AN ELECTRONIC GRADING AND REPORTING SYSTEM : A CASE STUDY OF BISHOP RUHINDI KEBISONI HIGH SCHOOL- RUKUNGIRI

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S23/BBUC/BSIT/020

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

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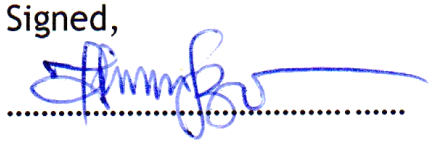
DECLARATION:

I, **MUHWEZI KENETH** declare that this Report is original and has not been submitted to any other university for the award of Bachelor of Science in Information and Technology and it is done out of my knowledge and understanding.

Signed,



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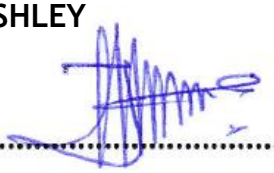
APPROVAL

This is to certify that **MUHWEZI KENETH**, (**S23/BBUC/BSIT/020**), will submit this project Report "ELECTRONIC GRADING AND REPORTING SYSTEM" in partial fulfillment of the requirement for the award of degree in information and technology at Uganda Christian University Bishop Barham University College is a record of this candidate own work carried out by him under my supervision.

MR. BILLY ASHLEY

Signature.....  ..... Date.....30/07/2021.....

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Lastly but not least in a special way I thank my wife **Mrs. Orishaba Fortunate**, she has been there for me in every situation, and my biological daughter Akankunda Stacey.

ABSTRACT

The proposed project is an Electronic Grading and Reporting System for Bishop Ruhindi High School located in Rukungiri District, Uganda. With the implementation of the new curriculum by the National Curriculum Development Centre (NCDC), schools are facing challenges in adopting a grading management system that aligns with the new curriculum. This study aimed to design and develop a system to streamline the grading and reporting process for Bishop Ruhindi High School, covering four classrooms (S1, S2, S3 and S4) with a provision to extend further to Advanced level.

The project made use of a combination involving HTML, CSS, PHP, MySQL, JavaScript, and JQuery. The system was developed utilizing Bootstrap. It was specifically designed to be accessible by the system administrator and instructors, with full rights to the system by the admin, including registering

pupils and teachers, entering marks, monitoring performance, and printing reports

The final examination of project methodology indicates that the Electronic Grading and Reporting System could assist with automating the grading and reporting process, enhance consistency and effectiveness, and establish a process to assess and refine the learning process at

Bishop Ruhindi High School will experience an installation with state-of-the-art and user-friendly functionality. A sound way to manage the process of assessing and documenting. In short, the Electronic Grading and Reporting System is a huge leap towards improving the Uganda education system, and by extension Bishop Ruhindi High School. The system is aimed at addressing challenges faced by learning facilities when running the new curriculum, and offers a framework for assessing and enhancing the learning process.

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CHAPTER ONE:

INTRODUCTION

1.1. Introduction

Implementation of an Electronic Grading and Reporting System is increasingly gaining wider coverage.

Notable in Uganda, with learning institutions seeking to mitigate with greater precision and consistency student

performance measures. This statement holds particularly with reference to the new curriculum embraced by the

The National Curriculum Development Centre stresses flexibility with student involvement.

Testing and measuring.

Bishop Ruhindi High School is found in Rukungiri District and is one outstanding example of schools doing a

an active approach to tackling these challenges. With a population of over 880 students and a

The faculty, consisting of 45 faculty members, recognizes the need for a framework that will

streamline teacher grading procedures, improve data validity, and provide instructors and administrators

with access to student data.

Currently, the learning facility relies upon manual practices for assessment and documentation, and these occupy significant time.

liable to inaccuracies and prone to errors. The proposed Electronic Grading and Reporting System will

processes automatically, hence submitting grades consistently and with a high degree of accuracy. The

The system will also provide instructors with direct access to information about students, thus allowing them to track

monitor student learning and make informed judgments about their teaching practice.

Additionally, it will include functionality such as attendance management and report generation,

by permitting transfer of information amongst instructors and administration and with the broader faculty community

community. The system is to interoperate with existing system and data warehouses, thereby decreasing the

administrative work from instructors and increasing the overall efficiency of the school.

Using this system, Bishop Ruhindi High School is set to improve learning performance,

boost efficiency and productivity, and lend support to data-driven decision-making.

The educational institution is assured that the execution of this system will facilitate not only the resolution of the

issues faced by its instructors and staff, and at the same time positioning the organization as a leader in implementing

information and communications technology in Uganda.

1.2. Background

The traditional process of observation and recording requires instructors to use concrete materials or papers.

attendance and mark sheets to register admission information of students at the school. In addition to

due to globalization and education industry development, the system of reporting and grading

underwent a radical transformation. The National Curriculum Development Centre (NCDC) has recently

embraced a new curriculum, with a further emphasis upon student examination and

evaluation. Uganda's schools have yet to adopt automated evaluation even with the new curriculum.

types of evaluation and reporting, enmeshing educators' ability to adequately evaluate and report on

pupil performance.

Research done recently found out that through manual grading at Ugandan schools there is an

an average mode score of only 75%, thus causing inconsistencies in student performance information.

Additionally, restricted access to information has brought challenges to lecturers to follow up with students' performance.

advances in real time to inform administrators' decisions regarding the institution's

efforts and controls.

For purposes of tackling these challenges, Bishop Ruhindi Kebisoni High School has signaled to implement

an Electronic Grading and Reporting System. The system will ensure grading is streamlined,

Leverage data consistency and accuracy and provide instructors and administrators with up-to-the-minute

access to student information. The system will incorporate activities such as evaluation, tracking attendance,

report generation, and student/parent portals, and will interface with existing systems and data

sources.

Bishop Ruhindi Kebisoni High School is certain that its adoption of the Electronic

Grading and Reporting System is to assist address challenges being experienced by its employees,

but at the same time distinguished it as a pioneer in technology application to education in Uganda. The

school is convinced that this system will serve a key contribution to successfully implementing the new NCDC

curriculum and to secure its students' success.

1.3. Problem statement

The Uganda Ministry of Education and Sports has increasingly come to prioritize student evaluation and measurement over the last two to three years as a way to improve education quality in Uganda. However, Uganda's majority of schools are still using a manual mode when grading and reporting and these are cumbersome and vulnerable to errors and further limit teacher capabilities to track student learning and make informed decisions about their teaching practice.

The Ministry of Education and Sports acknowledges the contribution to informed decision-making at the national and at the school level by accurate and reliable student performance data. However, failure by most schools in Uganda to adopt automated grading and reporting is a key stumbling-block to attainment of this objective.

Keeping these challenges in consideration, Bishop Ruhindi Kebisoni High School has suggested adopting an Electronic Grading and Reporting System to mechanize the grading process, improve data integrity and provide access to student information to all teachers and administrators at all times and at all levels. The system will allow the school to accomplish the Ministry's vision and mission of student examination and evaluation and will act as a foundation for data-driven decisions at the secondary level.

1.4. Objectives

1.4.1. General Objective

The implementation of an Electronic Grading and Reporting System to enhance efficiency and realize effectiveness in managing student data, grading and reporting for Bishop Ruhindi Kebisoni High School.

1.4.2. Specific objectives

- To carry out literature review for Bishop Ruhindi High School Electronic Grading and Reporting System.
- To Create a system for grading and reporting at Bishop Ruhindi Kebisoni High School.

1.4.3. Research questions

- Which best practices and key characteristic functions are there for Bishop Ruhindi Kebisoni High School for Electronic Grading and Reporting System?
- How can grading and reporting system efficiently handle student information, grading, and reporting at Bishop Ruhindi High School?
- How are perceptions and experiences among teachers and administrators towards the effectiveness and efficiency of Bishop Ruhindi High School's newly introduced Electronic Grading and Reporting System?

1.5. Significance of The Study.

Educational quality improvement: The deployment of an Electronic Grading and Reporting System will enhance consistency and accuracy of student performance data to present a truer picture of student progress and allow instructors to refine their teaching practice accordingly. This will enhance the quality of education being delivered to the students at Bishop Ruhindi High School.

