languages:

- HTML5: Standard markup language used in creating web pages, which will define the structure and content of the interface of the system.
- Bootstrap: Most popular front-end framework, which is used for developing responsive mobile-friendly interfaces.
- JavaScript: Scripting languages that could possibly be used in implementation to create a more interactive web application with form validation, handling data, real-time updates, and other dynamic behaviours.
- CSS: Cascading Style Sheets is a stylesheet language that determines how Web pages are presented; maintains layout, colors, fonts, and other visual appearance aspects.
- PHP: This is a server-side scripting language used for data processing, interaction with databases, and dynamic content generation for the web application.

Database

MySQL is an open-source relational database management system, which has been implemented for storing data of students, marks, and so on.

Development Environment:

Visual Studio Code: A free code editor, open-source, with an enormous amount of extensions and functionalities that make development efficient.

Version Control

Git is a method by which developers can track document changes, work with other developers and create different code versions.

Rational for Technology Choices:

- HTML5, JavaScript, Bootstrap and CSS: Core technologies of web development, these form the base that allows for the development of an interface and functionality for the system.

- PHP- Because it is a server-side language, PHP can do some engaging in data processing, database interactions, and the creation of dynamic content in its own tongue.

- MySQL: A relational database would be suitable for a structured data format; student records, marks, and courses would all fall into a relational database schema.

- Visual Studio Code: A versatile code editor, smoothly sitting within your comfort zone for efficient development.

- Git: A version controller that provides complete track changes, develops with other developers, and versions of code.

The combination of all these technologies will come up with a robust and scalable student marksheet management system, accommodating specific requirements of Saint Jean Baptiste College.

