

Design and Implementation of a web-based Secondary School Clearance System (SSCS): A Case of Pamodzi Combined Secondary School in Ndola District, Zambia.

Conference ID: CFP/945/2018

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Abstract: *Students in Zambia just like any other place in the world do disengage from their respective Secondary Schools upon completion of their School tenure or other reasons as transfers or any such thing. And before they can be allowed to completely disengage from their respective Secondary School, students are required to undergo a thorough clearance process which is aimed at determining their status whether they owe the School anything worth of return such as , unpaid fees, mattresses, books, and many other such items in order to successfully permit them to disengage. A clearance form is given to such students where all parties represented on the form are required to clear the student up to the final authority who mainly happens to be the School Head Teacher. This is common among students that have satisfied the academic requirement and go back to their former Secondary Schools to get their statements of results or school certificates. The process of student clearance involves many parties such as Boarding, Faculty, Bursary, Library, and Sports, Examinations etcetera after which the student is allowed to collect their School certificate or given transfer for those under transfer to other Schools. The aim of this project is to design and implement a web-based clearance system for the Pamodzi Combined Secondary School dubbed “Secondary School Clearance System (SSCS)”, a web-based information system using the Hypertext Pre-processor (PHP) for server scripting, JavaScript, Cascading Style Sheet (CSS), Apache and MySQL for database implementation and help create a central repository for students to be cleared. Hopefully, this system will mitigate and subsequently eliminate the challenges usually incurred in the manual clearance system thereby increasing the overall application throughput, performance and enhanced institution decision making. Among the essential system modules are the Login Module, Add Learner, Add Learner, Make Clearance, and Administer Module. The administrator creates users using the Administer Module.*

Keywords: *Clearance, System, Web-based, Academic Requirements, Central Repository.*

1.0 INTRODUCTION

Students in Zambia do disengage from their respective Secondary Schools upon completion of their School tenure or other reasons as transfers or any such thing. And before they can be allowed to completely disengage from their Secondary School, students are required to undergo a thorough clearance process which is aimed at determining their status whether they owe their School something worth of return such as , unpaid fees, mattresses, books, and many other such items in order to successfully permit them to disengage. (JICA, 2014).

A clearance form is given to such students where all parties represented on the form are required to clear the students up to the final authority who mainly happens to be the School head teacher. This is common among students who have satisfied the academic requirement going back to their former Secondary Schools going to get their statements of results or certificates. The process of student clearance involves many parties such as Boarding, Faculty, Bursary, Library, and Sports, Examinations etcetera after which the student is allowed to collect their School certificate or given transfer for those under transfer to other Schools.

1.1 Background of study

Pamodzi Combined Secondary School is a public secondary school in Ndola district of the

copper belt province of Zambia approved by the ministry of education in the year 1976 as a Primary School and upgraded to a secondary school in 2017 to offer both primary and secondary school education.

In a secondary school like Pamodzi Combined Secondary School, there is need for an automated method of keeping data, more so a greater need for an online school clearance system. Such a system alleviates the various problems and stress involved in the manual method of clearing students. Moreover, the issue of delayed service delivery processes is because of mobility to complete the tedious manual process of clearance, which the system intended to curtail.

1.2 OBJECTIVES OF THE STUDY

Essentially, the aim of this project was to design and implement a web-based clearance system for the Pamodzi Combined Secondary School dubbed “*Secondary School Clearance System (SSCS)*”. A web-based information system using the Hypertext Pre-processor (PHP) for server scripting, JavaScript, Cascading Style Sheet (CSS), Apache and MySQL for database implementation and help create a central repository for students to be cleared.

This system mitigates and subsequently eliminates the challenges usually incurred in the manual clearance system thereby increasing the overall application throughput,

performance and help in institution decision-making processes. Among the essential modules will be the Login Module, Clearance Registration Module, Cleared/Not Cleared Module, and Administer Module.

The system administrator is responsible for user creation using the administer module.