Aligning with the goals of the Ministry of Education and Sports: The electronic grading and reporting system to be introduced is consistent with the Ministry of Education and Sports' goals and objectives regarding student evaluation and assessment. The system will help supply information to aid the Ministry to enhance the quality of education in Uganda and help ensure that schools are compliant with the Ministry's standards for student evaluation and assessment.

Reduction of administrative work: The grading process is automated and streamlined and is linked to other systems and data sources, the Electronic Grading and Reporting System will reduce administrative work and improve the general efficiency of the school. This will save time allowing teachers to spend time with students and instruction and reduce administrative work involved with tracking student performance and generating reports.

Improving data-driven decisions: The availability of student performance data at all times with any device by all stakeholders through the Electronic Grading and Reporting System will help you track students' progress and make data-driven decisions about teaching practices. This will enhance data-driven decisions at all levels at a school and promote a culture of improvement at all times.

1.6. Project Scope.

1.6.1. Physical scope

The project scope is to develop and install a GRADING AND REPORTING system for BISHOP RUHINDI HIGH SCHOOL located at Rukungiri District, Uganda. The system is to automate grading and present students' performance data to instructors and administrators at a glance at real time.

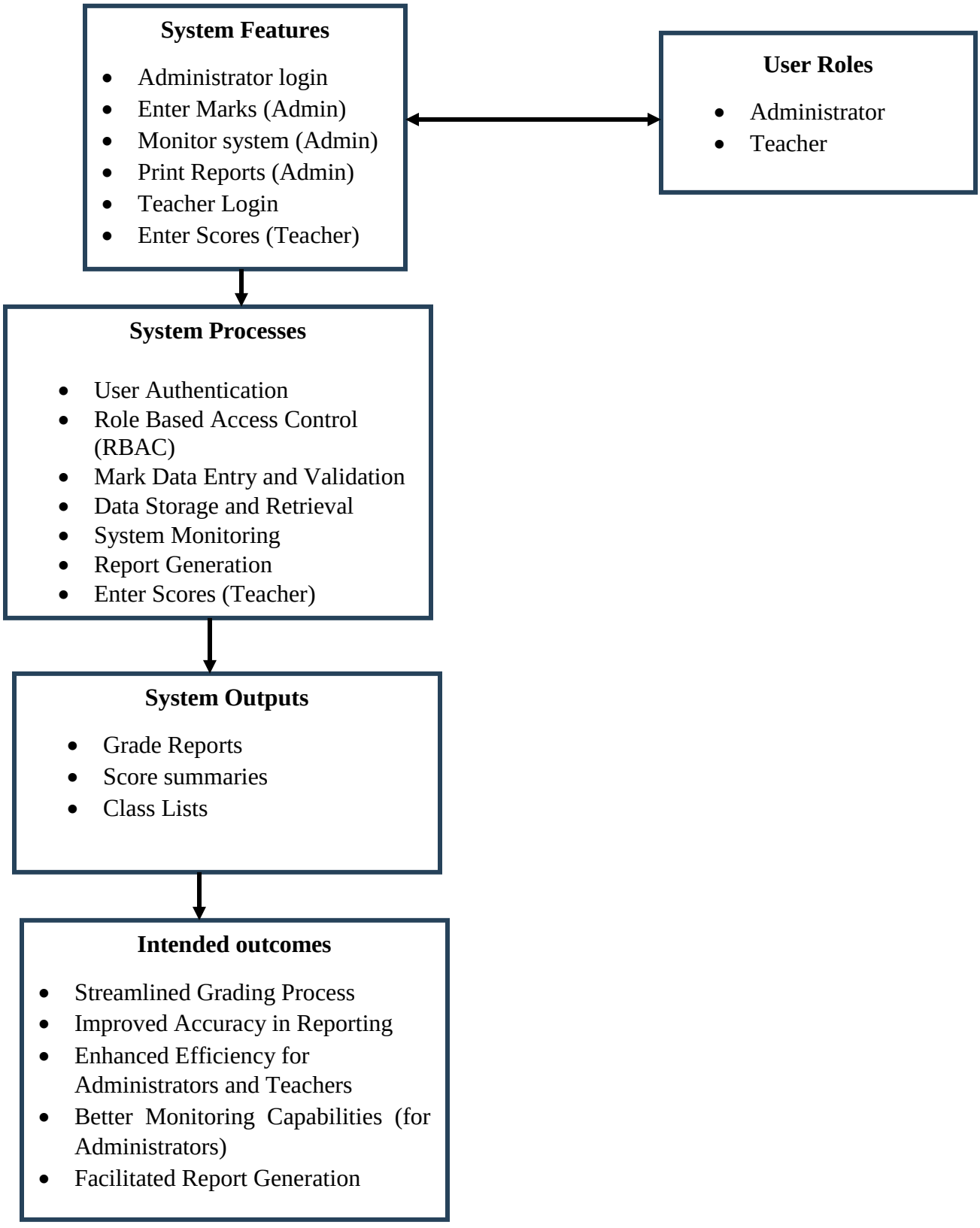
1.6.2. Technical scope

The system uses both software and hardware components and is developed using PHP, HTML, JavaScript, CSS and the database is developed using MySQL for simplicity.

1.6.3. Time Scope

Getting all information and designing a complete running system will require
3 months i.e., from Feb 2025 to April 2025.

1.7 Conceptual framework



The core conceptual framework for this research work on Grading and Reporting System is based upon system functionalities and administrators' and teachers' roles with sound data management driving key system processes like user authentication, data inputs, tracking, and reporting. These system processes generate key outputs like score and grade reports and score summary and so help to accomplish advantages like streamlined grading process and precise reporting and enhanced efficiency to users.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews past research and learned discussions regarding Electronic Grading and Reporting Systems with regards to the transition from manual to computerized procedures. The intent is to identify challenges schools experience generally and Bishop Ruhindi High School specifically and to create background for a digitally based grading and reporting system to emerge. The discussion touches on findings from literature published between 2020 and 2025 and illustrates the dynamism characterizing data management at learning institutions.

2.2 The Grading and Reporting System as it Exists Today

Grading and reporting at Bishop Ruhindi High School have yet to be done using computers. Student marks are recorded by the instructors with pens and calculators and respectively filled out by hand onto report cards. The cards have student's biodata such as name, class and term as well as performance through various subjects.

Though this system has been applied for decades, it is extremely time and effort consuming and prone to inaccuracies. The instructors are compelled to work for extended periods to complete the mark sheets, and calculation mistakes or data application can have an inverse effect at the end. Moreover, maintaining paper documents makes it difficult to keep records and access information slow and ineffective. As cited by Ouma and Oketch (2021), most schools in East Africa are still using these archaic procedures, and this makes it difficult to provide timely feedback as well as performance monitoring.

2.3 Issues with Manual System

The manual grading system has some drawbacks with all stakeholders being involved: students and instructors. Firstly, it is prone to a lot of mistakes. A computational error or omission can lead to incorrect reporting with subsequent implications for student marking. Kavuma, Mutebi, and Ocen (2022) added that these errors can go unnoticed until it is too late to rectify them and always stir controversy among parents and schools.

Another significant issue is time inefficiency. The instructors spend much time gathering and checking students' records instead of performing instruction-related activities. Mugisha and Nalubega (2023) pointed out burnout and quality of instruction decrease due to administrative overload.

Additionally, there is the challenge of disjointed and non-coordinated data. The information for students is normally distributed in various physical files or books thus complicating it for the school administrators to access a full academic record. Tumwesigye, Akello, and Mwebaza (2021) noted it is difficult to follow through with student performance from term to term or year to year because data is not centralized.

Security and privacy are further issues at large. The paper documents are prone to damage, theft, or loss. The confidential information of students can fall into wrong hands and risk schools and learners equally. UNESCO (2022) emphasizes student data protection regardless of any learning environment and warns violations of confidentiality can have grave outcomes.

In addition, with manual processes, information access is limited. Student and parent report cards are usually only sent out once a term. This discourages early intervention, particularly if a student is heading in the wrong direction.