4.1.3. Screenshots
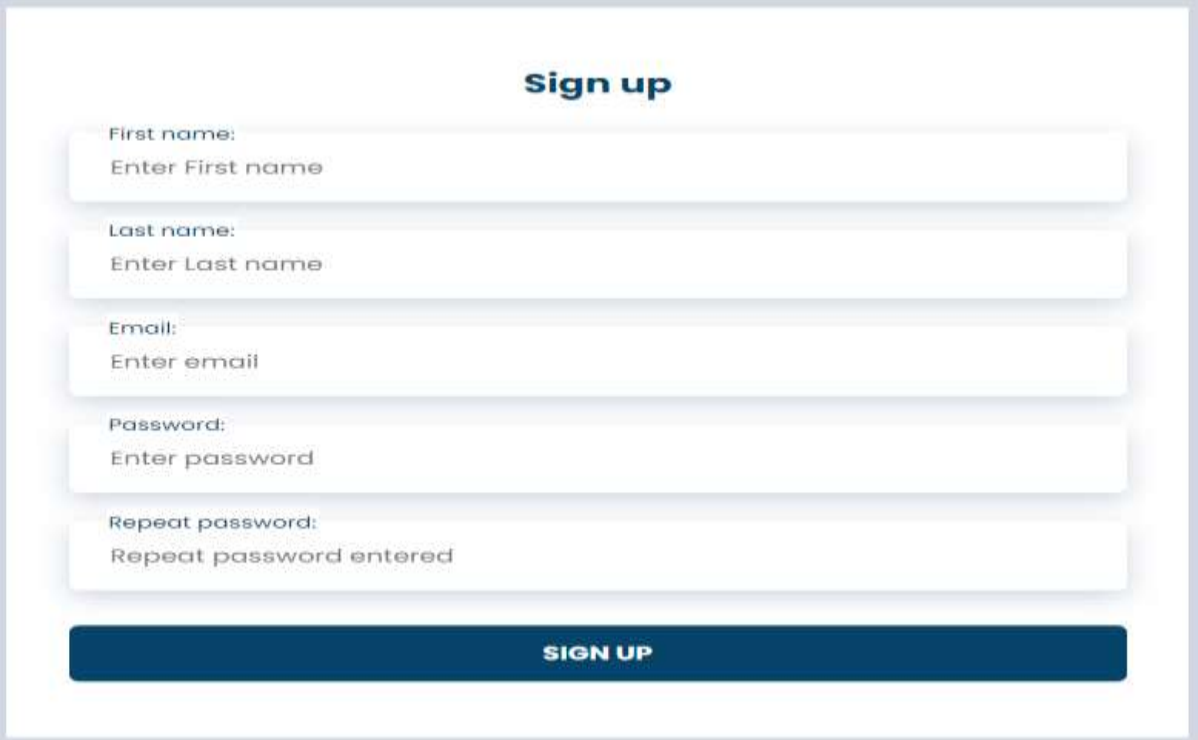
4.1.3.1. Interface of student marksheet management system

Here is the overview page where the user can register or log in.
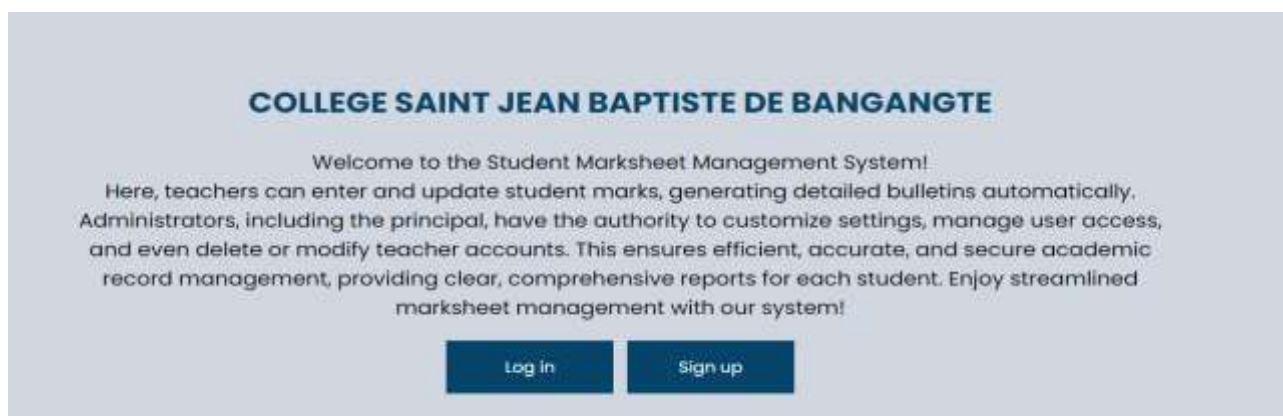
FIGURE 6: INTERFACE OF STUDENT MARKSHEET MANAGEMENT SYSTEM
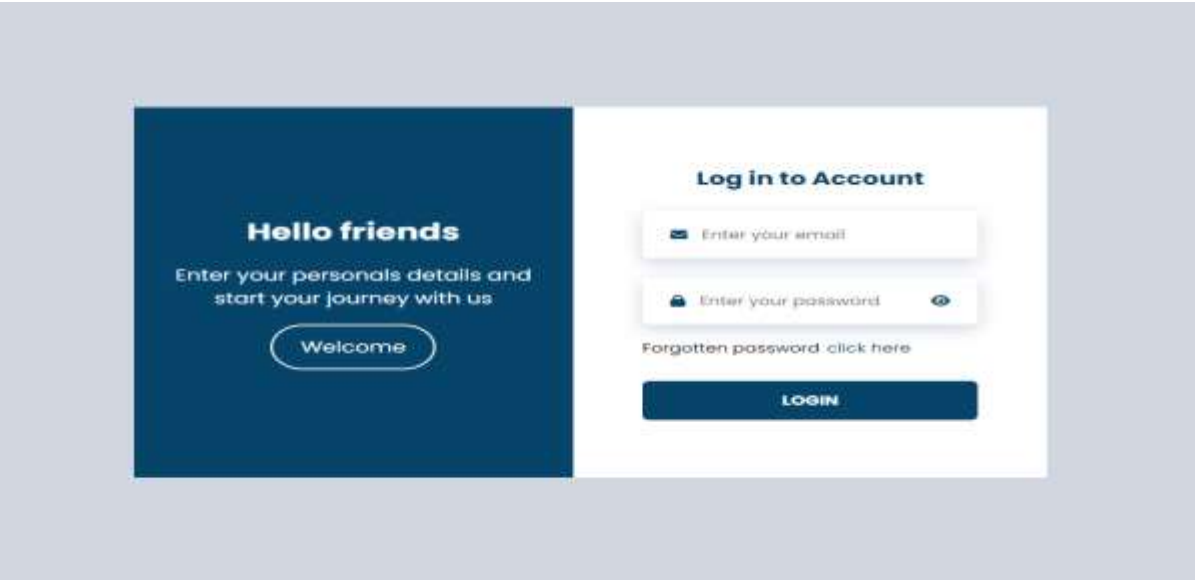
This is the form where all users must provide all the information in order to create an account on the system.

FIGURE 7: SIGN UP FOR USERS INTERFACE.

This is the page where all users who already have an account must log in.

FIGURE 8: LOG IN FOR USERS

Here is the presentation of all the classes that the college has.
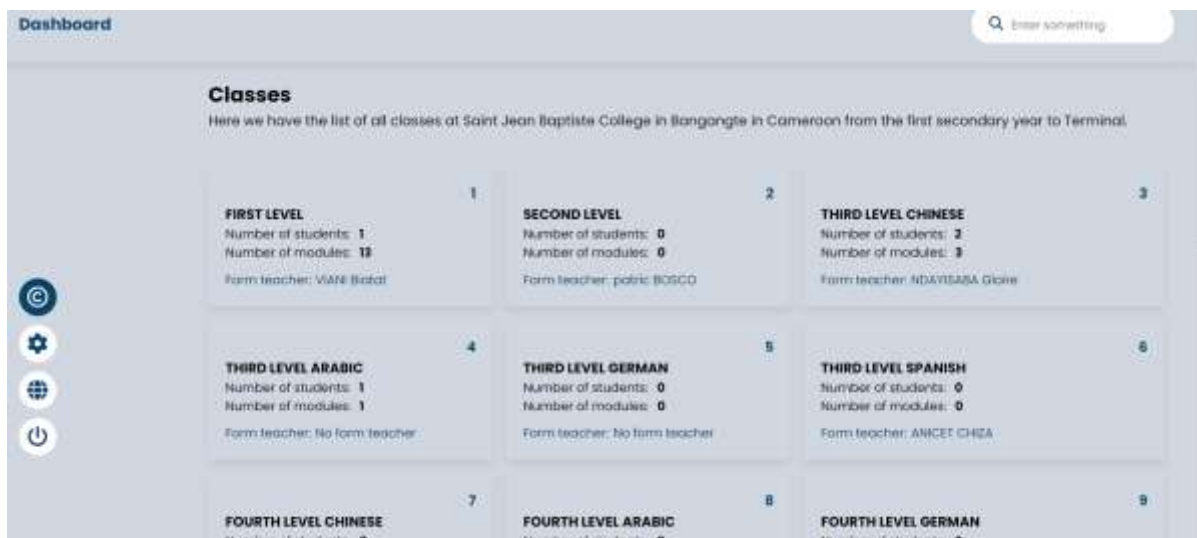
FIGURE 9: THE LIST OF ALL CLASSES

