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Design of Computerized Inventory Management System the Case of MPC

BY

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List of Abbreviation's

CSS: Cascading Style Sheets

DBMS: Database Management System

DFD: Data Flow Diagram

DNS: Domain Name System

ER: Entity Relationship

ERD: Entity Relationship Diagram

MySQL: Microsoft Structured Query Language

WAMP: Windows, Apache, MySQL, and PHP

PHP: Hypertext Preprocessor

JS: Java Script

HTML: HyperText Markup Language

MPC: Maichew Polytechnic College

WWW: World Wide Web

URL: Uniform Resource Locator

SQL: Structured Query Language

PC: Personal Computer

LAN: Local Area Network

HTTP: Hypertext Markup Language

CIMS: Computerized Inventory Management System

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Abstract

Stock management is very important in retail stores especially in those that have large number of items like Maichew polytechnic College. The goal of inventory management is to balance supply and demand in order to keep customers satisfaction to drive profits. The most important benefit of an inventory management system is to save time and money. A Stock Management System is a tool used to track goods and services of a company. Inventory or stock management is a process that integrates the flow of supplies into, and out of an organization to ensure right quality at right cost. Inventory management is one of the basic problems for higher education organizations in developing countries like Ethiopia as the result of using manual inventory management system at this computerized era. Maichew Polytechnic College is also currently using completely a manual Inventory System on the inventory of all the properties of the college. To overcome those problems, this project explores the challenges of manual inventory management system for MPC and infers solutions to the current challenges by designing a computerized inventory management system to order and update the stocks the college. The system has categorized into different modules to make the system adapt to the further changes. Every effort has made to cover all user requirements and make it user friendly. The researcher recommended that the computerized system should replace the manual system of stock recording and processing in order to speed up managerial decision of the college.

CHAPTER- ONE: INTRODUCTION

1. Introduction

Every company has their own inventory where each of the company manages the inventory by various ways of managing system. However, the purpose of the inventory is the same, where the inventory must always ready to use and the inventory cost must below. Inventory management is the process of efficiently overseeing the constant flow of units into and out of an existing stock of goods. This process usually involves controlling the transfer of units in order to prevent the inventory from becoming too high, or dwindling to levels that could put the operation of the company into jeopardy (Opeyemi et.al.2013**)**.

Inventory control is one of the key management areas in organizations. This is because of the internal roles inventory control plays in the organizations such as facilitation of continuous production, smoothening of operations and enhancement of customer service (Singh, 2013). Managers are in critical need for reliable and effective inventory control system in order to reduce costs and remain competitive (Oballah and Waiganjo,2015).

Inventory's help to maximize customer service by protecting against uncertainty, if we could forecast exactly what customers want and when, we could plan to meet demand without uncertainty. An inventory system provides the organizational strokes and the operating policies for maintaining and controlling goods to be stocked. The system is responsible for ordering and receipt of goods: timing the order placement and keeping track of what has been ordered, how much, and from whom. The system also must follow up to answer such question as has the supplier received the order? Has it been shipped? Are the dates correct? Are the procedures established for recording or returning under standable merchandise? (Silver E. (2011).

The goal of inventory management is to balance supply and demand in order to keep customers satisfaction to drive profits. The most important benefit of an inventory management system is to save time and money. Again, without an inventory management system, countless man-hours are wasted manually recording what items are used for each transaction, delivering these forms to the office, and then manually entering the data into the accounting system. An inventory control system is a set of hardware and software based tools that automate the process of tracking inventory. Inventory Management is one of the basic problems for public Universities in Africa. It causes a lot of paperwork, in the absence-automated system (Yinyeh and Alhassan, 2013).

Inventory management is one of the basic problems for higher education organizations in developing countries like Ethiopia as the result of using manual inventory management system at this computerized era.

1.1 Back ground of the study area

Maichew Polytechnic College is located in the southern part of Tigray, in the town of Maichew, approximately 668 kilometers north of the Ethiopian capital Addis Ababa. Though the College has established recently, it has a long historical background. Originally, the Tigrian People's Liberation Front (TPLF) founded it as a Technical School during the armed liberation struggle of 1974-1991. During that period, the school was training technicians for the army and peasants to enable them maintain their utilities (pumps, generators etc.) in the liberated areas of the Region. As of 2003, E.C the college was upgrade to a polytechnic level, which enabled it to provide Level V training programs.

Currently, Maichew Polytechnic College offers regular program in water technology, Construction Technology, Automotive technology, Manufacturing technology, Electrical technology and Information technology fields, from level I - V based on the market demand of the region and accreditation given by TVET Bureau. Maichew Polytechnic College has within the campus, seven large and well-equipped workshops, a library building, administrative offices, classrooms, staff residence, Staff and students Lounge, student's dormitories and Sport fields. As of 2008 E.C the college was given an accreditation which enabled it to provide degree programs on different fields like manufacturing technology, automotive technology, Electrical technology and Information technology.

1.2 Statement of the problem

Maichew Polytechnic College is currently using completely a manual Inventory System on the inventory of all the properties of the college. Due to this problem

- They could not easily track down the properties of the college.
- There is Redundancy in entering items.
- It takes too much time in making their inventory

To overcome those problems, this project explores the challenges of manual inventory management system for MPC and infers solutions to the current challenges by designing a computerized inventory management system to order and update the stocks the college.

1.3 Objective

1.3.1 General Objectives

The main objective of this system is to develop a computerized inventory system for Maichew Polytechnic College.

1.3.2 Specific Objectives

- To reduce paper based system
- To manage stock easily (in and out stock)
- To generate daily, monthly and annual report easily
- To ensure data security

1.4 Significance of the project

Stock management, maintenance and control are a vital tool in any business. To know when to place for a new item and update status will depend on how information-processing can handled. This paper help provides such tools and helpful in management, control and effectiveness.

1.5 Scope of the project

The program designed to take care of a typical control system, which deals with inventory control of Maichew polytechnic College Store and other stores having similar problem of inventory control.

The possible people that can use the system would be the following.

- **Manager:** is the administrator of system. He has the authority to administer the system; he can open it if he has transactions to do.
- **Storekeeper**: the person assigned to manage the stocks of the college; he/she have also the authority to operate the system; he/she is the one that will make the inventory of the property of the college.

1.6 Limitation of the project

The systems have implemented using the current technology although some modifications had to done at various places**.**

- In the system, there is no facility for time scheduling of workers.
- There is no online ordering mechanism.
- It is not possible to use this system out of inventory management.

1.7 Definition of terms

- **Inventory**- is the process of making an itemized list of supplies on hand.
- **Inventory system**- is the system of recording the stocks of the college in the store room
- **Manager**- is the administrator of the system.
- **Storekeeper** – the person assigned to manage the stocks of the college.
- **Data loss**-refers to the sudden loss of data or information.
- **Data Security**- is the practice of stopping data leakage by filtering the network traffic.
- **Data Integrity**- refers to the validity of data, meaning data is consistent and correct.

CHAPTER –TWO: LITERATURE REVIEW

Theories are analytical instruments to understand the study, to elaborate and make assumption about the subject matter. It can also help us to compare the conceptual framework are evaluate and comment on the research gap of the given study (Mwangi & Nyambura, 2015).

2.1.1 Concept of inventory

Inventories are materials or resources of any kind having some economic value. It is also a major asset that should provide return for capital invested and either awaiting conversion or use in future. Apart from these, there are many indirect materials such as maintenance materials, fuels and lubricants, and other materials that are used in a manufacturing or service rendering organizations. They are classified as inventories of materials for future use. However, they differ only in their use and classification from raw and other direct materials. All required items are stocked in to warehouse to be used when the needs arise (Datta, 2003).

According to Godana, & Ngugi (2014), inventory is essential to organization for production activities, maintenance of plant and machinery as well as other operational requirements. This results in tying up of money or capital, which could have used more productively. The management of an organization becomes very concerned in inventory stocks are high. Inventory is part of the company assets and it can always reflect in the company's balance sheet.

2.1.2 Type of inventory

Most of the inventory items classified as the following:

1) Raw material as inventory as input to manufacturing system
2) Bought-out-parts (BOP) inventory which directly go to the assembly of product as it is.
3) Work-in-progress (WIP) inventory or pipeline inventory
4) Finished goods inventory for supporting the distribution to the customers.
5) Maintenance repair, and operating (MRO) supplies, these include spare parts, indirect materials and all other sundry items required for production/service systems (Varta, 2014).