2.4 The Argument for Digital Grading and Student Information Systems

With schools embracing digital tools ever more vigorously, there is an unprecedented move towards automated reporting and grading systems. The systems are to automate student records and facilitate information sharing amongst parents, students, and instructors.

One of digital system's strongest advantages is enhanced precision. With computerized calculations, there is less chance for human fallibility and thus less chance for wrong markings being added up and recorded. Asiimwe, Nabirye, and Otim (2022) document that schools employing digital marking systems exhibit a noticeable difference towards enhanced reliability in their study reports.

Another significant benefit is efficiency. Teachers can easily enter marks and print out report cards with minimal effort. Nakibuuka (2021) observes that computerized systems save time and less work for teachers, and thus educators can spend more time on instruction and less time generating reports.

Data protection is further enhanced with digital systems too. The documents can be password-enabled and encrypted to render them more secure compared to paper records. Digital systems improve access control and backups according to ICT Authority Uganda (2023), and these ensure that student data is not deleted by mistake or accessed by third parties.

Also, digital resources provide for access to information from a distance. Teachers, students, and parents can log in to access grades and track performance with real-time access. Kizza (2022) observes that this real-time feedback fosters stronger connections among schools and home and promotes accountability everywhere.

Despite the benefits, schools must overcome some challenges when using digital systems. Infrastructure is one challenge, particularly among rural communities who lack access to the internet. Teachers are also asked to go through training to effectively work with new technology. Nabukenya, Bukenya, and Namaganda (2021) argue implementation is only a success when there is technical support and proper administration by school administration.

2.5 The Proposed Framework for Bishop Ruhindi High School

The electronic grading and reporting system recommended for Bishop Ruhindi High School is prepared with the aim to automate and improve the present manual practices. The system will consist of two main user roles: instructors and system administrator.

Teachers will enter student biographical information and collegiate performance measures. Teachers will receive secure logon identifiers with access limited to those subjects or classes with which they are affiliated. Teachers will also be able to access personalized student profile pages and hence expedite augmented tracking and reporting.

The admin will manage the entire system, manage user accounts, and maintain data integrity. The admin will also be empowered to modify system configuration and create summary reports to the school's leadership group.

This new system is set to minimize paperwork, enhance the consistency of academic reports, and facilitate stakeholders' access to and interpretation of student performance data. It is aligned with broader education objectives to modernize schools' operations and improve learning outcomes.

2.6 Summary.

Research consulted during this chapter highlights the constraints of hands-on grading and reporting processes, especially those with emerging student compositions and amplified administrative requirements. Latest research studies and reports published during 2020 to 2025 further highlight the imperatives to undertake digital platforms with enhanced accuracy, system efficiencies, and data protection.

For Bishop Ruhindi High School, this electronic system is a timely and useful solution to pressing needs. By implementing a newer system, the organization will enhance its capabilities to handle student records, facilitate teacher efficiency, and realize improved communications with parents and other stakeholders.

CHAPTER THREE

PROJECT METHODOLOGY

3.1 Introduction

The chapter is a discussion regarding data collection procedures followed during research study and system design. To identify specifications and requirements to install the School Grading and Reporting System, a study regarding the current manual system was conducted. The data collection process entailed an examination of all primary activities and selective observation and investigation to determine activities to observe during the system design process. In the process of finding facts, various procedures such as observation, interviewing, examination of documents, and questionnaires were employed to aid an understanding of the system from its current state.

3.2. Research Design

The research design for this study was a qualitative case study design, which involved the examination of the Bishop Ruhindi High School's grading and reporting system and the challenges faced by the school in implementing the new curriculum introduced by the National Curriculum Development Centre (NCDC). This design was chosen because it allows for in-depth exploration and understanding of the school's current grading and reporting system, as well as the potential solutions to improve the system.

3.2.1 Target Population

The target population for this study will be teachers, students, and management at the BISHOP RUHINDI HIGH SCHOOL. A sample of this population will be selected from these about 1000 people for the data collection phase through convenient sampling.

3.2.2. Sampling.

A sample is an element of the population considered for actual inclusion in the study, or it is a subset of measurements drawn from a population we are interested in. Therefore, sampling can be defined as selecting or choosing a small portion of the total set of objects, events, persons, which together comprise the subjects of the study.

3.2.3. Sampling techniques.

Stratified sampling together with purposive sampling methods was used as the major sampling techniques, grouping population into different strata. The population sample is divided into distinct. Independent strata that can enable the researchers to draw inferences about specific subgroups like school staff both teaching and non-teaching, students and others.

Table 1 Showing the different strata and number in the strata

Strata	**Total number of people in strata**
School teaching staff	50
Non-teaching staff	20
Students	500
Others	80
Total	700

3.2.4. Sample Size.

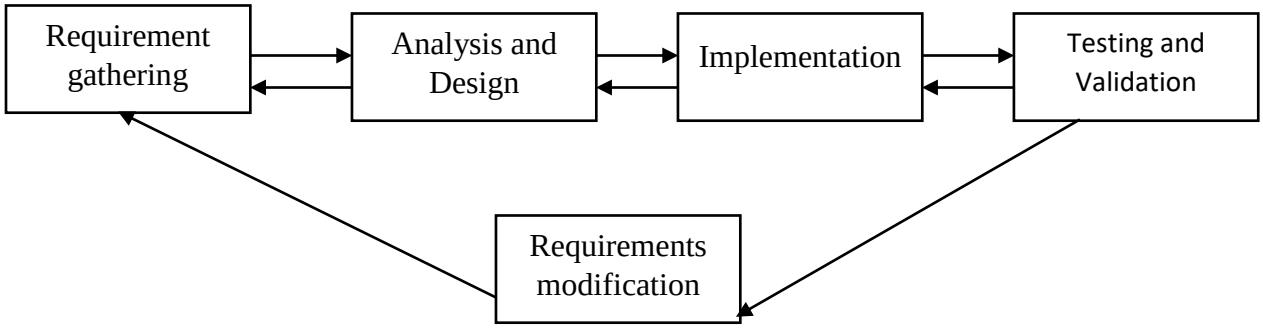
This research project basing on Bishop Ruhindi High School therefore from each category the researcher took a stratum population and used it to get some information about the manual system implemented one using research tools. The researcher took 10% of every strata and used it to get responses. (**sample size of strata = 10% * strata**)

Table 2 Showing sample size

Strata	**Total number of people in strata**	**Sample size (10% strata)**
School teaching staff	50	(0.1*50) = 5
Non-teaching staff	20	(0.1*20) = 2
Students	500	(0.1*500) = 50
Others	80	(0.1*80) = 8
Total	700	65

3.3. System Development Methodology

The Electronic Grading and Reporting System for Bishop Ruhindi High School was developed using incremental model and System development life cycle (SDLC) approaches, which included the following phases:



- **Requirements gathering:** Data were gathered through document review, interviews, and surveys to determine the requirements of the new grading and reporting system.
- **System analysis and design**: Based on the data gathered in the requirements gathering phase, the system was analyzed and designed to meet the needs of the school.
- **Development and testing**: The grading and reporting system was developed and tested to ensure that it meets the requirements and functions as intended.
- **Deployment**: The grading and reporting system was deployed to the Bishop Ruhindi High School and used for grading and reporting purposes.
- **Maintenance and support**: The system was maintained and supported to ensure its continued functionality and to address any issues that arise.

3.3.1. Data Collection Techniques

The data for this study was collected using a combination of methods including:

Document review: In this technique, the researcher analyzed publications of experts and previous studies about various School Grading Systems like journals and books to review literature on related systems. Having analyzed the existing grading and reporting system and reviewed literature on related systems, the researcher was able to stimulate the new system's requirements

I used it because of its advantages such as;

- It is not expensive because the data is already there

- It permits examination of trends over the past
- It doesn't interrupt program or client's routine in program
- There are few biases about information

Interviewing method: The researcher carried out one-on-one directed conversation with key users and stakeholders of the existing system among which included the administrators and bus conductors, and some clients to find out how they have been coming up with the existing system, what difficulties encountered with the existing system and their expectations or suggestions for the new system. I used this technique because;

- It gives accurate information on what you are researching.
- The researcher is able to ask all the questions and gets all the answers at that moment, since there is direct contact.
- It allows the researcher to get more information through probing and observing nonverbal messages.