4.1.3.2. Principal Interface

Here is the interface where the principal of the college should use to log in to the system.
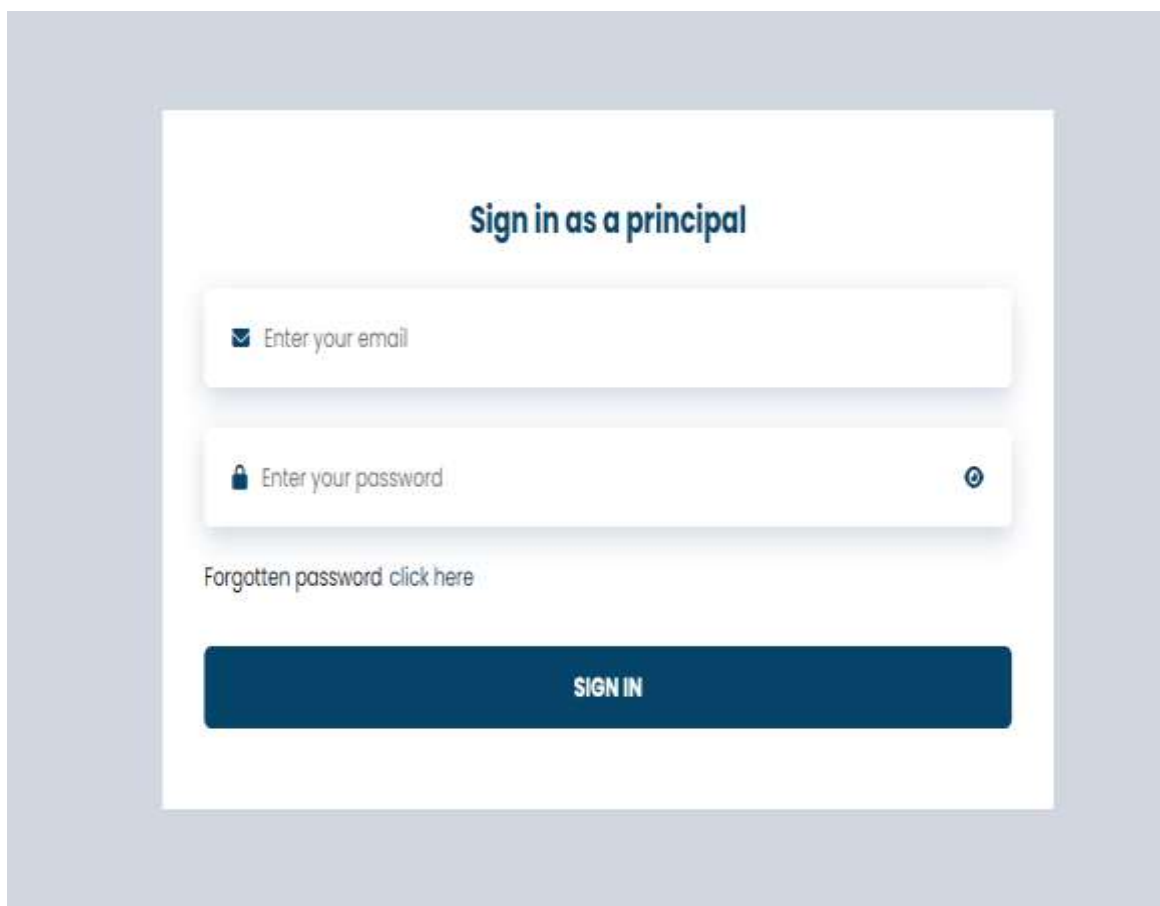
FIGURE 10: PRINCIPAL INTERFACE