2.2 Inventory management

According to Sharma (2006), inventory management can be describing as the protection of over investment and under investment in inventories, by improve on the main necessary operational activities. According to Susan & Michael (2000), people warehouse (that is, stores) are

responsible the distribution of inventory materials to all storage or using locations. They are also responsible for the physical security, safekeeping of material at all stores locations, and for all store keeping activates, including material receiving, put-away, and material picking and shipping. Other responsibilities include maintaining accurate inventory records, managing the physical layout of storehouses.

According to Reid & sanders, (2007) inventory management mostly serves two main purposes. First, all responsible inventory management takes responsibility of stock material. The availability of inventory is important for the smooth running of operation. The second goal is by performing the required activity; efficient service level can be achieving by minimizing the optimal costs.

(Mohamed, et.al. 2016) said that every company manages its inventory items by using different ways of their own managing system. However, usage inventory is similar and also where the inventory is stored or is ready to be used and the cost must expect to be low. Lau, and Snell, (2006) notes that inventory management scope is concerned with the replacement and lead time, carrying costs of inventory, asset management inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, available physical for inventory, quality management, returns and defective goods and damage forecasting. Godana & Ngugi (2014) stated that inventory management is more concerned on controlling of each stapes of inventory activities. This is practicing by involving the system of storekeeping and stock control activities efficiently and economically in the store. most of the time the efficiency of inventory management procedures and practices are under question for management because many times the result of a procedures of managing inventory have a problem of shortage leading different weakness may be a loss that happens a result of over stock level, under stock level, expiry inventory, failure to achieve the set goal.

CHAPTER–THREE: RESEARCH METHODOLOGY, DESIGN AND SYSTEM ANALYSIS

3.1 Methods and techniques

To achieve the objectives of this project; There are different methodologies available for collecting information (data gathering techniques).

3.1.1 Documentation

This technique allows us to use manuals and book at Maichew Polytechnic College, review and other books related to the subject of this project.

3.1.2 Observation

We want to use this method because sometimes what workers say and what is really happening may differ. To get the right information we use direct observation with documentation analysis and material.

3.1.3 Interview

Interviewing the Employee, like manager, storekeeper and other employees, which have skills and knowledge about Inventory Management System to collect data that are valid, reliable and relevant data to this work.

3.2 System design

The major fact taken into consideration in the design of the new system is the automation of the inventory control system for effective management. In the course of the design, the daily report on transactions are captured, databases were created to keep customer order the design of computerization of inventory system is a creative it, which has its objective.

It is designed to substitute the manual system thereby enhancing its efficiency and accuracy. A sort of security guaranteed by the new system is more effective than the manual system is highly achieved. It starts with an access method, which allows the user to go into various area of the program; this is done by using the menu option. Thus, provides quick access to the different data area of the program. The design process takes place at two levels

3.2.1 Context Diagram

The Context Diagram shows the system under consideration as a single high-level process and then shows the relationship that the system has with other external entities (systems, organizational groups, external data stores, etc.)

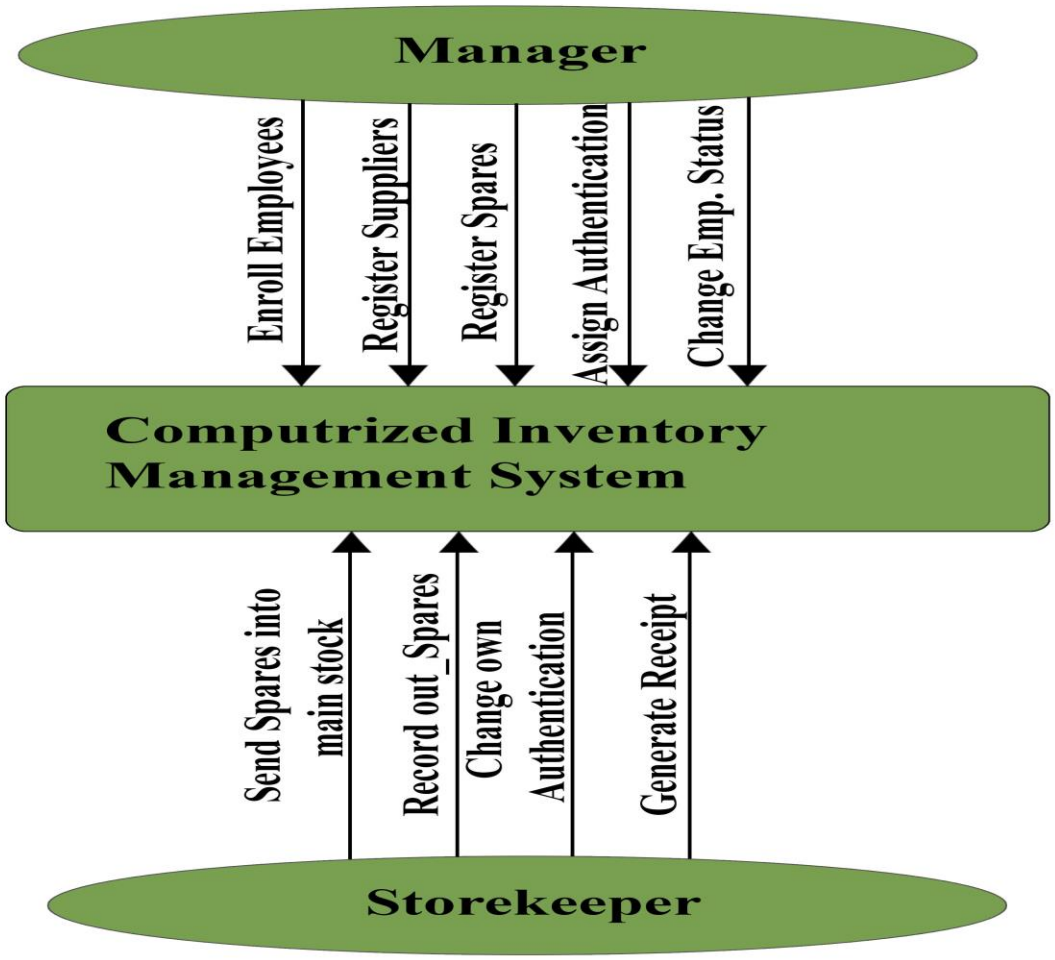

Fig. 3.2.1 Context diagram

3.2.2 Data Flow Diagram

The Data Flow Diagram (DFD) is a graphical representation of the flow of data through an information system**.**