3.3.2 System Requirements

Hardware Resources:

- A computer or laptop with internet access for the system administrator.
- A computer or laptop with internet access for each teacher.

Software Resources:

- Web Server (Apache)
- PHP or higher
- MySQL database
- HTML5, CSS3, JavaScript

3.7. Logical System Design

User Authentication:

- The system will have three types of users: administrators and teachers.
- The administrator will have the highest level of access to the system and will be responsible for registering students and teachers, grading students, and printing reports.

- Teachers will be responsible for entering student marks into the system.
- Management will be responsible for approving the grades entered by the teachers.

Student and Teacher Registration:

- The administrator will use a form to register new students and teachers in the system.
- The form will collect information such as name, date of birth, class, and subject taught (for teachers).
- The administrator will also assign a unique username and password for each registered user.

Grading:

- Teachers will enter marks for each student in each subject.
- The system will automatically calculate the student's average identifier for each subject.
- The administrator will use the system to assign final grades for each student based on the identifiers and averages.
- Management will review and approve the final grades before they are made official by signing on the reports

Reporting:

- The administrator will use the system to generate reports for each class (S1, S2, S3 and S4) in PDF format.
- The reports will include a list of students, their marks, and their final grades.
- The administrator will be able to filter the reports by class.
- The class teachers will also be able to print the reports for distribution to students and their families.

Data Management:

- The system will use a database (MySQL) to store all student and teacher information.

- The database will be secured with appropriate measures to protect sensitive information by a root password that only the administrator knows.
- The system will also have backup and recovery procedures to ensure data integrity in case of system failure or other issues.

3.9. Database design.

To design a database for the Electronic Grading and Reporting System, you can start by identifying the entities or objects that will be stored in the database and their relationships. For this particular system, the entities will include: Students, Teachers, Classes (S1, S2, S3 and S4), Grades, Reports among others

The relationships between these entities can be: Each student belongs to one class, each teacher teaches one or more classes, each class has one or more students and one or more teachers, each grade belongs to one student and one class, each report belongs to one class among others.

Based on these entities and relationships, I'll create a database schema with tables for each entity and columns that represent the attributes of each entity. For example, the students table can have columns for student ID, first name, last name, guardian, home location, class ID, etc. The grades table can have columns for grade ID, student ID, class ID, marks, etc.

Once the schema is complete, will use SQL commands to create the tables and relationships in a relational database management system in this case is MySQL.

3.9.1. Implementation Techniques

This will be focused on the details of implementation including the programming environment, data structures and the language to be used, whereby BOOTSTRAP, HTML, PHP, CSS, JQUERY, and MySQL will be used to develop the system because of the following reasons;

Bootstrap; Bootstrap is an open-source toolkit for developing with HTML, CSS, and JS. Quickly prototype your ideas or build your entire app with our Sass variables and mix ins, responsive grid system, extensive prebuilt components, and powerful plugins built on jQuery.

Bootstrap is the third-most-starred project on GitHub, with more than 131,000 stars, behind only freeCodeCamp (almost 300,000 stars) and marginally behind Vue. jsframework. According to Alexa Rank, Bootstrap getbootstrap.com is in the top-2000 in US while vuejs.org is in top-7000 in US.

Hypertext Mark-up Language; Hypertext Mark-up Language (HTML) is a popular mark-up language used in web pages. HTML, can be simply written in a text editor and tested through web browser. Writing in html is easy; with html, it is also possible to add media and images to the web page. HTML contains special mark-up tags like <title>, <h>, <p> etc. To declare the title of the page for example, the title has to be included in the title tags. Similarly, the paragraphs, headings and other different contents in website pages have to be included inside the respective HTML tags. It is easy to store HTML code; in a simple text file with filename followed by .html or .html extension. HTML gives developers the possibility of creating sections in the document. As <title> tag gives the title for the web page, <H1> for example specifies the main content of the web page. Similarly, with H2, H3 and so on tags, HTML creates minor contents. There are tags for other features such as paragraphs (<p>), style of font (bold) and tables (<table>) etc.

JQuery; JavaScript library designed to simplify HTMLDOM tree traversal and manipulation, as well as event handling, CSS animation, and Ajax. It is free, open-source software using the permissive MIT License. Web analysis (from 2017) indicates that it is the most widely deployed JavaScript library by a large margin.

JQuery's syntax is designed to make it easier to navigate a document, select DOM elements, create animations, handle events, and develop Ajax applications. JQuery also provides capabilities for developers to create plug-ins on top of the JavaScript library. This enables developers to create abstractions for low-level interaction and animation, advanced effects and high-level, theme able widgets. The modular approach to the jQuery library allows the creation of powerful dynamic web pages and Web applications.

JavaScript; JavaScript is one of the most popular script languages for webpages today. JavaScript (JS) is an object-oriented language that supports features such as imperative and functional programming. The syntax is similar to other object-oriented

languages such as Java and C++, hence making it easy to learn for people who know these languages. JS is used to add interactive features such as buttons,

Cascading Style Sheet (CSS); Is a language that was developed in 1992-1993. CSS helps design each element of the mark-up elements language such as HTML by giving complete control to the designer. While the HTML elements enable the web page designers to add what content they want, CSS makes it possible how to display the content to the user. CSS covers the areas such as colors, layout, advanced positions of elements, fonts and allows the content to adapt the content to different devices such as phones, tablets, bigger screens and printers. CSS can operate independently as well as be used with any mark-up languages based in XML. CSS uses simple, everyday English words and has an easy syntax. CSS is crucial in advanced web designing as it gives control to the layout and offers numerous techniques to make the web page look sophisticated. Currently, all main browsers such as Internet Explorer, Safari, Opera, Chrome and

MySQL Database; Databases are collections of similar data. Databases are used for organized collection and storing of similar data, to be later used for specific purposes. A database contains tables with rows and columns populated with objects, which displays connection between them. A database acts as a shared resource for the programs, which can use the information from the database. Many enterprises rely on databases today to store a wide range of information systematically. Databases are used almost everywhere: in small companies, which can use database to save customers' information, and for more advanced scientific and military areas. Databases facilitate the task of searching hundreds and thousands of records much simpler by storing them in an organized manner. Among many database programs available today, MySQL Database is to be used in the development work for this thesis

3.9.2. Testing and Validation.

The testing and validation procedure for the Electronic Grading and Reporting System would involve several steps to ensure the system meets the requirements and works as intended.

- **Unit Testing**: This involves testing each component of the system individually to ensure it works as expected. For example, testing the user registration and

authentication, teacher's mark input and management's approval, and report printing.

- **Integration Testing:** This is performed by evaluating how well different components in the system are integrated. This would attempt and test the interface between front-end and back-end, user interface and database, etc.
- System Testing: This is done to test the complete system to confirm whether it performs like a complete system and fulfills specified requirements. This would check the performance, functionality, and usability of the system.
- **User Acceptance Testing**: This is when actual users are used to test the system to confirm it is satisfactory and useful to them. This would entail management, admin, and teachers of Bishop Ruhindi High School.
- **Security Testing**: This is done to test the system's security elements like password protection, data encryption, etc. to make sure the system is secure and safeguards sensitive data.

Finally, there would be a formal reviewing process involving stakeholders such as Ministry of Education and Sports and National Curriculum Development Centre (NCDC) to ensure it is compliant with standards and regulations set by these organizations.

3.9.3. Future Work

- The future work section provides possible future extension and improvement for Bishop Ruhindi High School Grading and Reporting System. Some possible additions are:
- Integration with other school management systems such as student management and employee management systems to improve efficiency and reduce manual data entry.
- 'On-the-go' application creation, by means of which teachers and managers can access the system while being mobile and fill out records when necessary.
- Implementation of machine learning techniques to aid in grade prediction and to decode trends among students' performance.
- System extension to allow incorporation with other subjects and to be employed by other classes during the same or at other schools at the district level.