The project had such objectives as:

- To provide a borderless access system to effectively and efficiently process student clearance,
- To ensure prompt clearance,
- To assuage the problems, frustrations, and stress of student looping and queuing up during clearance, and
- Provide a reliable and transparent system devoid of personal inclinations and possible interests during the clearance processes.

1.3 SCOPE OF THE STUDY

This project was limited to the development and implementation of a web-based clearance system for Pamodzi Combined Secondary School in Ndola in Zambia. The classes of individuals likely to benefit from this project are students, staff and faculty members, administrators, parents and guardians and other stakeholders of Pamodzi Combined Secondary School. This system supports the easy and timely access to needed information between students, staff and

faculty members and administration, and proper tracking and enhanced security of student clearance records and information.

2 LITERATURE SURVEY

This section focuses on many related literature that covers the broad framework from which the research was done. The essence of this review therefore is to make known of some other research made in relevance to the project topic. Many researchers have made some findings on how this problem can be solved and achieve the objective of the subject.

An Online clearance system is an internet based work that would help ease the queuing system in the university's clearance process. In their elaborate journal (Usman Opeyemi Lateef and Olusanya Olayinka O, 2016), highlighted that when well implemented the online clearance system would build an effective information management that is very convenient to use for Schools since it is internet based and can be accessed from anywhere. Such a system replaces the manual method of clearance for graduating students and that also help students to carry out their clearance without coming to the various offices for clearance. To (Agbo-Ajala O. and Makinde O. E, 2015), the design for this software at a big institution such as a university would serve as a more reliable and effective means of undertaking students clearance, remove all forms of delay and stress as well as enable you to

understand the procedure involved, as well as how to do your clearance online.

In almost every institution found in different parts of the world, when a person is about to disengage from an institution, the person undergoes through a clearance process to determine the persons status, whether he/she will be permitted to disengage. If the person is free to disengage, then he/she will be issued a clearance. To such scholars as (Agbo-Ajala O. and Makinde O. E, 2015), Clearance is a certificate giving permission for something to be done. In higher institutions of learning, final year students that have satisfied the academic requirements to graduate are required to undergo a clearance process before they can successfully be allowed to disengage from the university. The process of clearing involves the Student's academic department, Faculty, Bursary, Students Affairs, Library, Hostel, Sport department, Health Centre and Registry (Exams and Records). A student is allowed to collect his/her graduation certificate only after he/she has been cleared. (Umezina Chukwuebuka Ben et al, 2015), designed an online clearance system which was intended to help build an effective information management for Schools especially for making clearance after graduation.

Their designed software would serve as a more reliable and effective means of undertaking students clearance, removing all forms of delay and stress as well as enable involved parties

understand the procedures involved as well as how to do their clearance online.

The online Student Clearance System would be able to manage student's clearance process across all the departments and units and eliminate the weakness of the manual process which mainly lack centralize repository for the clearance process. In manual systems the clearance process is slow, clumsy and stressful. Therefore, the clearance application can be used for recording and certifying that a student is cleared to disengage or not. The clearance applications are recorded and the status can be determined at any point in time. Ultimately, the online clearance system once developed would offer greater opportunities in School management seeing that all transactions or payments with regards to student clearance can be carried out online. (Awuzie, 2013).

3.1 SYSTEM ANALYSIS

A. System Analysis

The systems analysis methodology for developing and implementing the students' clearance system is presented below. It is adopted from the software engineering project models adopted from the traditional System Development Life Cycle (SDLC). It is broken down into the following stages: Requirement Gathering, Design, Programming, Implementation and testing, and Maintenance.

I. General analysis of the Existing System

Students in Zambia do disengage from their respective Secondary Schools upon completion of their School tenure or other reasons as transfers or any such thing. And before they can be allowed to completely disengage from their Secondary School, students are required to undergo a thorough clearance process which is aimed at determining their status whether they owe their School something worth of return such as , unpaid fees, mattresses, books, and many other such items in order to successfully permit them to disengage. (JICA, 2014).