Here is the list of all the Form/Head Teachers of the college.
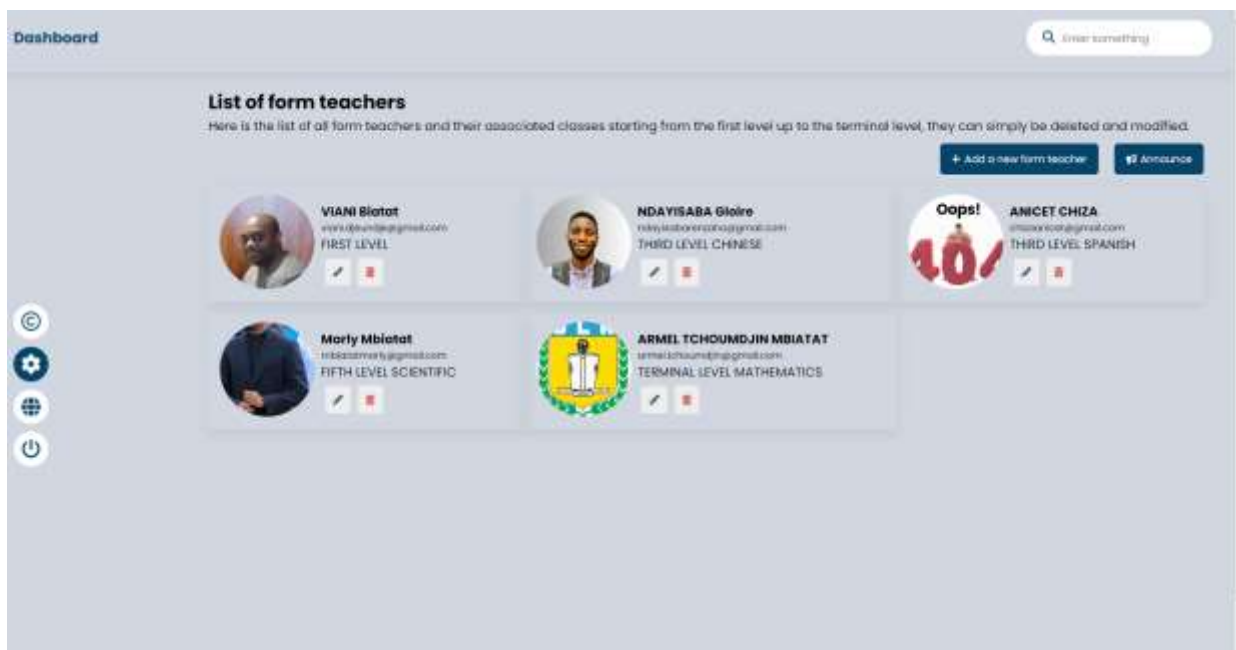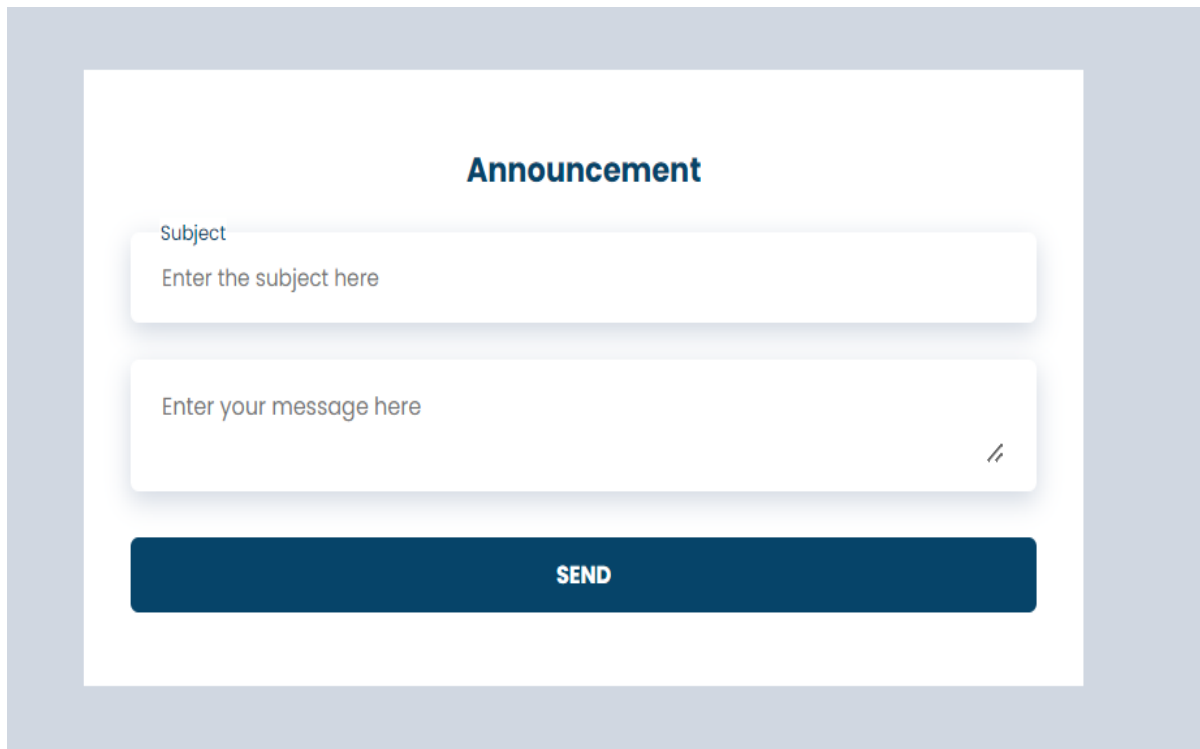
FIGURE 11: LIST OF FORM / HEAD TEACHERS