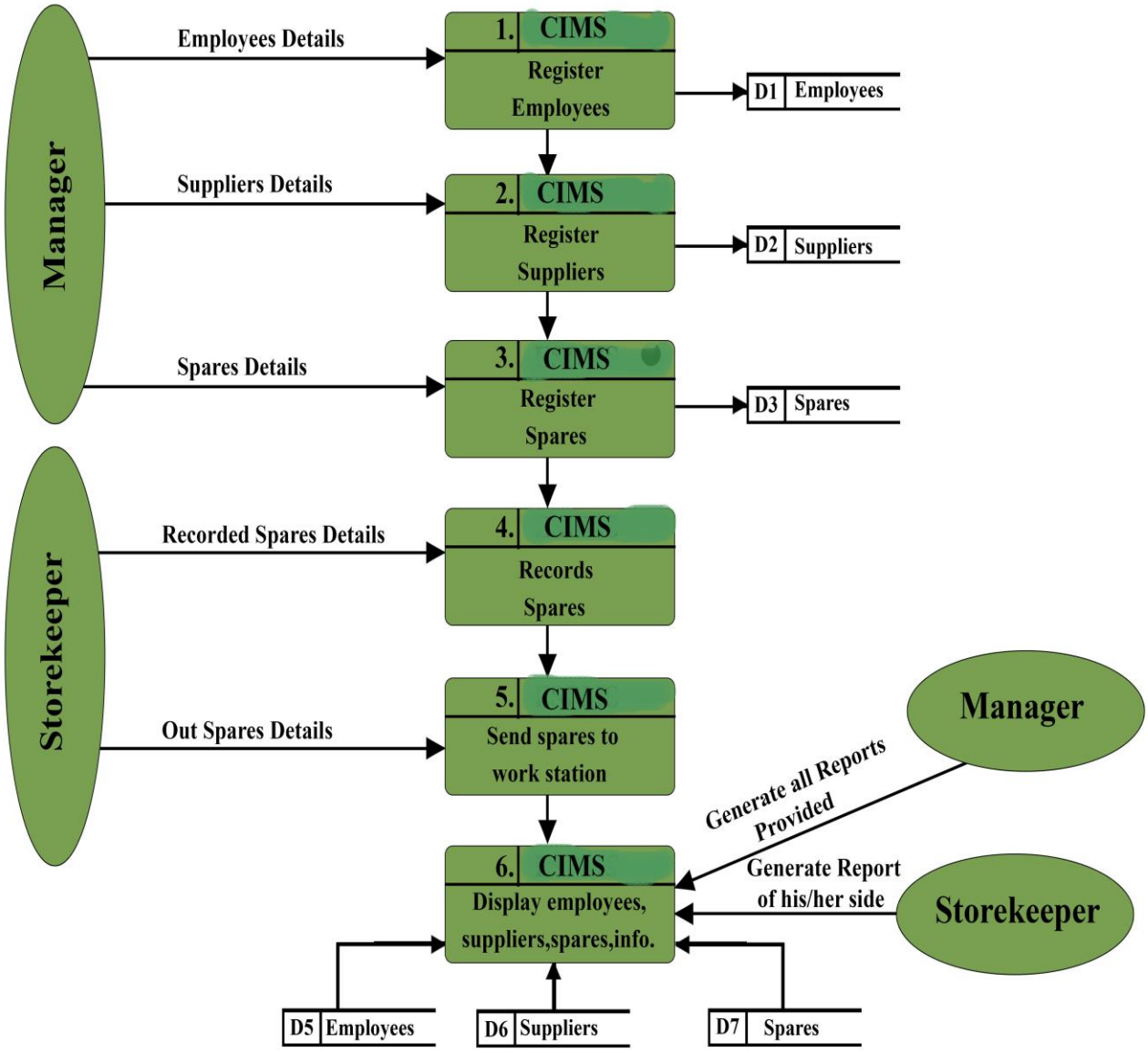

Fig. 3.2.2 Data flow diagram

3.2.3 Entity Relation Ship Diagram (ERD)

ER modeling is a data modeling technique used in software engineering to produce a conceptual data model of an information system. Diagrams created using this ER-modeling technique are called Entity-Relationship Diagrams, or ER diagrams or ERDs.

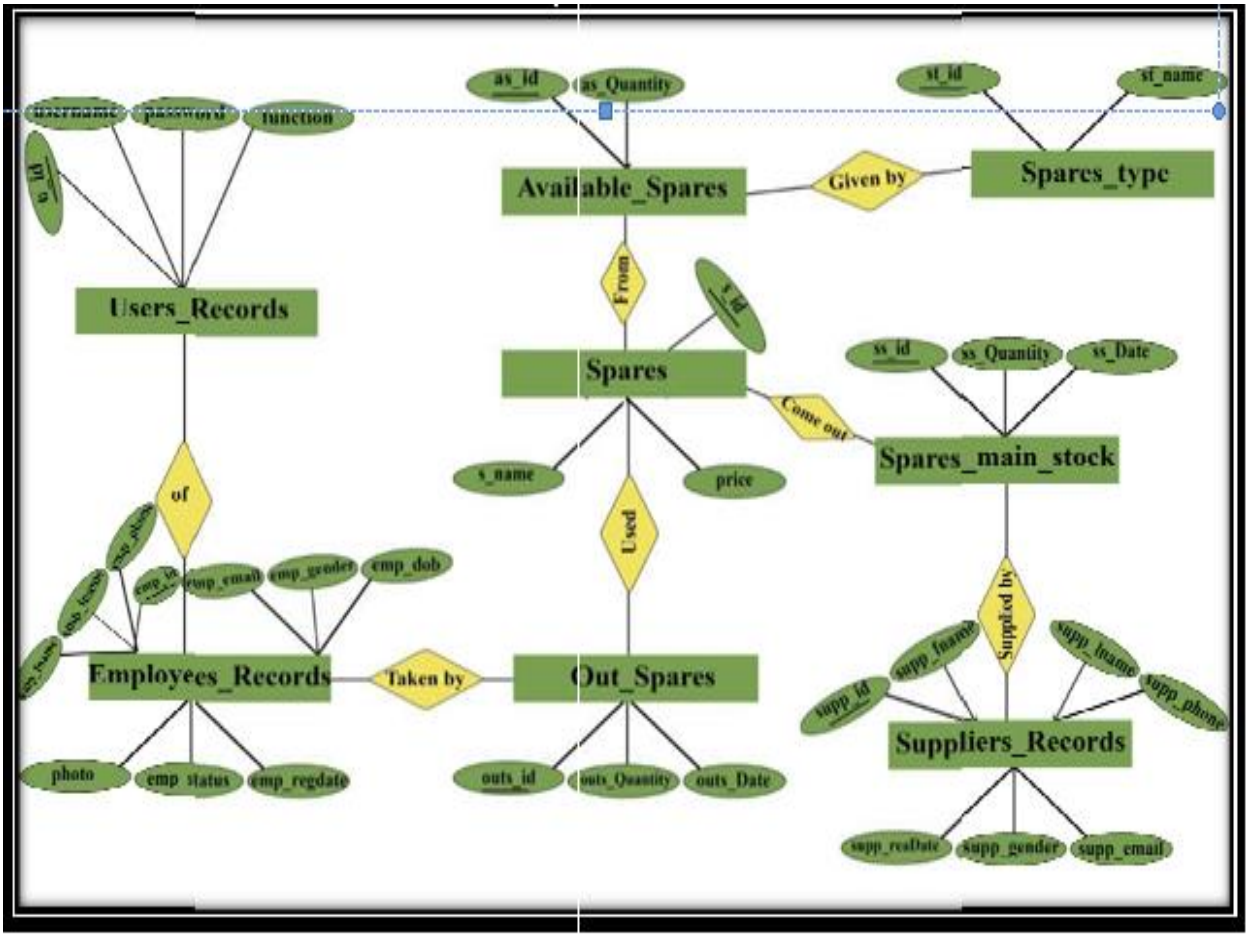

Figure 3.2.3: The Entity Relation Ship diagram.

3.2.4 The physical data model

The physical ER model normally developed to be instantiated as a database. Therefore, each physical ER model must contain enough detail to produce a database and each physical ER model is technology dependent since each database management system is somewhat different.