- Improving system security controls to ensure the integrity and privacy of student information.

3.9.4. CONCLUSION

In conclusion, the grading and reporting system for Bishop Ruhindi High School in Rukungiri District is designed to address the issue of the new curriculum by NCDC and the need for schools to adopt a grading management system. The proposed system was designed using HTML, CSS, PHP, SQL, JavaScript, jQuery, Bootstrap to meet the system requirements. The project methodology involved research design, data collection techniques, system methodology, document review, target population, and testing and validation procedures. The logical system design was based on the access of the system by admin, staff and management with the admin having full control over the system. The database design and flow chart were formulated to ensure that the system works efficiently. The testing and validation procedures were put in place to ensure that the system meets the set objectives. Finally, the conclusion highlights the importance of the grading and reporting system and the future work provisions that need to be put in place to continuously improve the system.

CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 System Description

This section offers an exhaustive coverage of developed grading and reporting system. The architecture of system, its workflow, user-system interaction and sequence of major process is described by it. Visual aids in terms of diagrams are employed to facilitate clear understanding.

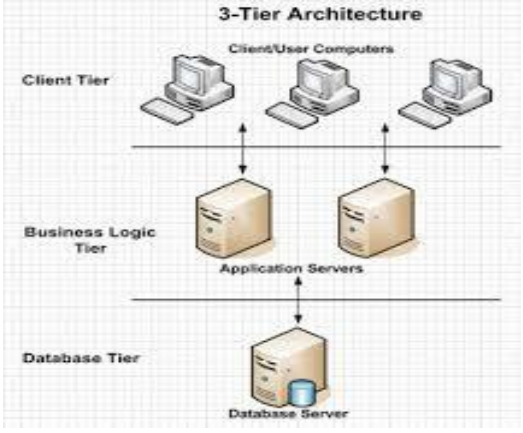
4.1.1 System Architecture

The system architecture adopts a multi-tiered approach to ensure scalability, maintainability, and security. It comprises the following key components:

Presentation Tier: This is the user interface that allows administrators and teachers to interact with the system. It includes login screens, data entry forms for marks and scores, system monitoring dashboards, and report generation interfaces.

Application Tier (Business Logic): This layer handles the core functionalities of the system. It includes modules for user authentication, mark and score processing, report generation logic, and system monitoring functionalities.

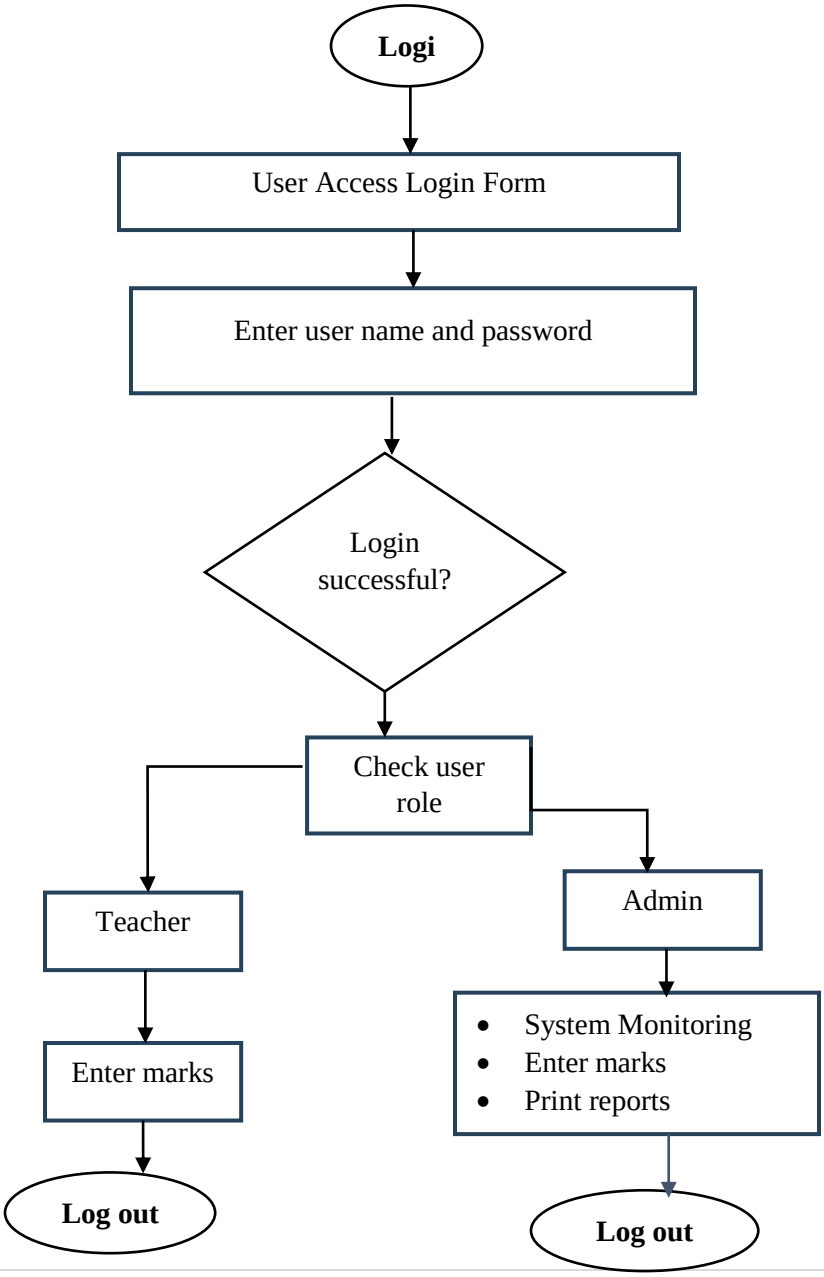
Data Tier: This layer consists of the database where all system data is stored, including user credentials, student marks, teacher-entered scores, and generated reports.



4.1.2 System Flow Chart

The system's operational flow begins with user authentication. Upon successful login, the system presents different interfaces and functionalities based on the user's role (administrator or teacher).