This is the page where the principal can add, modify or delete a Form/Head Teachers.
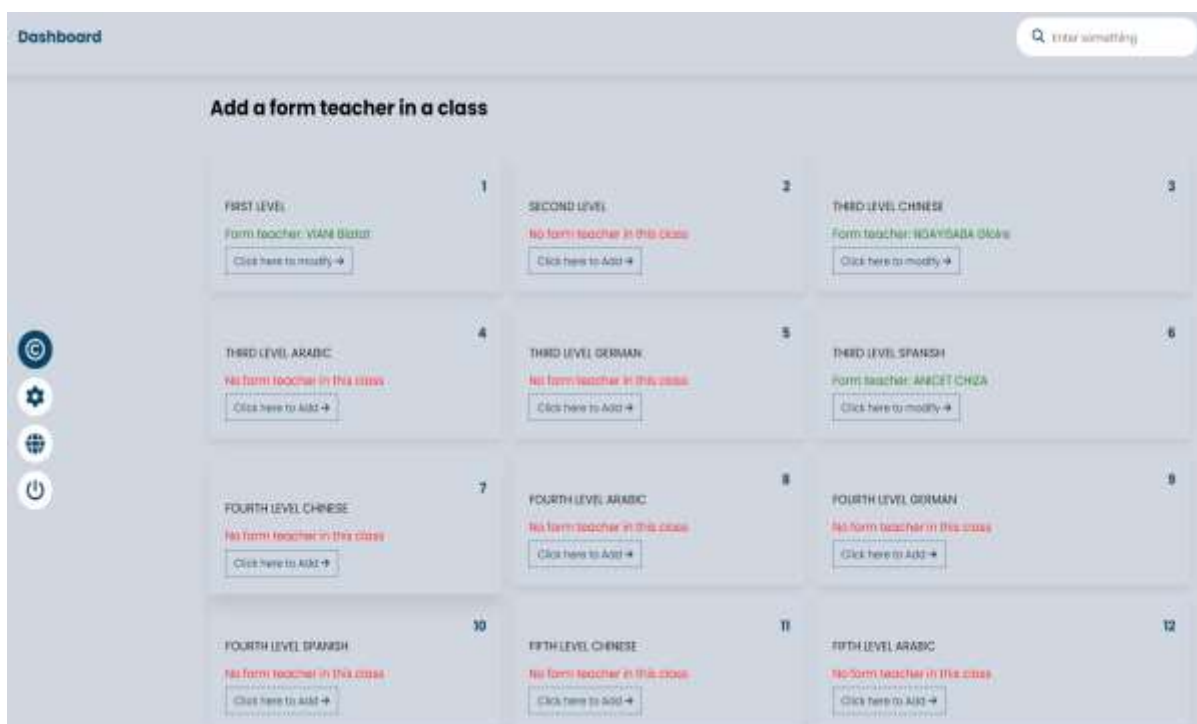
FIGURE 12: ADD A FORM / HEAD TEACHER IN A CLASS

This is intended for the principal of the college to make announcements to all Form/Head Teachers.
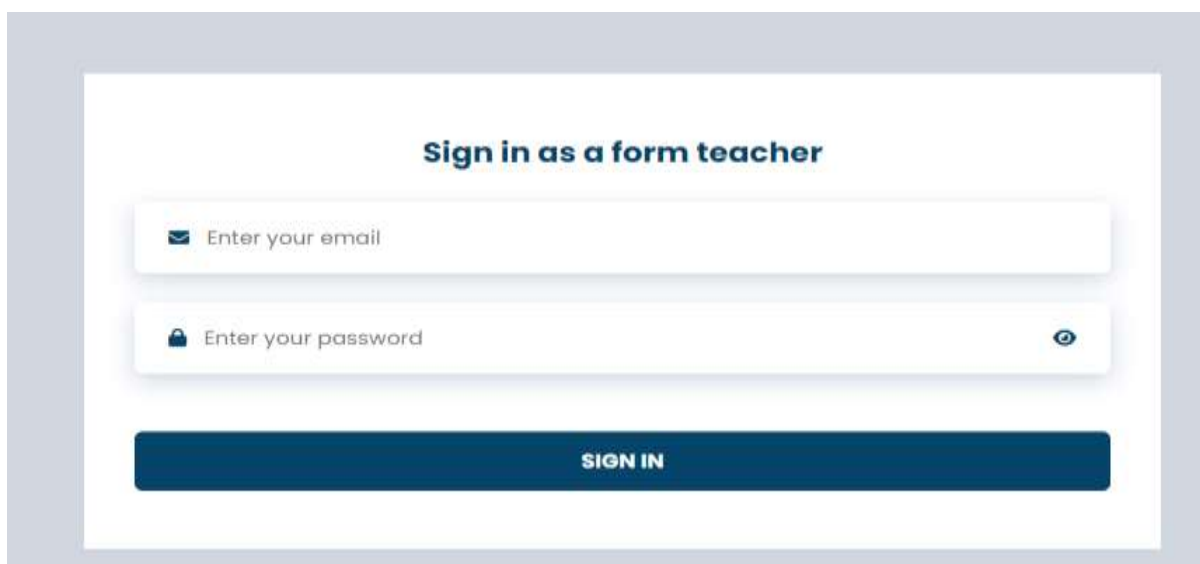
FIGURE 13: ANNOUNCEMENT