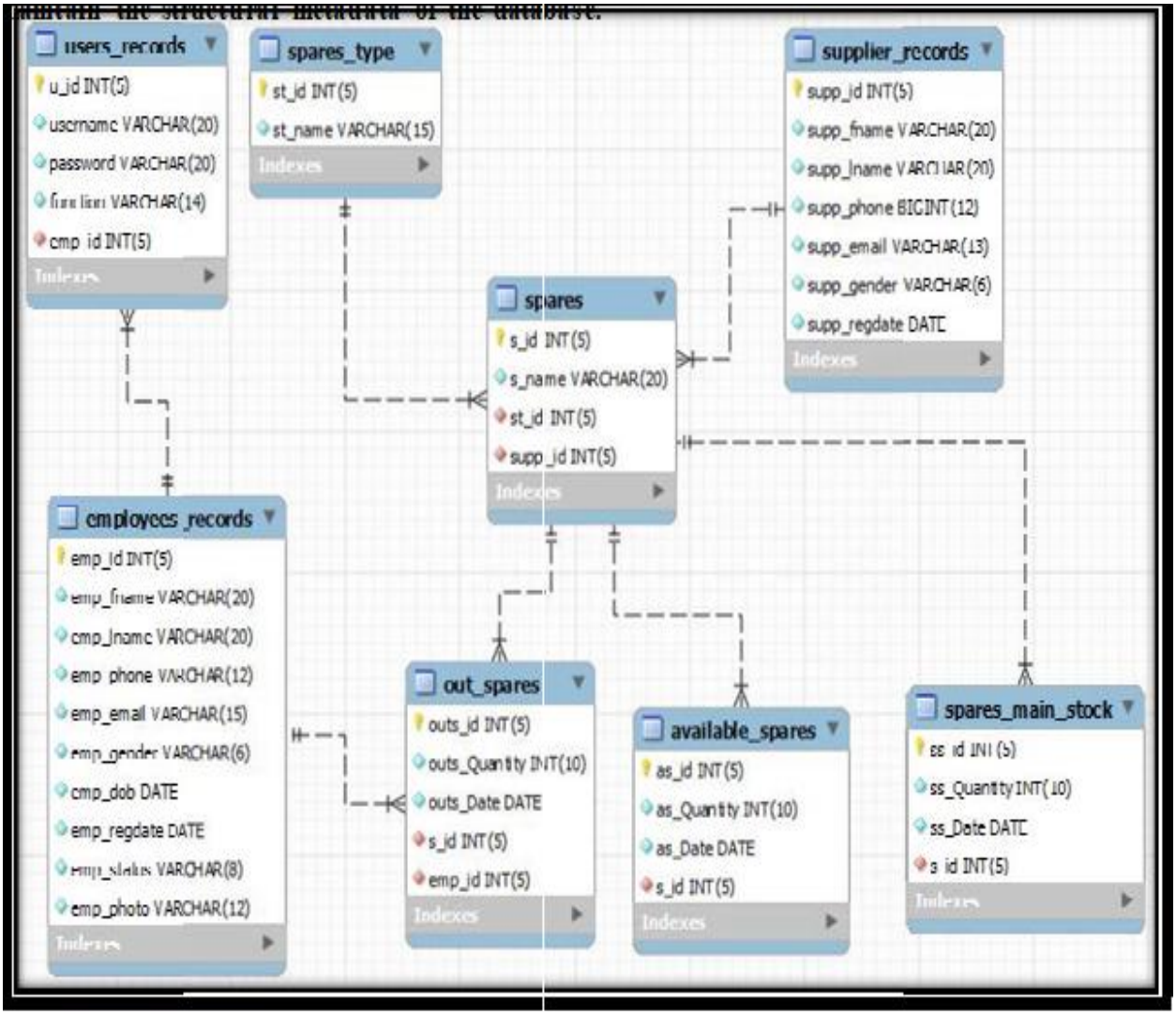

Figure 3.2.4: The physical data model diagram.

3.2.5 Data dictionary

A data dictionary is a collection of descriptions of the data objects or items in a data model for the benefit of programmers and others who need to refer to them. A data dictionary, or metadata repository, as defined in the IBM Dictionary of Computing, is a "centralized repository of information about data such as meaning, relationships to other data, origin, usage, and format." The term may have one of several closely related meanings pertaining to databases and database management system. A data dictionary defines the structure of the database itself (not that of the data held in the database) and is used in control and maintenance of large databases*(RamezElmasri and Shamkant B. Navathe, 1993).*

Entity	**Attributes**	**Types**	**Contraints**	**Description**
1.employees_records	Emp_id	Int(5)	Unique	Employee identification primary key in this table.
	Emp_fname	varchar(20)	Multiple values	Employee firstname
	Emp_lname	varchar(20)	Multiple values	Employee lastname
	Emp_phone	varchar(12)	Unique value	Employee's phone number
	Emp_email	varchar(20)	Unique value	Employe email
	Emp_gender	varchar(6)	Multiple values	Gender for enrolledemployee
	Emp_dob	Date	Multiple values	This shows the employee's birthdate.
	Emp_regDate	Date	Multiple values	The employee's enrollment date.
	Emp_status	varchar (8)	Multiple	This shows if the

			values	employee is active or dismissed.
	Emp_photo	varchar (12)	Unique	The image of enrolled employee.
User_records	u_id	int(5)	Unique	User identification primary key for User_records.
	Username	varchar(20)	Unique	The user's username.
	Password	varchar(20)	Multiple values	The user's password.
	Function	varchar(14)	Multiple values	The role played by the user (manager or storekeeper)
	Emp_id	Int (5)	Multiple values	Employee identification and foreign key from employees_records.
3. out_spares	outs_id	Int(5)	Unique value	Out-spares identification and primary key in out_spares.
	Outs_quantity	Int(10)	Multiple values	The quantity of spares sent to the workstation.
	outs_date	Date	Multiple values	The transaction date
	S_id	Int(5)	Multiple values	Spares identification and foreign key from spares.
	Emp_id	Int(5)	Multiple values	Employee identification and foreign key from

				employees_records.
4. spares	s_id	Int(5)	Unique value	Spares identification and primary key in spares.
	s_name	Varchar(20)	unique value	The name for a given spare part.
	St_id	Int(5)	Multiple values	The foreign key from the spares_type. It categorizes the spares.
	Supp_id	Int(5)	Multiple values	The foreign key from supplier_records.
5. spares_type	st_id	Int(5)	unique value	Spare-type identification and primary key in spares_type.
	st_name	varchar(15)	Multiple values	The name for a given category of spares.
6. available_spares	as_id	Int(5)	unique value	The available-spares identification and primary key.
	As_quantity	Int(10)	Multiple values	The quantity of available spares.
	As_date	Date	Multiple values	The date at which the above quantity is available.
	S_id	Int(5)	Multiple values	The spares identification and foreign key from spares.
7.Spares_main_stock	Ss_id	Int(5)	Unique	The primary key of the

			value	spares in main stock.
	Ss_quantity	Int(10)	Multiple values	The quantity of the spares in the main stock.
	Ss_date	Date	Multiple values	The date pares are recorded in the main stock.
	S_id	Int(5)	Multiple values	The foreign key from the spares.
8. supplier_records	Supp_id	Int(5)	Unique value	Supplier identification and primary key in this.
	Supp_fname	Varchar(20)	Multiple values	The firstname of a given employee.
	Supp_lname	Varchar(20)	Multiple values	The lastname of a given employee.
	Supp_phone	Bigint(12)	Unique	The supplier phone
	Supp_email	Varchar(13)	Unique value	The supplier's email.
	Supp_gender	Varchar(6)	Multiple	The gender of supplier
	Supp_regDate	Date	Multiple	Registration date.

Table 1: The data dictionary.

3.3 Existing system

In Maicew Polytechnic College, all activities are performed using manual because there is no computerized system to simplify their work. When the suppliers bring the spare parts to the college, the storekeeper records them in his/her stock-book, which is a book to record the information concerning the spares in MPC. That information includes the follow of those spares from the purchasing time up to the usage time. In addition, that book conserves some information about the damaged products, stock status, employees etc. Moreover, the storekeeper uses this stock-book to indicate the report after a given period or any time when he/she is asked to present the report. The storekeeper only gathers the stock book and this leads to a great and negative challenge to the manager, as he is not able to follow the flow of the usage of the purchased spares. When the manager needs to get some information, he/she is obliged to contact the storekeeper and asks him/her the information he/she needs.

3.4 Proposed system

The new proposed system developed to overcome the problems caused by the usage of manual system to manage the stock of its spare parts. This proposed system can have only two users who can actively interact with the functions this system provides. Those users are the manager and the storekeeper. In this system, the storekeeper is no longer use the stock-book that usually causes the problem of mismanagement but he/she can use the computerized system that has a manageable database to record all information about the spares. On the other hand, the manager can monitor and follow the flow of the use of spare parts and view the daily report without contacting the storekeeper for every enquiry.

In this computerized system, the storekeeper registers the purchased spare parts, the enrolled employees and suppliers. He/she also records from the stock to the workstation and the employee who takes them. He/she can view the ‘end of the day’ and any other report that is related to his/her tasks.

CHAPTER –FOUR: SYSTEM IMPLEMENTATION

4.1 The implementation stages

The implementation stage has two stages, which are:

1. Programming stage
2. User training stage

4.1.1 Programming stage

The researcher used PHP programming language due to its ability to use effectively and efficiently carry out record management. In addition to use the computerized operation and to code various instructions and to debugged it. Each segment separately tested and the whole segment of modules integrated to form a single program, which is the computerized inventory system. These have the advantages of identifying and debugging error easily.

When the programmer needs a specific user interface feature such as a button, he selects the appropriate ready to use component provided by the programming language. No need to write code to create and display commonly required control. It provides all features that are required to develop graphical user interface as ready to use components.