The responsible parties grant clearance forms to such students where all parties represented on the form are required to clear the students up to the final authority who mainly happens to be the School head teacher. This is common among students who have satisfied the academic requirement going back to their former Secondary Schools going to get their statements of results or certificates. The process of student clearance involves many parties such as Boarding, Faculty, Bursary, Library, and Sports, Examinations etcetera after which the administration allows the student to collect their School certificate or given transfer for those under transfer to other Schools.

The current clearance system used by the Pamodzi Secondary School is a manual

one. This makes the system tedious and time consuming. Here, a student has to visit all the clearance offices with a clearance form for them to sign, once this form is signed by all the necessary parties, it becomes proof that the student has been cleared, the process takes much time to be completed and processes a lot of stress to both staffs and the students involved. In the manual system, the file cabinet hubs the documented clearance forms. The school initializes a search operation in the file cabinet each time they need the clearance form to locate a particular student clearance form.

The current system is associated with the following problems:

- Delay in processing clearance forms,
- Unavailability of some key staffs while processing some clearance forms, which leads the students or their guardians repeatedly visiting a particular office in order to sign their clearance form(s),
- Loss of some vital documents as the filing system is manual,
- Damage of document due to fire or rain incident,
- Illegal removal of forms by fraudulent staff leading to insecurity and
- Take a lot of time to retrieve a particular clearance form(s).

II. Proposed System

The proposed system in this write-up is expected to be better than the succeeding ones in terms of speed, features etc. All the criticized points (limitations) in the existing systems will be handled. The need for the new system is to work and solve the limitations discovered in the previous systems. The new proposed Student clearance System was implemented in order to solve the challenges faced in the manual way of Final year clearance in our higher institution of learning. We design the new system to solve the problems affecting the manual system in use. It is designed to be used online thereby relieving both administrators, staff and students from much stress as experienced from the manual system. This does the analysing and storing of information either automatically or interactively, it makes use of online access to internet. The system also has some other features like:

- Accuracy in handling of data,
- Fast rate of operation and excellent response time,
- Flexibility (i.e.) it can be accessed at any time,
- Easy way of back up or duplicating data in varied storage media in case of data loss,
- Better storage and faster retrieval system, and

- Accessibility from any part of the world.

B. System requirements

i. **Functional Requirement:** The functional requirements for the SSCS are:

- *Administration of Users:* The system shall record a database of user accounts. There are three types of users. The unit clearance officer (users) use the student clearance system for either posting the students status or making the enquiries/printing reports. The other user is the student users who register in the system to be cleared, are able to create and edit some information in their clearance record. The third classes of users are technical users like the system administrator who will be able to creating new, editing, and deleting a user.

- *User Authorization:* The student clearance system shall allow the user administrator to approve the registration of a new user by authorizing his user account.

ii. **Non-functional requirements:** These kinds of requirements are sometimes called constraints of the system. Non-functional requirements denote limits of the system and its expected behavior. They do not impact the system directly in terms of functionality:

- **Usability:** The system must be errorless in the most common web browsers such as Chrome, Edge, Explorer, Firefox, Opera, and Safari. The system shall inform the user about its current state (loading, item created, item updated, etc.)
- **Reliability:** The system must not contain errors making some system functionalities unavailable or errors disturbing the user while working with the system.

iii. Design Requirements: The system must work in a form of online web application. Records deleted in the system shall be kept in the database.

iv. Implementation Requirements:

The system must be implemented in PHP 7.0. The presentation layer of the system has to be implemented in HTML (version 5.7) Framework. The database for the system shall be MySQL (Version 5.7).