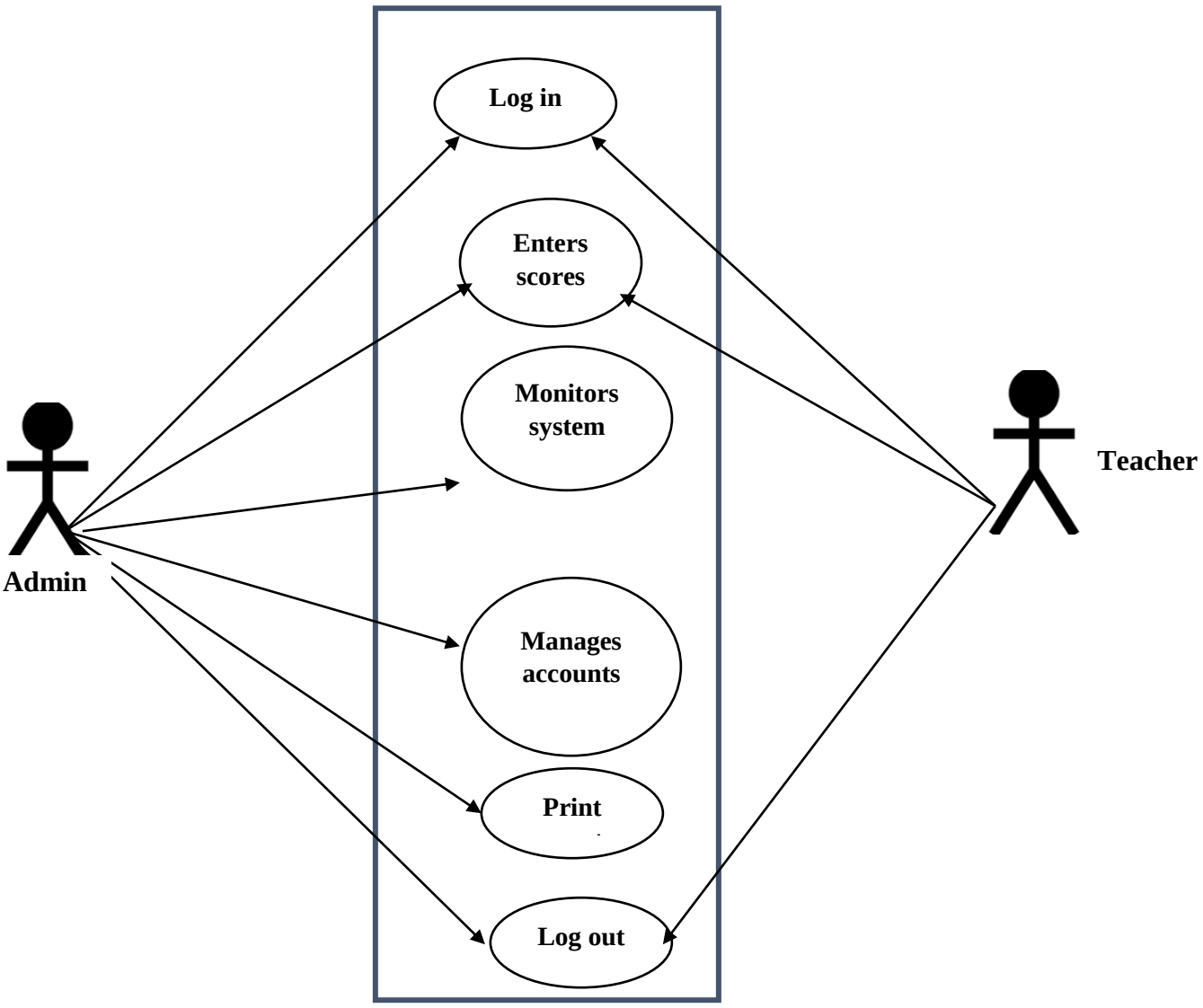
- **Administrator Flow:** The administrator logs in, gains access to system monitoring features, can enter marks (potentially for specific assessments or overall grades), manage user accounts (though not explicitly stated as a feature, it's often implied for an admin), and initiate the printing of various reports.
- **Teacher Flow:** The teacher logs in and is presented with the interface to enter student scores for their assigned subjects or classes.



4.1.3 Use Case Diagram

The use case diagram illustrates the interactions between the actors (Administrator and Teacher) and the system's functionalities.

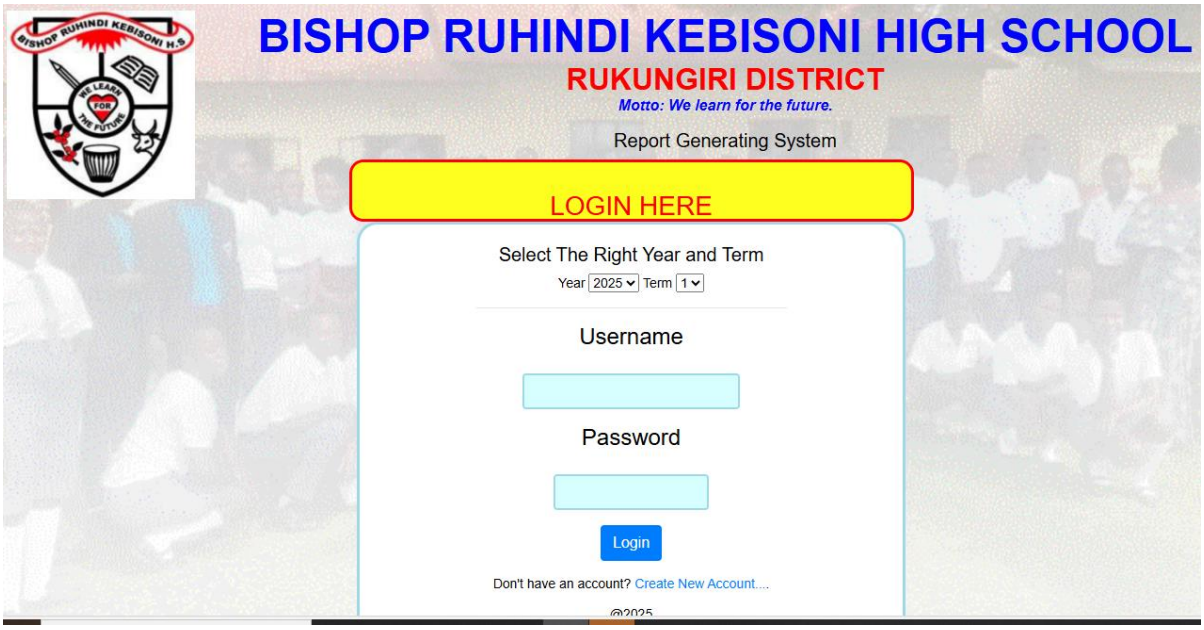
- **Administrator:** Can perform the following use cases: Log In, Enter Marks, Monitor System, and Print Reports.
- **Teacher:** Can perform the use case: Log in and Enter Scores.