4.1.2 User training stage

In this stage the developed systems has been installed into the MPC Store manager computer and then train the prospective users on how to use the new system to perform daily transaction.

4.2 Requirements for the project deployment

4.2.1 Hardware Requirements

1. Pentium 111 processor (minimum)
2. 256MB-4GB RAM/ memory
3. 10GB Hard disk space (minimum)
4. keyboard
5. Mouse
6. CD-ROM drive
7. A 1500v uninterrupted power supply (ups)

4.2.2 Software Requirements

1. Operating system: windows XP professional edition or windows vista
2. Mozilla Firefox
3. Macromedia family consisting of Dreamweaver 8, fireforks8
4. MySQL database
5. WAMP server
6. PHPMYADMIN

4.3 Implementation

The new system has designed to be efficient in use. Here, we will look into the various technical aspects that influenced the successful implementation of this system and determine the effective operation of the system. System implementation follows the approval of the system objectives.

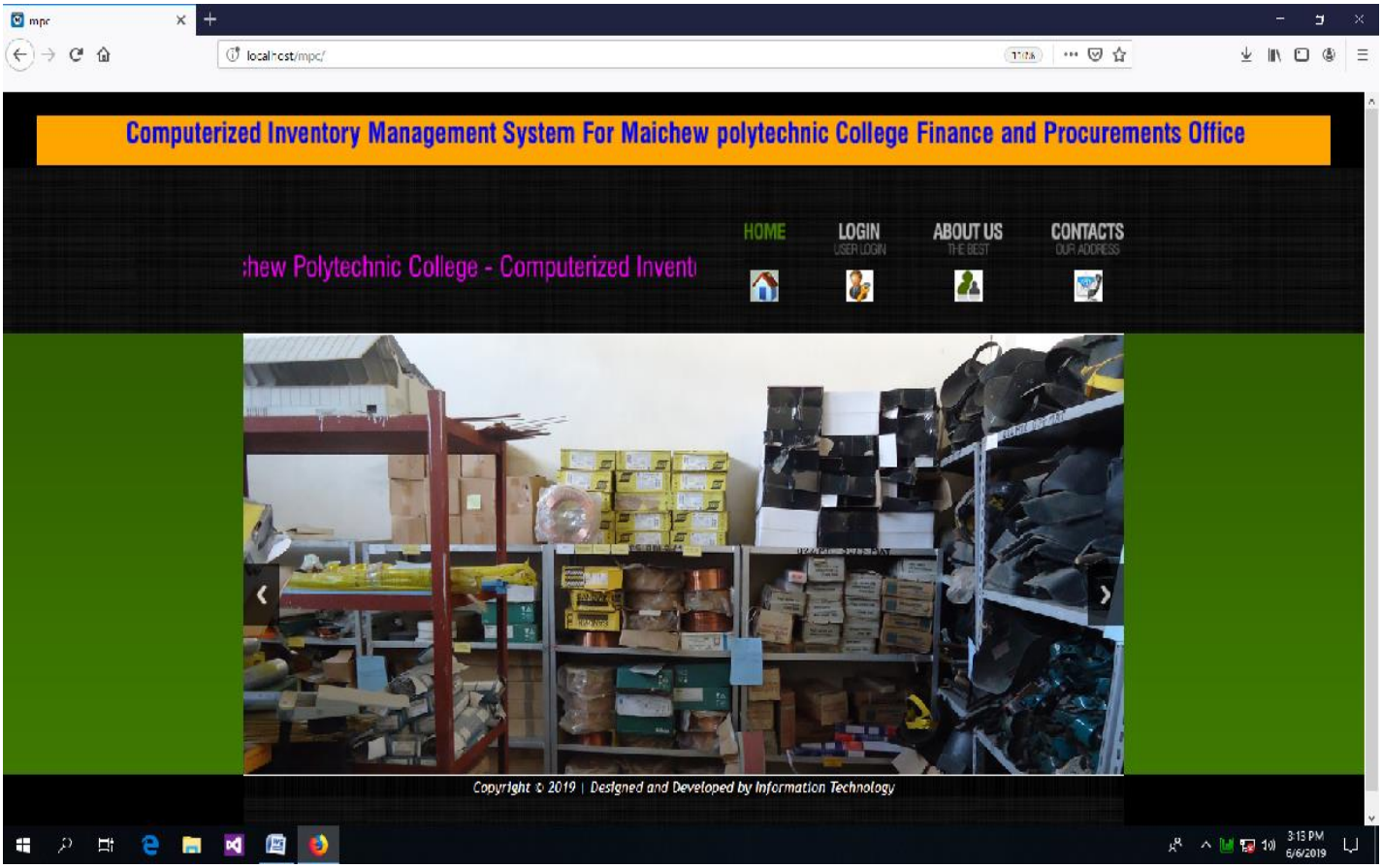

Fig. 4.1 Welcome Form

This is the first form that appears when the system runs.

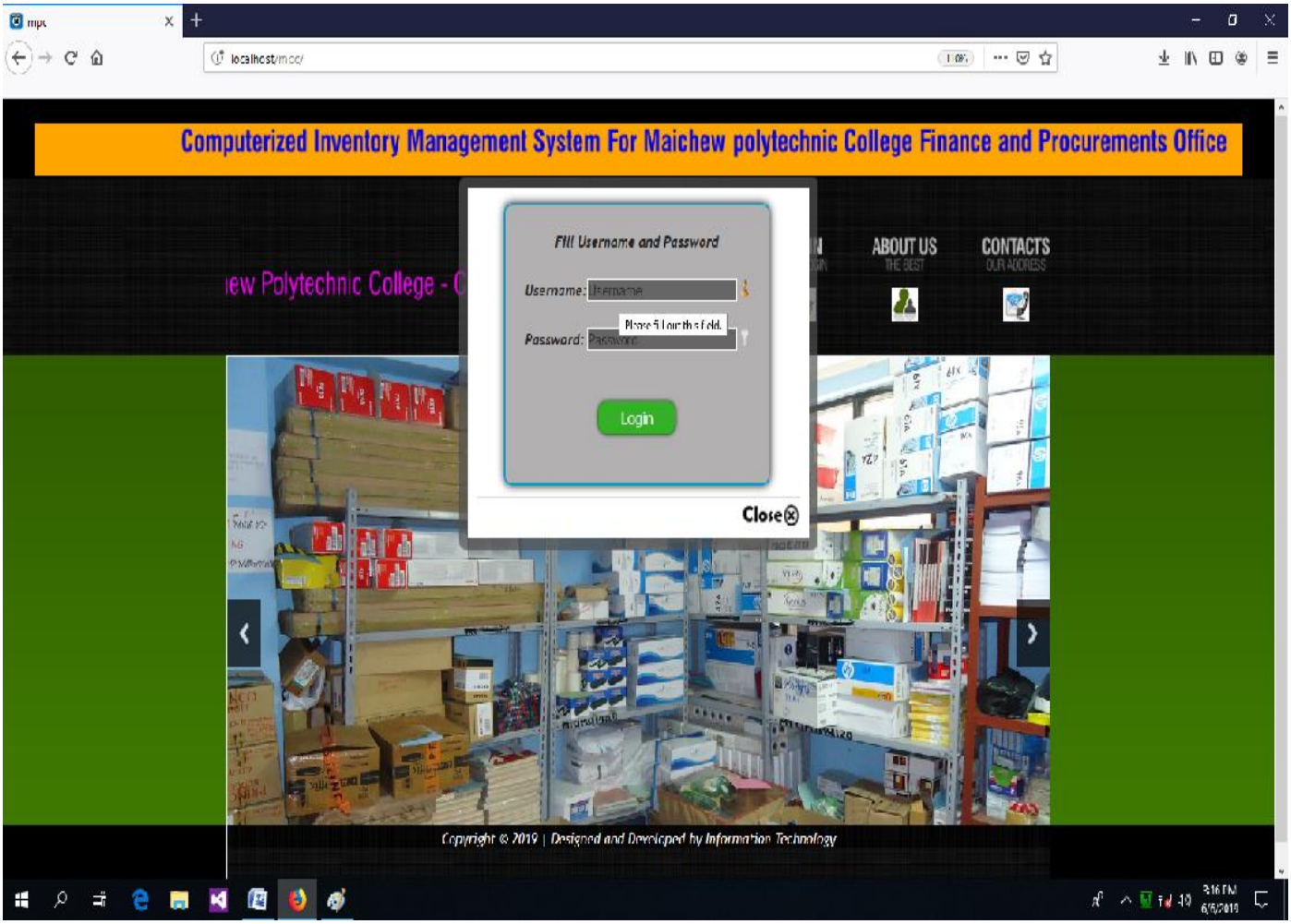

Fig 4.2 login form

This is the first form that requires the user to provide the information (i.e. username & password) needed in order to the access the features of the system.