C. SYSTEM ARCHITECTURE

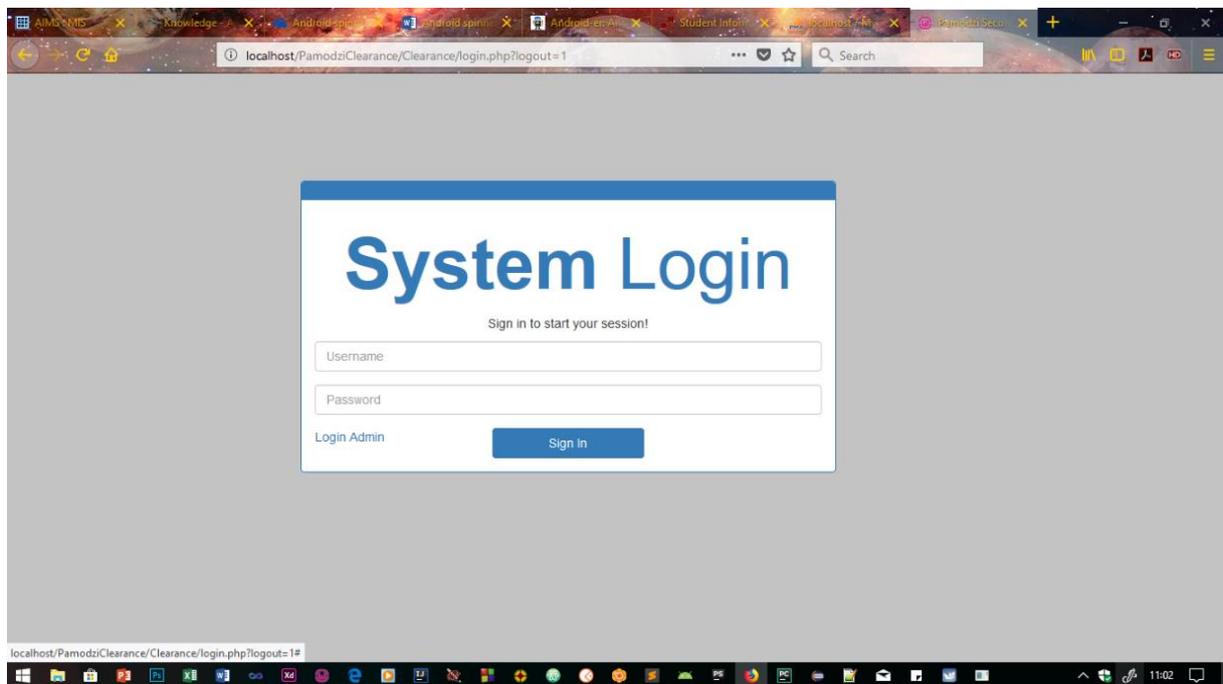


Figure 1: SSCS Login Screen

Figure 1 is a representation of the SSCS login screen. The system prompts the user to supply their authentication details. If the credentials match with the information stored on the database, the system permits the user to carry out an operation. Notably, the system does not leave room for autocomplete filling. This is an added authentication feature to ensure system and data integrity and confidentiality.