4.1.3.3. Sign in as a Head / Form Teacher
This page is to make it easier for Form/Head Teachers to log in.

FIGURE 14: SIGN IN AS A HEAD / FORM TEACHER

This page is for the Form/Head Teacher of the class allowing him to add the students registered for the class where he is a Form/Head Teacher, add the Modules, the marks and print the report cards of the students in his class.
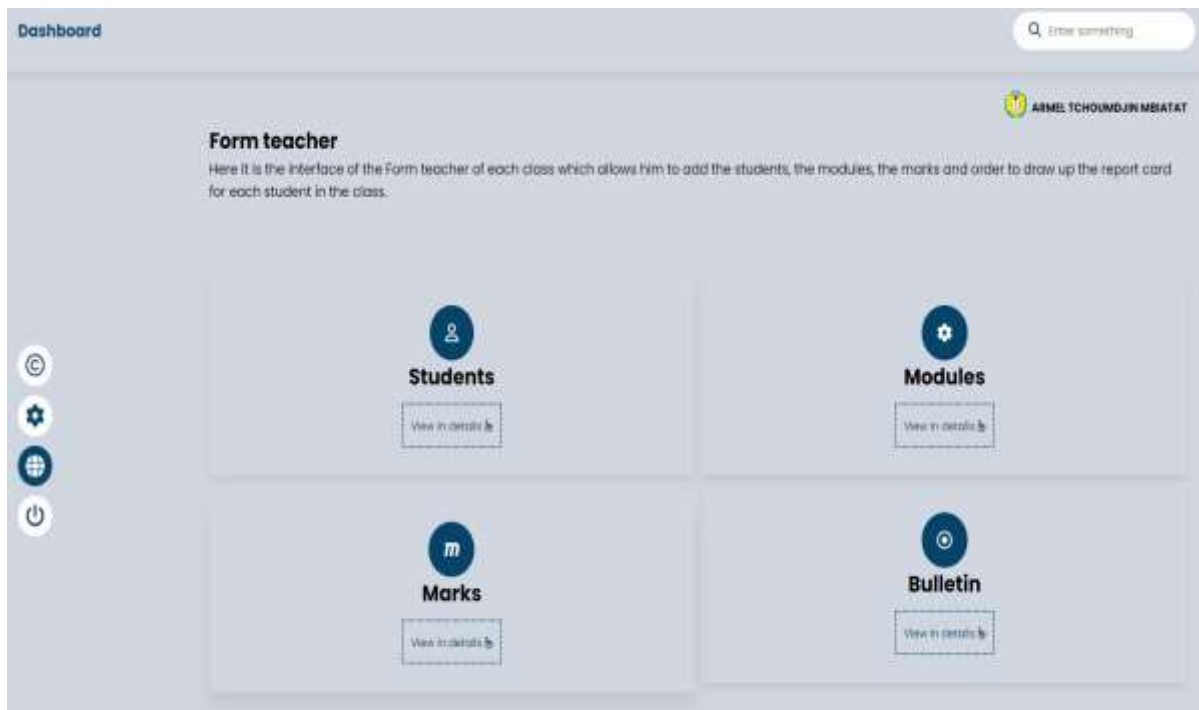
FIGURE 15: THE INTERFACE OF HEAD / FORM TEACHER