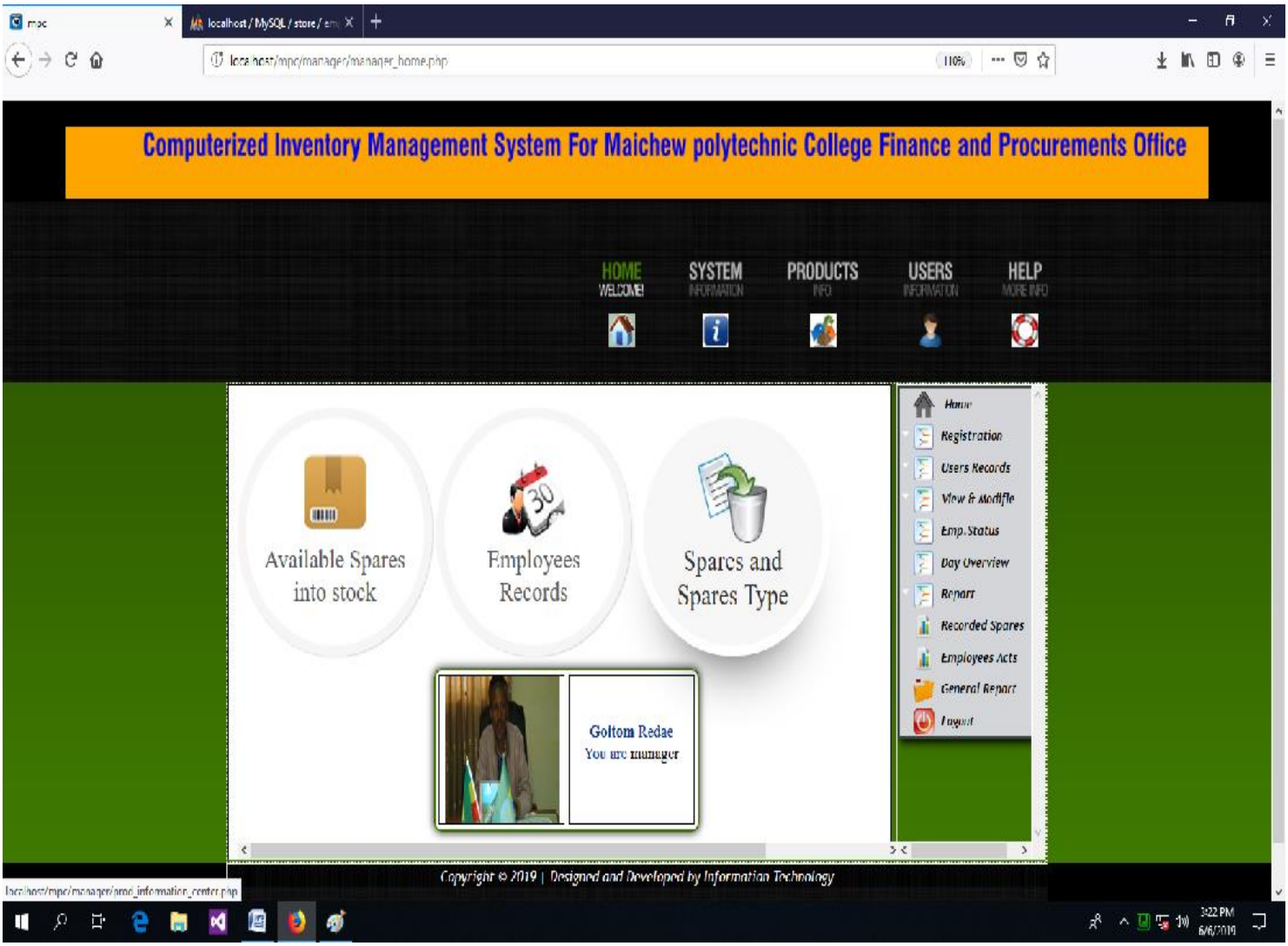

Fig. 4.3 Admin Home form

This is form seen after user name and password have supplied or inputted. It can access on the manager side

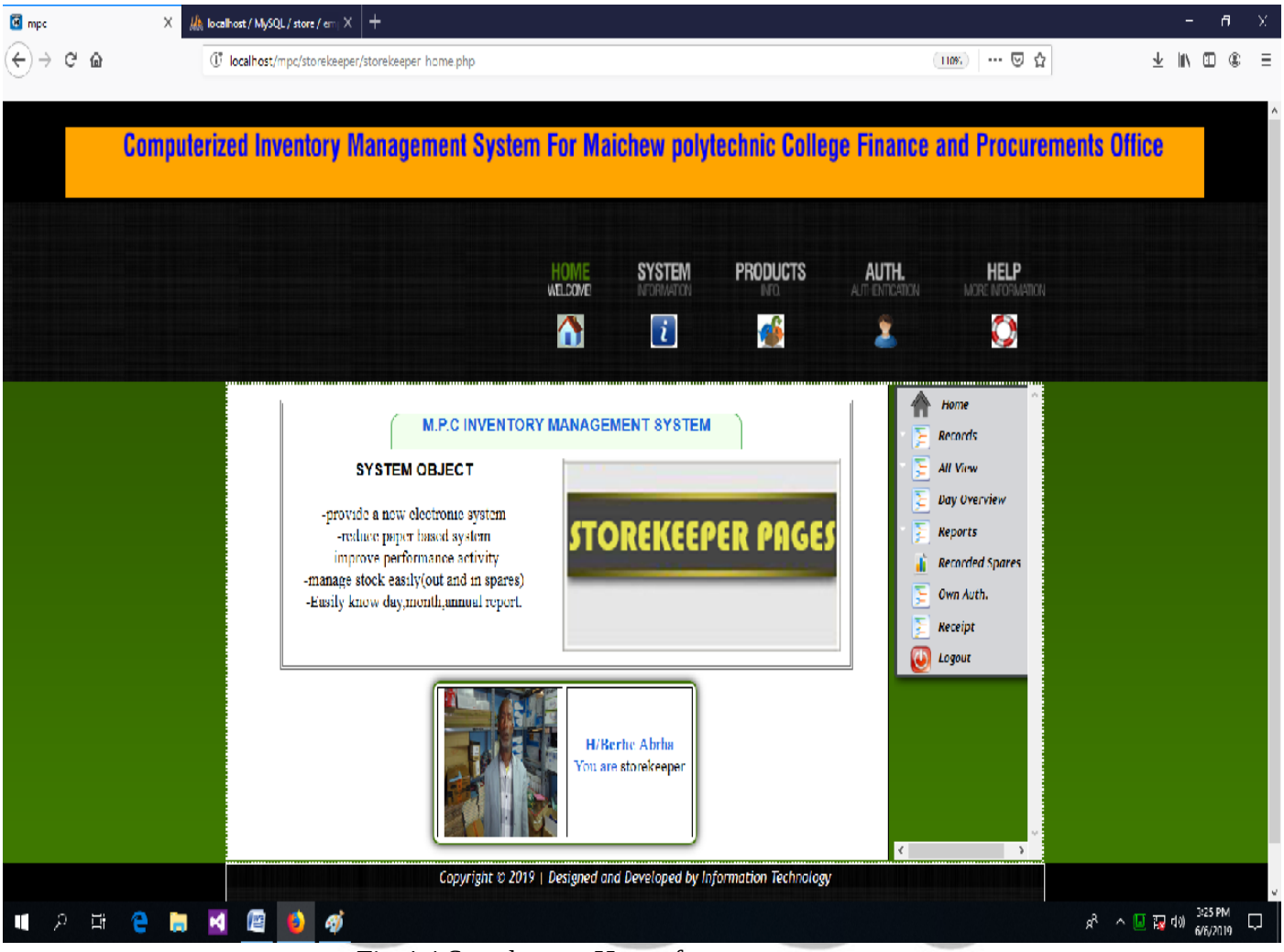

Fig.4.4 Storekeeper Home form

This is form seen after user name and password have supplied or inputted. It can access on the storekeeper side.