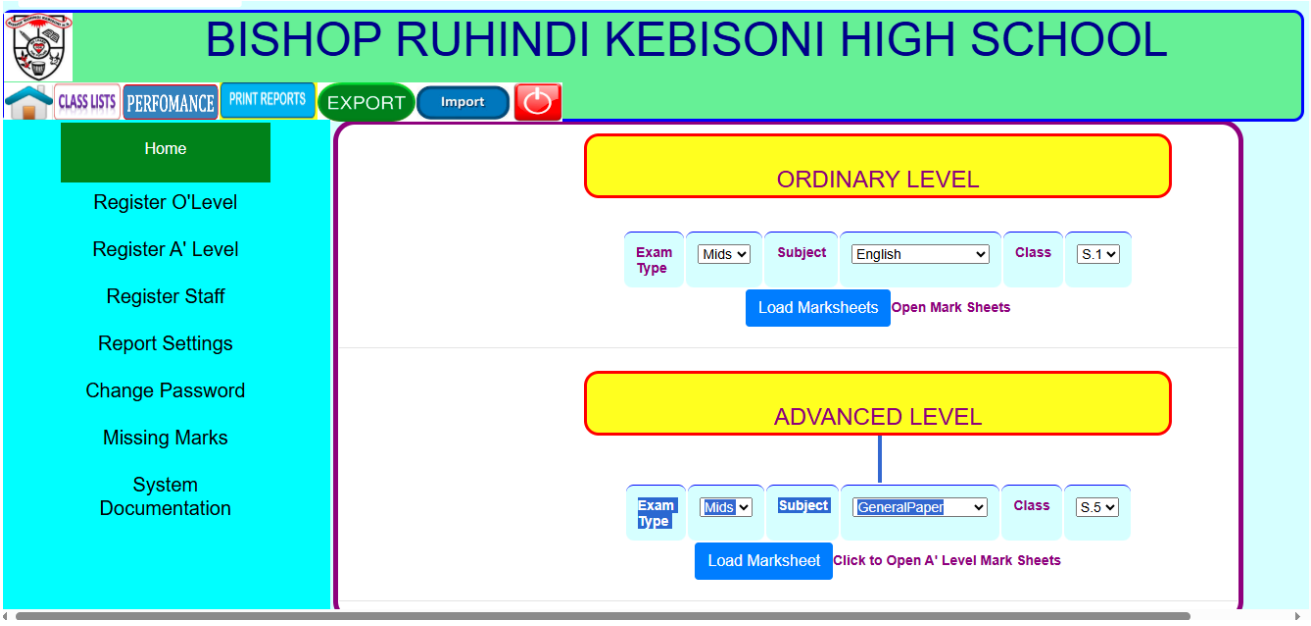
4.2 Data Inputs

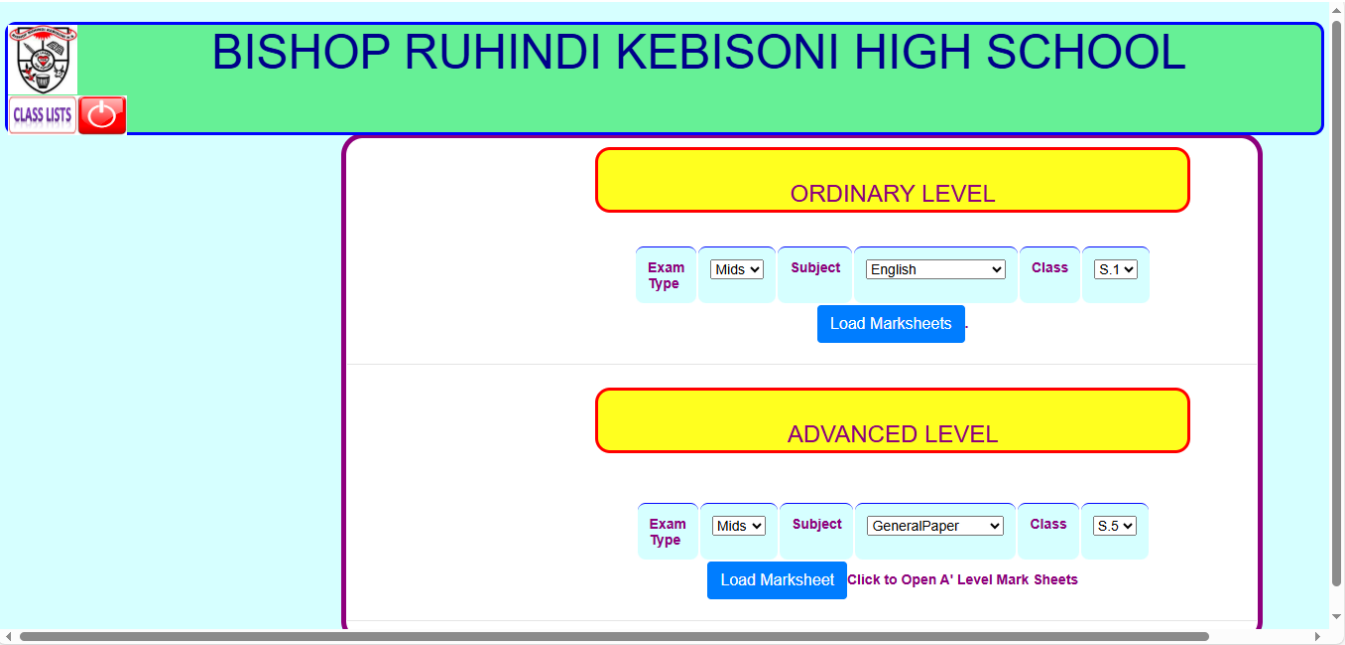
The system relies on the following data inputs to function effectively:

- **User Credentials:** Login information (usernames and passwords) for administrators and teachers to access the system securely.

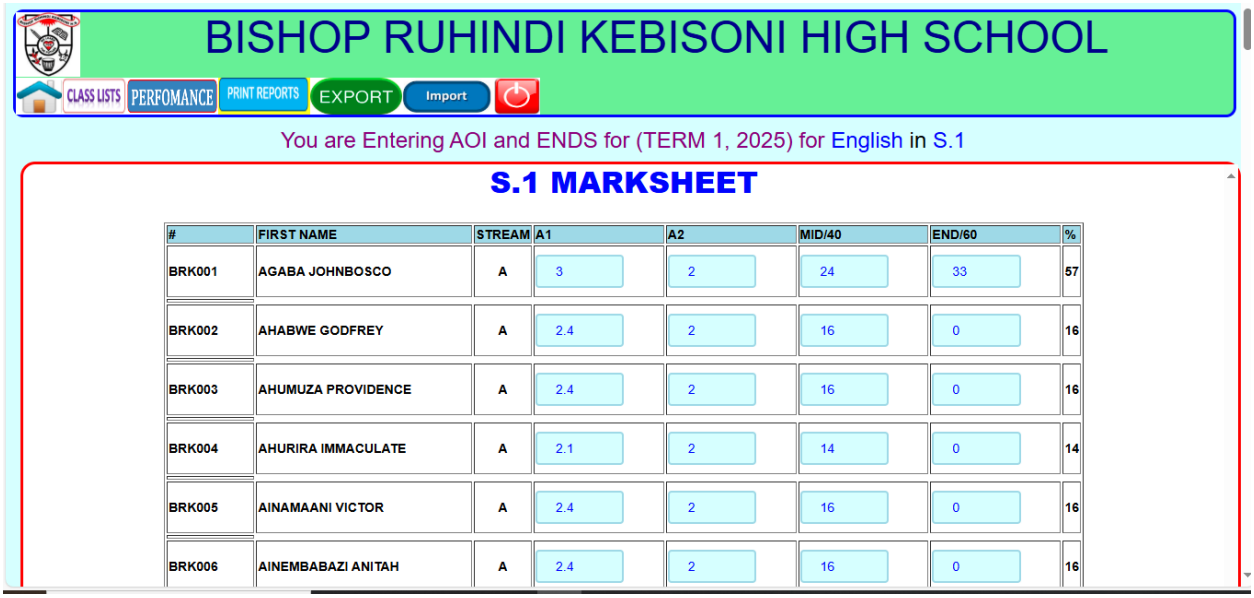


ADMIN SIDE





- **Student Marks:** Numerical or categorical grades assigned to students, potentially entered by the administrator.



#	FIRST NAME	STREAM	A1	A2	MID/40	END/60	%
BRK001	AGABA JOHNBOSCO	A	3	2	24	33	57
BRK002	AHABWE GODFREY	A	2.4	2	16	0	16
BRK003	AHUMUZA PROVIDENCE	A	2.4	2	16	0	16
BRK004	AHURIRA IMMACULATE	A	2.1	2	14	0	14
BRK005	AINAMAANI VICTOR	A	2.4	2	16	0	16
BRK006	AINEMBABAZI ANITAH	A	2.4	2	16	0	16

- **Student Report**

BISHOP RUHINDI KEBISONI H/S

P.O.BOX 118, RUKUNGIRI.

School Motto: We learn for the future

Tel:074531678, 0772644895(Head Teacher).

Learner's Name: AINAMAANI VICTOR Class: S.1 Stream: A

ID NO: 12354560 Term: 1 Year: 2025

POSITION IN CLASS: 46 Out Of 50

KEY: BOT= Begining Of Term, IDNT = Identifier, EOT = End Of Term

SUBJECTS	CODES	AOI1	AOI2	SCORE/20	EOT/80	TOTAL/100	GRADE	COMMENT	TR INITIALS
ENGLISH	112	2.4	2	16	0	16	A	Outstanding	N.V
MATHEMATICS	456	1.95	2	13	23	36	E	Basic	B.J
PHYSICS	535	2.25	2	15	78	93	A	Moderate	T.W
CHEMISTRY	545	3	3	20	45	65	C	Moderate	N.C
BIOLOGY	553	1.8	2	12	12	24	E	Basic	H.F
HISTORY	241	1.65	2	11	14	25	A	Moderate	M.O
GEOGRAPHY	273	1.65	2	11	14	25	E	Basic	N.C
PHYSICAL EDUCATION	555	2.25	2	15	78	93	A	Moderate	A.P
LUGA YA KISWAHILI	336	1.65	2	11	67	78	B	Moderate	N.C
ENTREPRENEURSHIP	845	1.8	2	12	45	57	C	Moderate	N.D
CRE	223	2.25	2	15	78	93	A	Moderate	N.S
AGRICULTURE	527	2.55	3	17	56	73	B	Moderate	N.B
ICT	840	2.25	2	15	56	71	B	Moderate	BV
ART AND DESIGN	612	2.1	2	14	35	49	D	Basic	MN
RUKIGA RUNYANKORE	345	1.8	2	12	71	83	A	Moderate	M.W
LITERATURE	208	2.1	2	14	22	36	E	Basic	AR

TOTAL SCORE: **1074**	AVERAGE SCORE: **71.6%**	PERFORMANCE IS : **MODERATE**

Score Range	Identifier	Level	Descriptor
2.5 - 3.0	3	OUTSTANDING	Learner Acheived Most Learning Outcomes.
1.5 - 2.4	2	MODERATE	Learner Acheived Some Learning Outcomes.
0.1 - 1.4	1	BASIC	Learner Acheived Few Learning Outcomes.