Here is the list of all the students in the class where the Form / Head Teacher is the only one who can add, modify and delete a student from the class.
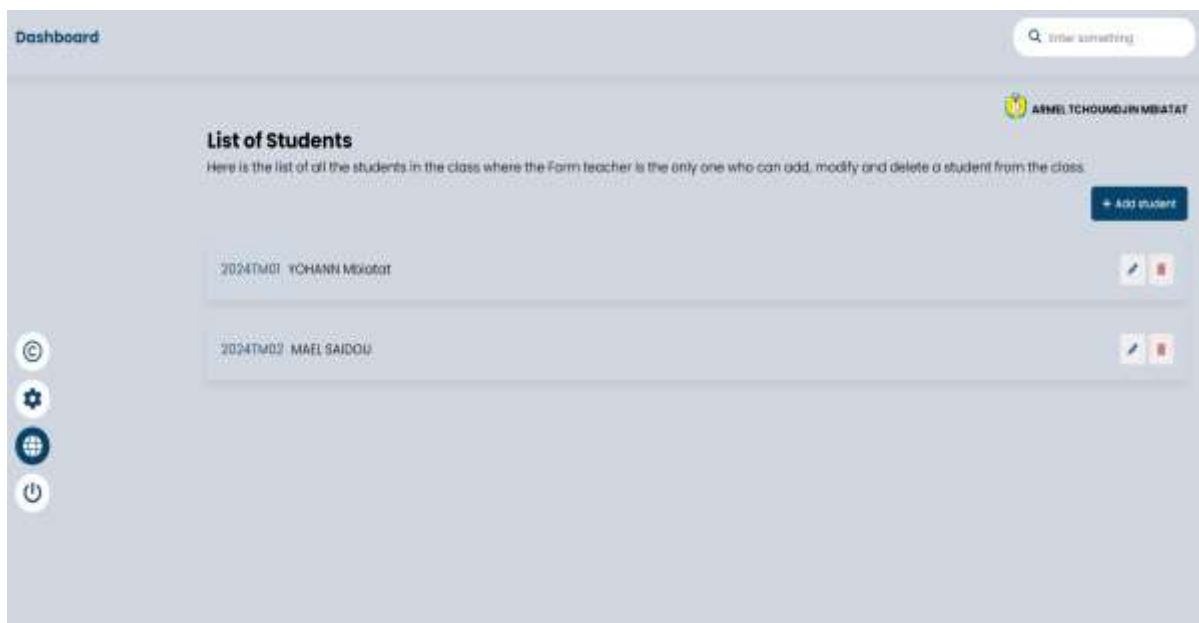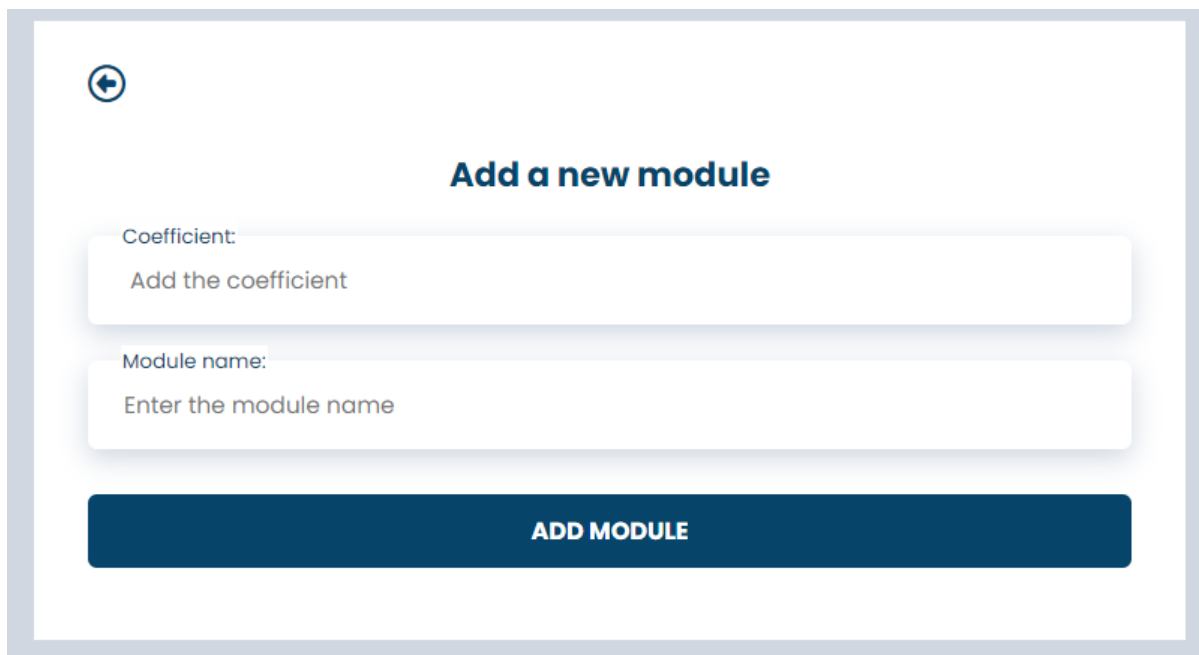

FIGURE 16: LIST OF STUDENTS

FIGURE 17: ADD A NEW STUDENT

FIGURE 18: MODULES OF THE CLASS

Here this interface allows the Head Teacher of the class to add the modules with their respective coefficient.

FIGURE 19: ADD A NEW MODULE

Here the Head Teacher of the class selects the student to add the averages.

FIGURE 20: MARKS OF STUDENTS

Here the Head / Form Teacher of the class selects the Trimester followed by the sequence and finally the average of the composition that the student had in a subject of his or her class.

FIGURE 21: ADD MARKS

FIGURE 22: MARKSHEET (BULLETIN)