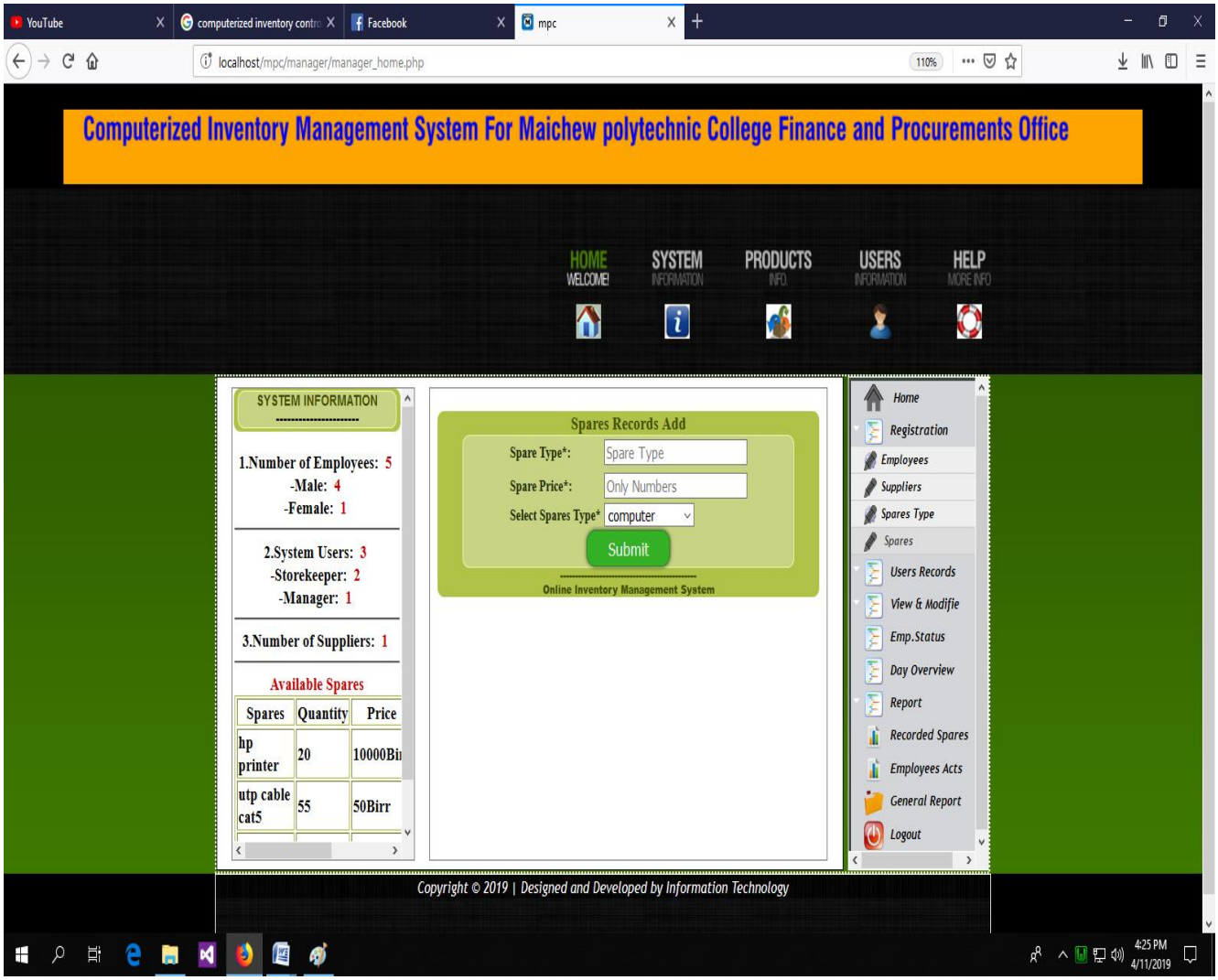

Fig. 4.5 Manage Stock form

This interface allows the manager to add new stock in to the system

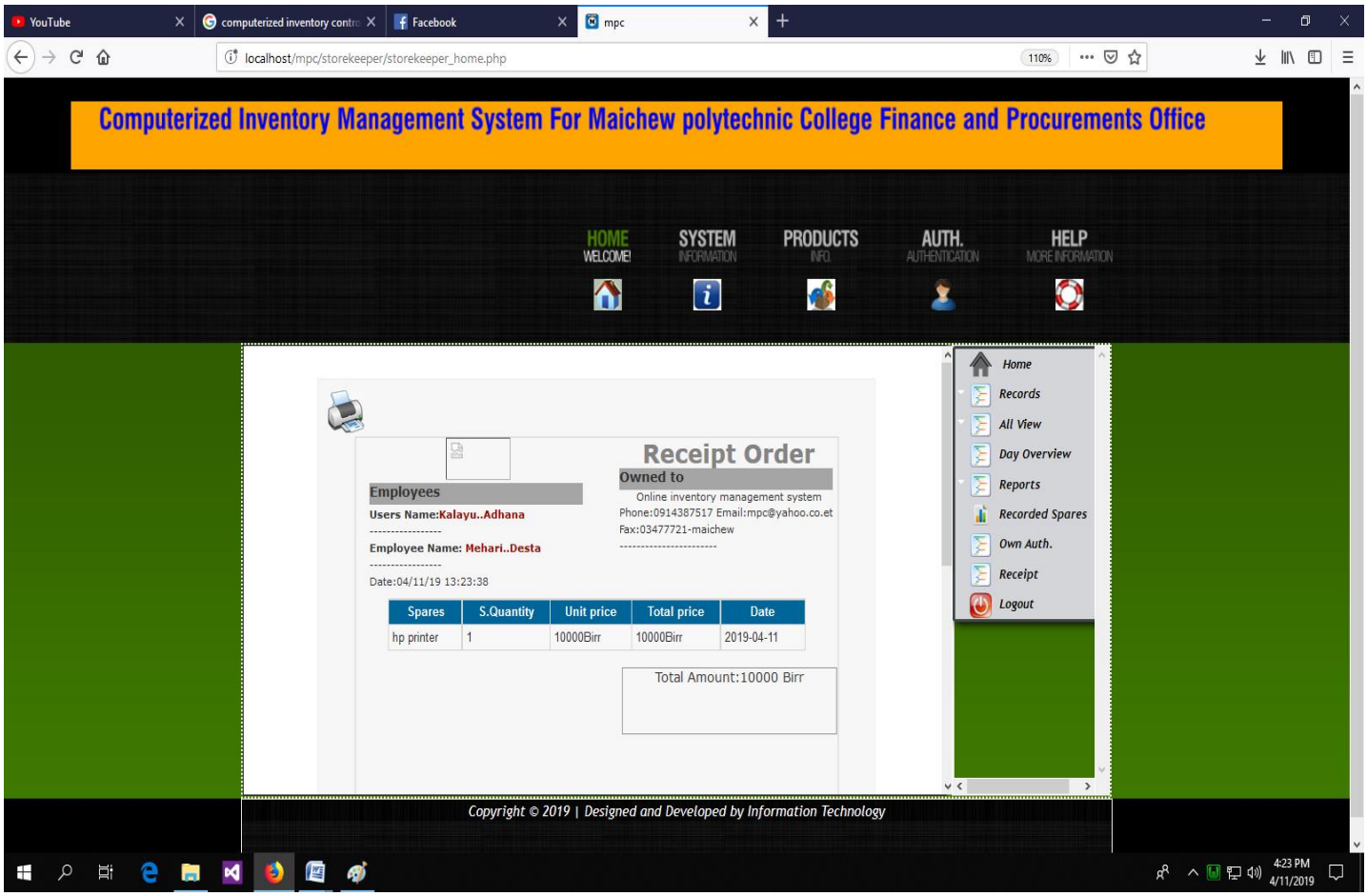

Fig.4.6 Receipt form

This form enables the receipt of the requested spare to be printed receipt and issued to a staff.