REMARKS FROM CLASS TEACHER: Aim higher. SIGNATURE:.....

HEAD TEACHER'S COMMENTS(On Performance): Put in more efforts for better grades.

Fees Balance: .....Next Term Begins On: 03rd May, 2025.

OTHER COMMENTS:.....

(STAMP AND SIGNATURE)

4.3 System Specification

This section outlines the minimum hardware and software requirements for the grading and reporting system to operate efficiently.

4.3.1 Hardware Specification

The server hosting the system should meet the following minimum specifications:

- **Processor:** Intel Core i5 or equivalent processor
- **RAM:** 8 GB or higher
- **Storage:** 500 GB Hard Disk Drive or 256 GB Solid State Drive
- **Network Interface Card:** Ethernet or Wi-Fi capability

Client machines accessing the system (used by administrators and teachers) should have:

- **Processor:** Intel Pentium Dual-Core or equivalent processor
- **RAM:** 4 GB or higher
- **Storage:** Sufficient storage for browser and temporary files
- **Display:** Monitor with a resolution of at least 1024x768
- **Input Devices:** Keyboard and mouse

4.3.2 Software Specification

The system requires the following software components:

- **Operating System (Server):** A stable server operating system such as Ubuntu Server, CentOS, or Windows Server.
- **Web Server:** Apache HTTP Server or Nginx.
- **Database Management System:** MySQL, PostgreSQL, or a similar relational database management system.
- **Programming Language(s) and Framework(s):** (Specify the languages and frameworks used for development, e.g., PHP with Laravel, Python with Django, etc.)

- **Operating System (Client):** Windows, macOS, or Linux distributions with a modern web browser.
- **Web Browser (Client):** Google Chrome, Mozilla Firefox, Safari, or Microsoft Edge (latest versions recommended).

4.4 System Requirements

This section details the functional and non-functional requirements that the grading and reporting system is designed to meet.

4.4.1 Functional Requirements

These specifications outline the below activities that the system should be able to perform:

- FR01: User Authentication: The system shall enable administrators and teachers to safely log in using their own credentials.
- FR02: Role-Based Access Control: The system shall give varying degrees of access and functionality depending on the user's role (administrator or teacher).
- FR03: Mark Entry (Administrator): Administrators should be able to enter and save marks for a student for multiple assessments or generic grades.
- FR04: Score Entry (Teacher): Teachers should be able to enter and save scores for their own subjects or classes for students.
- FR05: System Monitoring (Administrator): The system should enable administrators to track system use and user access.
- FR06: Report Generation (Administrator): Administrators should have the ability to generate and print different reports (e.g., grades, summary scores).

4.4.2 Non-Functional Requirements

These specs identify the actual work to be done by the system:

- FR01: User Authentication: The system will allow administrators and lecturers to login securely using their personalized authentication.

• FR02: Role-Based Access Control: The system is to allow various access and functionality based upon the user's assigned role (administrator or teacher).

• FR03: Mark Entry (Administrator): The system is to permit administrators to enter and update student marks for various assessments or cumulative grades.

• FR04: Score Entry (Teacher): The system will allow instructors to enter and maintain student scores for classes and subjects assigned to them.

• FR05: System Monitoring (Administrator): The system is to present administrators with means to track system activities and user access.

• FR06: Report Generation (Administrator): The system is to permit administrators to print and generate different reports (e.g., grade reports and score summaries).

4.4.2 Non-Functional Requirements

The specified requirements define the system's quality attributes:

•NFR01: Security: The system is required to maintain the confidentiality and integrity of user authentication and student information through secure storage and authentication procedures.

• NFR02: Usability: The system is to have an interface with intrinsic simplicity to facilitate navigation and comprehendibility by instructors and administrators equally.

•NFR03: Reliability: The system at all times is to remain operational and perform successfully during allocated work hours with minimal non-functioning time.

•NFR04: Performance: The system will react to user demands and handle information quickly with acceptable loads.

•NFR05: Scalability: The system architecture will have to scale to handle an increasing number of users and data with little perceptible loss in performance.

• NFR06: Maintainability: The system's architecture and codebase need to be properly structured to ensure convenient maintenance, updates, and fixing of mistakes.

4.5 Testing

This section describes procedures implemented to ensure the quality and functionality of grading and reporting system.

4.5.1 Unit Testing

Unit testing involves the testing of individual units or modules of a system individually to ensure their correct functionality. For example, it involves checking the module of login authentication to determine its correctness in checking user credentials and checking the module of score validation to ensure its correct handling of different kinds of inputs.

4.5.2 Integration Testing

Integration testing was aimed at checking the interaction amongst different modules in the system. For instance, it is checking the integration between the score entry module and the database to ensure that submitted scores are properly stored and retrieved. Another example is checking the interaction between the user authentication module and the access control based on roles to ensure that users are granted appropriate permissions when they log in.

4.5.3 System Testing

System testing involved testing the entire integrated system as a whole to evaluate its compliance with the specified functional and non-functional requirements. This included testing all user workflows, such as administrator login, mark entry, report generation, teacher login, and score entry, under realistic conditions.

4.5.4 Testing Results

This section contains a summary of the testing activities and their outcomes.

Test Case ID	Module/Functionality	Test Description	Expected Result	Actual Result	Status
UT-LOGIN-01	User Authentication	Attempt login with valid administrator credentials	System grants administrator access	System granted administrator access	Passed
IT-SCORE-02	Score Entry & Storage	Enter scores for a student and verify in database	Scores are successfully stored in the database	Scores were successfully stored in the database	Passed
ST-REPORT-01	Report Generation	Generate a graded report for all students	System generates a comprehensive grade report	System generated a comprehensive grade report	Passed

4.6 Data Outputs

The system is designed to generate the following data outputs:

- **Grade Reports:** Comprehensive reports displaying student grades for specific periods or subjects, potentially including averages and other relevant metrics.
- **Score Summaries:** Reports summarizing student performance in individual assessments or subjects.
- **Class lists:** List of all students in a specified class.

CHAPTER FIVE

CHALLENGES ENCOUNTERED, RECOMMENDATIONS AND CONCLUSION.

5.1 CHALLENGES ENCOUNTERED.

During the development and testing of this system, the following challenges were encountered: They included difficulties in integrating different modules, unexpected bugs during testing, and time constraints. Integrating the user authentication module with the role-based access control initially presented some challenges in ensuring the correct permissions were assigned to each user role.

5.2 RECOMMENDATION

Based on the findings and challenges encountered, the following recommendations are proposed for future development and implementation, implementing more robust input validation to prevent data entry errors, Integration of a more sophisticated reporting module with customizable report templates and conducting further user testing with a larger group of teachers to gather feedback on usability.

5.3 CONCLUSION.

The developed grading and reporting system provides a functional solution for managing and reporting student performance data. The system effectively allows administrators to enter marks and monitor the system, and teachers to enter scores, streamlining the traditional grading process. The testing phase demonstrated the system's core functionalities operate as intended, providing a foundation for efficient and accurate academic reporting.

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-APPENDIX.

WORKPLAN.

PHASE	DESCRIPTION	DURATION (WEEKS)	PERIOD	EXPECTED OUTCOME
1	**Planning** Problem Identification. Analyzing the feasibility	1	FEBRUARY 2025	Feasibility study
2	**Proposal writing** Literature review and writing all sections.	1	FEBRUARY 2025	Proposal writing
3	**Preliminary analysis** Identification of the system requirements.	1	FEBRUARY 2025	Requirements done.
4	**System design** Physical system interface programs	2	FEBRUARY - MARCH 2025	Designing the system
5	**Analysis and system design** Software testing and Evaluation	2	MARCH – APRIL 2025	Testing the system
6	**Report writing** Writing detailed account of the project.	2	MARCH - APRIL 2025	Report writing