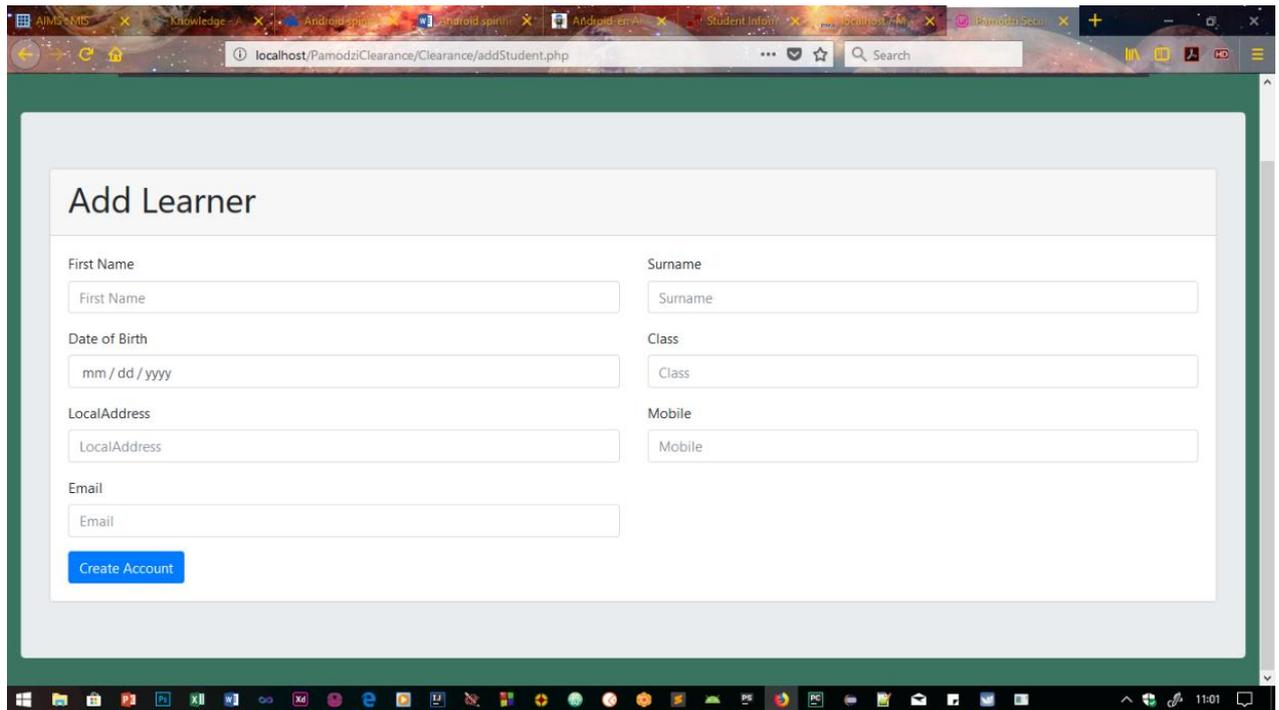


Figure 2: SSCS Add Learner Screen

Figure 2 illustrates how the privileged teacher can add the student at point of reporting at Pamodzi combined secondary school. The teacher takes and records all the necessary details as shown in figure 2.