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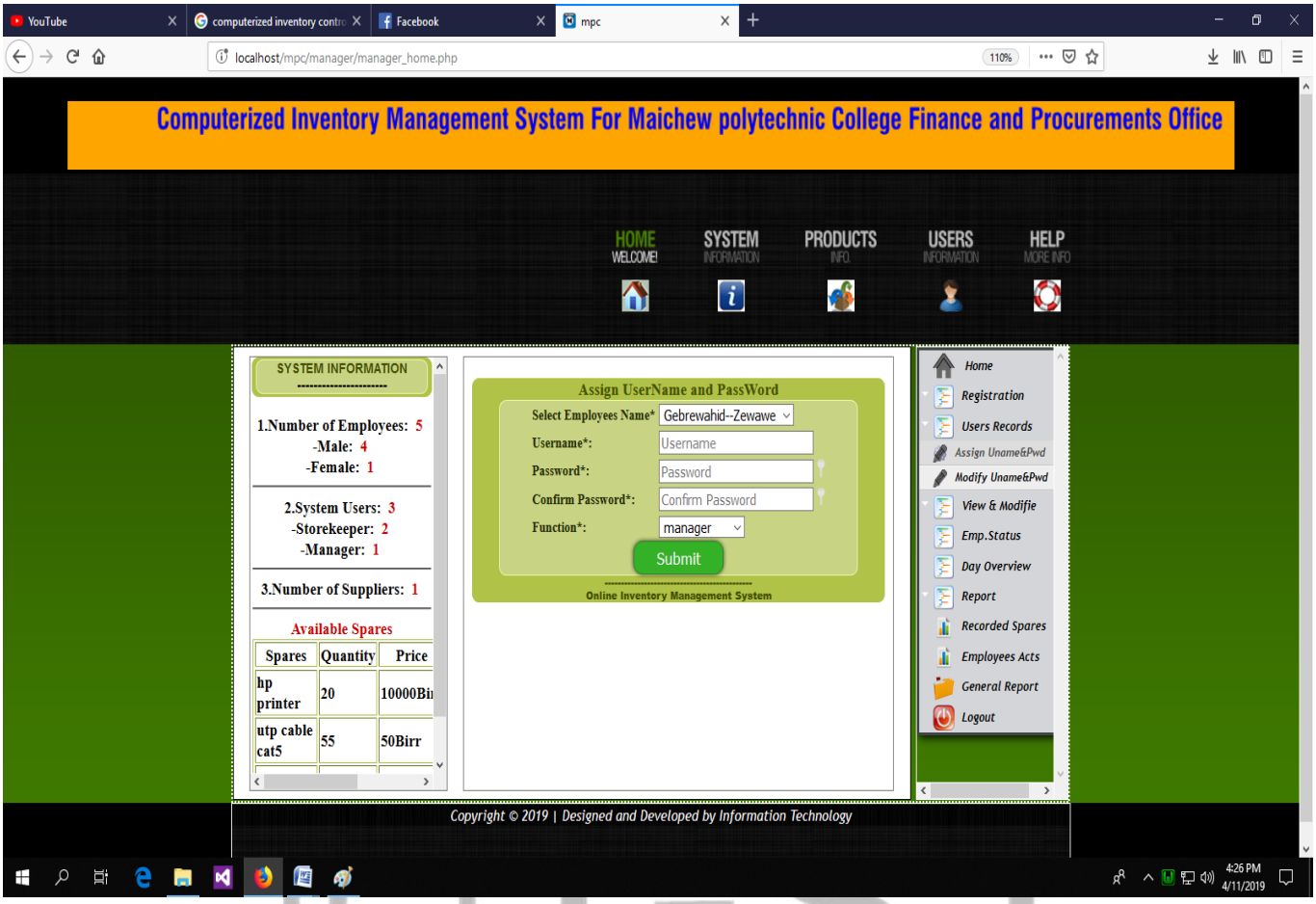

Fig. 4.7 change password form

Change password form allows the management or system admin to change a password.

CHAPTER- FIVE: TESTING AND RESULT

5.1 System testing

After a successfully completion of developing the system, the researcher tests it for its correct functionality of the system according to customer requirement and scope boundaries.

5.2 Testing methodology

The testing method in this project includes:

Unit testing: is the test conducted on each unit of codes (functions or modules) and run it separately to see its correct functionality?

Integration testing: is the test conducted on the various components of the system. Another way is to put all-modules together and then test the whole system.

System Testing: is the test conducted on the whole system, integrated system to evaluate the system's performance with its specified requirements

Alpha Testing: Testing using correct input and see for any failures. If failure occurs, find and correct the bug.

Beta Testing: The system is tested to incorrect data inputs.

5.3 Testing results

After test running with varied of data, which is after running the program, the output has shown on the monitor. The output has been printed on paper this shows that the new system was perfect and effective.

5.4 Error handling

1. System should report data type mismatches on fields on the form.
2. System should report violation of authorization rights.
3. System should report invalid login errors.

CHAPTER –SIX: CONCLUSION AND RECOMMENDATION

6.1. Conclusion

The objective of the project is to maintain an efficient and effective database management package for MPC that will in turn aid as a tool and effective decision-making about stocks in the organization. The project aligned at providing the management of MPC an accurate report of

stocks in the organization. The project also has the capacity of informing the organization if any goods as fallen below the recorder level, and goods that are in store and the quantity available in the store. The project among other achievement has an efficient security facility, which makes the records highly confidential, using effective password program. An automated stock management system is a computerized method of controlling sales and products in a company. This application will maximize efficiency, reduce labour, and avoid over cost. It will be efficient in tracking goods on a daily basis. The Stock Software will enhance flow of goods, improve customer services and enhance the inflow of cash. The system has categorized into different modules to make the system adapt to the further changes. Every effort has made to cover all user requirements and make it user friendly.

6.2. Recommendation

Future studies should look at the opportunity of implementing a standard procedure for the procurement method as applied in the industry with view minimizing waste in inventory.

Other issues that can further discussed are the ability to integrate the system into faculty website, providing more accessibility to the teachers, students and visitors to acknowledge the inventory status. In addition, better strategies have devised for the faculty and staffs so that a more feasible procedures followed in the procurement practices**.** The researcher recommended that the computerized system should replace the manual system of stock recording and processing in order to speed up managerial decision of the college.

References

Abisoye Opeyemi A.1, Boboye Fatoba2, Abisoye Blessing O3 (2013): Design of a Computerized Inventory Management System for Supermarkets.

Godana, B. andNgugi, K. (2014). Determinants of Effective Inventory Management atKenolKobil Limited. European Journal of Business Management, 1 (11), 341-361.

Mohamed, et.al. (2016). a study on Relationship Between Inventory Management and Company Performance: a Case Study of Textile Chain Store. Journal of Advanced Management Science, Vol. 4, No. 4.

Mwangi, W., & Nyambura, M.T. (2015). The role of inventory management on performance of food processing companies: a case study of Crown Foods Limited Kenya. European Journal of Business and Social Sciences, 4(04), 64-78.

Datta, K.A. 2003. *Materials Management,* 2nd Ed. Prentice -Hall of India PL. New Delhi.

Oballah D. and Waiganjo E. (2015), "Effect of Inventory Management Practices on Organizational Performance in Public Health Institution in Kenya," International Journal of Education and Research, vol 3(3).

Reid, R.and Sanders, R. (2007).Operations Management: an Integrated Approach. New York: John Wiley & Sons.

Singh , D. K.(2013) : A Strategic Tool of Inventory Management". International Journal of Engineering Research and Applications, vol. 3 (2), pp. 133-136,

Silver e (2011), decision system for inventory management and production planning and control, 3rd , New York Wiley.

Sharma, J. K. (2006). Operations Research: Theory and Applications. India: Macmillan Publishers.

Susan, T., & Michael, K. (2000, October 28). "Inventory Management in a Maintenance Environment, ". Research Results Digest-Number 40, pp.1-42.

Tundura,L.(2016): "Effect of Inventory Control Strategies on Inventory Record Accuracy in Kenya Power Company, Nakuru" Journal of investment and Management, vol. 5(5), pp. 82,

Yinyeh M. O, and Alhassan S. (*2013)***,** Inventory Management System Software for Public Universities in Ghana.

Vrat, P. (2014): Materials Management, Springer Texts in Business and Economics, DOI 10.1007/978-81-322-1970-5_2.