My database(students_marksheet_management_system) + my Tables
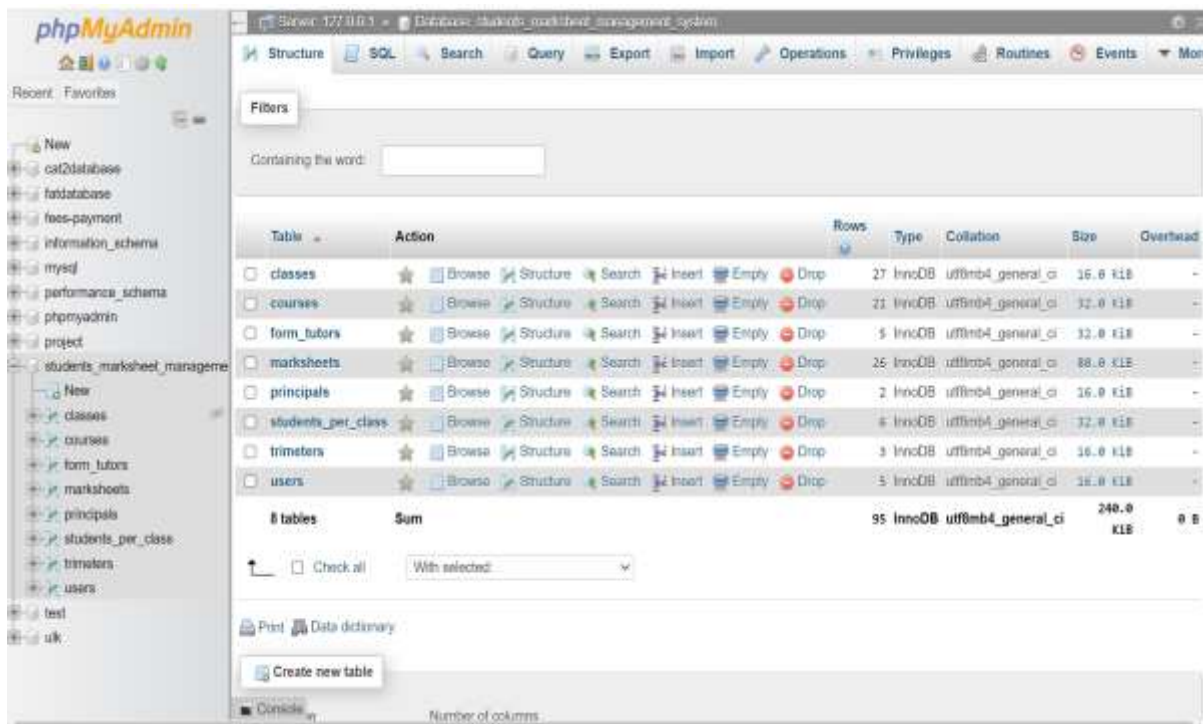
FIGURE 23: MY DATABASE

FIGURE 24: MY PHP CODE

FIGURE 25: MY PHP CODE

4.2. Testing

4.2.1. Introduction

Testing is one of the important phases in the development life cycle of any software system. It requires systematically checking various functionalities, performance, and reliability of the developed system for the assurance that it is meeting specified requirements and working as expected.

Objectives of Testing:

Find and Correct Errors: To detect and fix bugs or other defects in the code of the system to avoid errors affecting users.

Functional Testing: This test is required to ensure that the system will carry out the desired functions efficiently and correctly.

Quality Testing: This test aims to ensure the quality of the system, its usability, and its performance.

Requirements Validation: The aim of this test is to check whether the system covers all functional and non-functional requirements as specified in the contract document.

Types of Testing Unit Testing: The testing of a unit or component of a system in isolation from other units.

Integration Testing: This is the testing of interaction between different units or modules.
System Testing: Testing of the entire system as a whole to ensure that the system works correctly.

Acceptance Testing: In this, the end-users need to check if the system meets the needs and expectations.

In relation to the Saint Jean Baptiste College student marksheet management system, testing would include:

Accuracy and integrity of data checking: Student data, marks, and calculations should be correct and consistent.

Performance testing of the system to check its response time, the load it can sustain, and volume of data it is able to process.

Checking the functionality of the user interface to ensure ease of use and intuitiveness in the system interface and usability.

Checking the security measures so as not to allow sensitive student data to leak out into unauthorized access.

CONCLUSION AND RECOMMENDATION

Conclusion

The analysis of the **Marksheet Management System** at **Saint Jean Baptiste College in Bangangte**, Cameroon, reveals that the current system of managing student grades and marksheets is a critical aspect of the school's academic administration. However, like many secondary schools in Cameroon, the system faces challenges such as inefficiency, lack of digitization, data entry errors, and time-consuming manual processes. These issues hinder the smooth functioning of administrative tasks, leading to delays in report generation and inaccuracies in student assessments.

The need for a more modern and automated marksheet management system is clear. A digitized solution would enhance accuracy, reduce human error, and streamline the process from mark entry to the generation of final reports. Furthermore, implementing a well-structured and user-friendly system would alleviate the burden on teachers and administrative staff while improving communication with students and parents.

Recommendations

1. **Digitization of the Marksheet System:**

   o Implement a software-based solution that allows teachers to input, edit, and finalize marks digitally.

   o Introduce automated report generation that produces accurate and timely progress reports.

2. **Training for Staff:**

   o Conduct training sessions for teachers and administrative staff on using the new digital system effectively.

   o Ensure that the system is simple to use, reducing the learning curve for those less familiar with technology.

3. **Centralized Data Management:**

   o Create a centralized database to store all student marks, accessible by authorized staff.

   o Ensure that this database is secure and backed up regularly to prevent data loss.

4. **Improved Error Detection Mechanisms:**

   o Implement validation features that automatically flag inconsistencies or missing data, allowing for quick corrections.

   o Encourage periodic audits to ensure the system is functioning properly and that marks are accurately recorded.

5. **User Roles and Access Control:**

   o Establish clear roles and permissions within the system: for example, form teachers should have the ability to input marks, while the principal oversees the overall system without managing individual records.

6. **Parental and Student Engagement:**

   o Introduce an online portal where parents and students can check their academic progress in real-time.

   o Enhance transparency by providing access to term results and performance analytics.

7. **Regular System Evaluation:**

   o Conduct periodic reviews and updates of the system to address any challenges that arise and ensure it continues to meet the needs of the school.

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