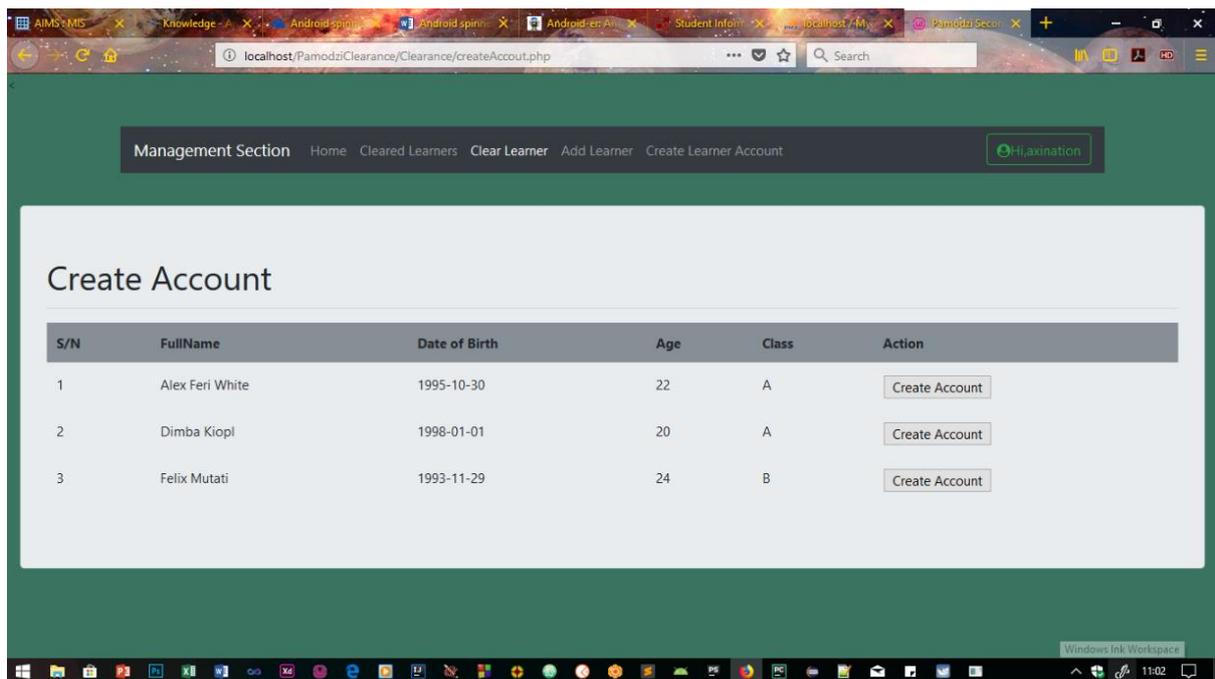


Figure 3: SSCS Create Account Screen

Figure 3 demonstrates how the administrator activates user accounts. The admin user creates the users and provides the needed information as per figure 2 which then need activation. He does this at the time administration gives them power to do so. The full names, age and class identifies each student. Each user can only do what the administrator specifies on the account. We do this to avoid chances of unauthorized user privilege escalation leading to defying of some key elements of information security.

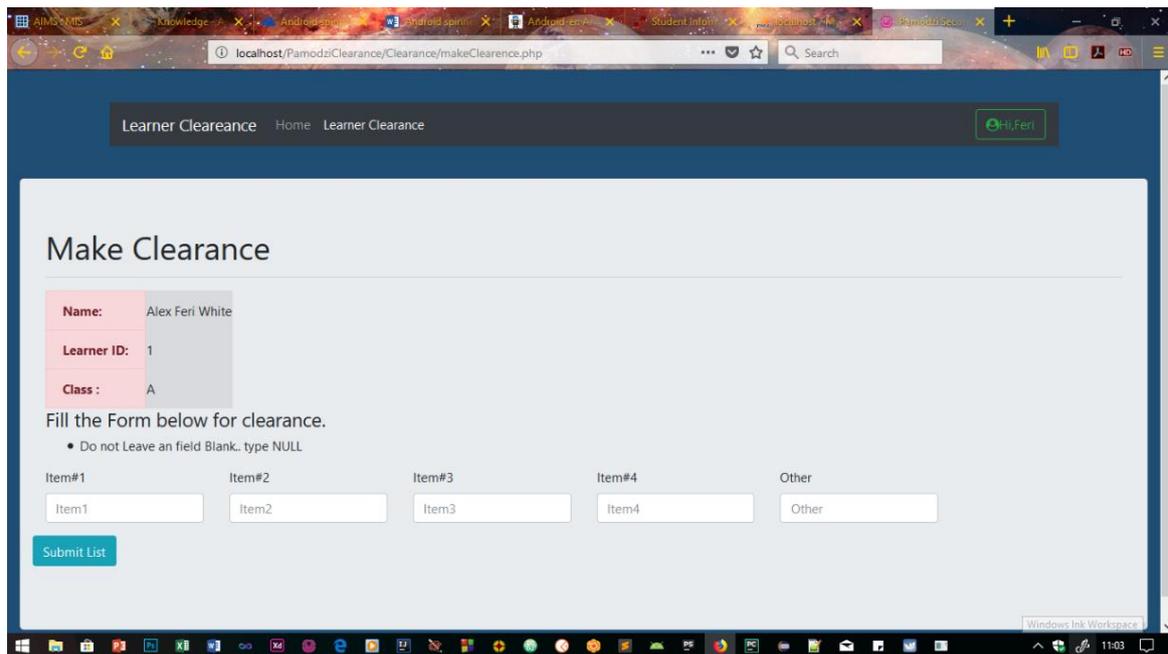


Figure 3: SSCS Make clearance Screen

Figure 3 demonstrates how the system handles the student clearance operation. The systems provides space to select item the student owes the school. Administrators do this at the time of the student's exit from a particular school.

i. Student Registration Form

Database Structure

FIELD NAME	DATATYPE	FIELD NAME
Surname	VARCHAR	20
First name	VARCHAR	20
Other names	VARCHAR	20

Gender	VARCHAR	6
NRC number	VARCHAR	13
Level	VARCHER	10
Date of Birth	VARCHER	10
Year	VARCHAR	4
Duration	INTERGER	10

Table 1: Student registration database structure

Table 1 gives the structure of the backend database structure during student registration.

ii. Student Clearance Database Structure

FIELD NAME	DATATYPE	FIELD SIZE
Surname	VARCHAR	20
First name	VARCHAR	20
Other names	VARCHAR	20
Gender	VARCHAR	6
Registration number	VARCHAR	13
Library	VARCHAR	10
Exams and Records	VARCHAR	20
Department	VARCHAR	20
Date	VARCHAR	10
Date of birth	DATE	
Residential address	VARCHAR	20
Comment	VARCHAR	300

Table 2: Student Clearance database structure

Table 2 is an illustration of the backend database structure for student clearance.

3.0 SYSTEM IMPLEMENTATION

The requirement needed to implement this system is as follows:

a. Hardware Requirement

For the effective operation of the newly designed system, we recommend the following minimum hardware specifications:

- The computer system in use should be IBM compatible (clone systems),
- The Random Access Memory (RAM) should be at least 2 GB,
- The system should have a hard disk of at least 120GB and at least a CD-ROM drive of high density,
- The system should be equipped with an E.G.A/V.G.A, a colored monitor,
- An uninterruptible power supply (UPS) units, and
- It should be internet ready.

Notice here that these listed configurations are the minimum requirement. The higher the report derived the better and the program will run much faster.

b. Software Requirement

The software specification required on the computer system is:

- A window 7 or higher version for faster processing,
- Dreamweaver (18.2.0.10165, 2018 stable version),
- XAMP 7.2.7 (MYSQL, Apache server) and,
- Mozilla web browser or better.

c. Operational Requirement

Internet access in the computer is primary prerequisite for the new system to be operational.

d. Personnel Requirement

A computer system with internet access with computer literate personnel.

4.0 CONCLUSION

Research and development are continuous processes; this is same in computer and software development. However, the effectiveness and efficiency of this new system provides room for further improvement. We did not manage to actualize all the original project objectives due to some limitations as earlier on mentioned. So these objectives could be improved upon, the outlined clearance system developed will offer greater opportunity in school management. We can now carry out all the transactions regarding academic activities online.

We developed the Secondary School Student Clearance System using PHP and MySQL, and it was implemented using data collected. It was able to manage student's clearance process across all the departments and units and it eliminated the weakness of the manual process which mainly lack centralize repository for the clearance process. Others are the process is slow, clumsy and stressful. Therefore, the clearance application can be used for

recording and certifying that a student is cleared to disengage or not. The clearance applications are recorded and the status can be determined at any point in time.

ACKNOWLEDGEMENTS

My profound gratitude goes to God Almighty for His grace, favour, and mercies upon my life and great success achieved within this little time in this project that could have not been visible without the contribution of my loved ones. I must acknowledge the efforts of my beloved parents and relatives who are a propelling force behind my success. God will crown your tireless efforts with the much-expected success. I would be very ungrateful if I fail to acknowledge my caring parents and others for their financial and moral support all through my stay in university.

I appreciate the efforts of my brothers and sisters for their love, care, understanding and prayers over me. I am equally happy to my supervisor Eng. Chuunga Kabutu for sparing time to go through my work. In addition, I am immensely grateful to the University country Coordinator (Dr. Silumbe Richard) for facilitating quality education opportunities provision to all who will, Heads of various Departments and my wonderful Lecturers.

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