THE DEVELOPMENT OF A COMPUTER-BASED STAFF MANAGEMENT SYSTEM

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ABSTRACT
Staff records play a significant role in an organization as it provides information needed to manage their employees’ performance. Many organizations, particularly the government agencies, are still using the conventional methods which are merely paper-based to record the data of their employees, this often results in outright waste of time in generating reports or searching for employees’ records and loss or damage of files. These inadequacies in the conventional method are characteristicallly alluded to for the justification in developing a computer-based staff management system; as it creates and maintains a database of staff records. This paper discusses the development of a computer-based system using C# while the database was designed using MySQL. With this new system in place, it will provide a dependable report of staff profile in support of management planning and decision-making. It will also accelerate the most time-consuming aspects of the organization which is processing and maintaining accurate staff information, secures and provide ways to access to employees’ records.

Keywords: Human Resources, Staff Management System, Record, Database, Development

1. INTRODUCTION
The public and private organizations generate staff records. Staff records play an imperative role in providing the information needed by organizations to manage and pay their staff members, plan their workforce requirements, and monitor staff performance. Ultimately, any organization’s development and sustainability will depend on sound and effective human resource management, and the approaches it chooses to follow will be derived in part from an analysis of the information contained in staff records. The goal of staff records management is to ensure that a complete and comprehensive employment history of each employee is readily available for as long as it is needed, and that the information contained in staff records supports the management, deployment, payment, and development of staff. Other key objectives of staff records management are to support transparency and organizational accountability and to enable accurate audits by creating and protecting human resource records as reliable evidence (Griffin and Hoyle, 2009).

According to Cain et al (1997) organizations need to keep staff information for long periods. For example, retention periods of 70 years or longer for staff files are common in many countries. Thus, staff databases
need to store data about individuals for decades – far longer periods that is typical for most database applications. Moreover, as public records, staff databases come under the responsibility of the national archives if they are selected for permanent preservation (Cain et al, 1997). A lot of government and central agencies with responsibility for HR functions follow written rules and procedures for human resource management. These documents are often printed and issued in compendium editions and are updated regularly. Classically, the rules and procedures address issues such as: general conditions of service, appointments, examinations, discipline, promotions, transfers, performance appraisal, emoluments, training, benefits, loans, leave, travel and transport. The rules may also specify the content and structure of forms used to execute HR processes. With the introduction of computerised systems, there is tendency of not keeping printed rules and procedures up to date any longer but to rely instead on business rules built into the systems; though up-to-date online or printed manuals are still indispensable to guide users through procedures.

The public sector is fundamentally the biggest organization in a country providing employment for numerous populace of her country. Although, some may view a public sector as a single firm while others may view it as consisting of a wide and contrasting variety of bodies varying from ministries and departments to parastatals, local government councils, health and educational institutions and other types of agencies. Some of these government agencies usually have offices all over the states of the federation, each of which will maintain staff records of some genus. All organization employs staff and creates personal records. Staffs are among an organization’s most significant and more often than not most expensive assets. Just like any other asset, staffs are resources that must be deployed to maximum advantage. The role of staff records cannot be overemphasized in an organization as it provides a basis for decision-making in every areas of staff work such as human resources forecasting and planning, recruitment and selection, employment history, education and training, and pay administration.

The conventional method or better still paper-based staff records are still very ubiquitous in government agencies, these are characterized by significant and space consuming categories of records. Although, computer-based staff information systems are becoming increasingly common in the advanced nations and there is an ongoing requirements for records managers to still understand how to manage the paper system because a large portion of staff records will continue to be on paper systems for the predictable future. Also, computer-based staff information systems are unlikely to succeed unless they can build upon an efficient manual system and in some cases a manual system may be the most efficient and realistic option given the resources available. But because of the size and intricacy of the government agencies, the public sectors often bump into extensive problems in maintaining accurate and up-to-date records of its employees. This impenetrability in turn can result in excessive expenditure on one hand and injustice to individual staff on the other hand. The development of staff management systems is increasingly seen as a means of providing significant benefits to the organizations and to individual staff; and the management of staff records can make a vital contribution to this process.

Nevertheless, staff records and information procedures can be managed manually but there is an increasing trend towards introducing computerized systems. It is very crucial to understand that whatever the technology to be used the system must always adhere to the requirements of a good record system; and if an organization is unable to manage its traditional based records it should not move to an electronic environment until the manually controlled one is achieved. On the contrary, computerization inevitably makes record keeping more complex. Human resource management has been undergoing considerable
change over the past few decades, as governments and decision makers have recognised the potential of technology to improve Human Resources (HR) management and information. At the same time, there has been a desire in many public agencies around the world to increase efficiency, reduce costs, save space, improve service delivery and enhance transparency and accountability. The conventional paper-based records systems, even if well organised and complete, cannot easily provide the information government need to manage the public service and to develop policies and plans based on accurate and current data. The expectation is that staff management system will not only improve staff record but will also provide more accurate, consistent and usable information.

1.1 Statement of the Problem
Staff management system (SMS) is a well detailed processing and employees’ management application designed to accelerate the most time consuming aspect of the organization which involves maintaining accurate information and providing update records of the employees. Lagos Waste Management Authority (LAWMA) uses conventional paper based staff system. They keep their employees staff records by filing it on file cabinets. The information of employees that are being kept include service records, appointment of permanent employees, appointment forms, confirmation, accumulated leaves, numbers of absence or tardiness and leave. All these records can efficiently be managed by staff management system where you can inquire into employees’ record at any time the user wants in order to check employment history, accumulated leaves and sickness time, plus variety of staff data such as education, beneficiary and emergency notifications information. But this government agency only makes use of Microsoft Word and Microsoft Excel thereby underutilizing the versatility of computerization. The best way to eliminate the challenges encountered with the use of traditional record keeping system is to design a computer-based staff management system that would allow the users to register basic data in a very simple and easy way. This computer-based system allows the user to process payment checks for all employees recorded in a database with no limit to the numbers of employees and it defines deduction and earnings categories.

1.2 Research Objectives
This study aims at developing a computer-based staff management system for Lagos Waste Management Authority. However, other rationales of the study include the following:
(i) To conduct personal interviews to and distribute questionnaire to gather data needed for analysis and design.
(ii) To design an easy to use system using C#.
(iii) To construct a database using MySQL.
(iv) To design a backup scheme

1.3 Research Questions
This research work will be guided by the following research questions:
(i). Why proposing a Staff Management System (SMS) for Lagos Waste Management Authority?
(ii). How will the proposed computer-based staff management system affect the existing conventional system?

1.4 Significance of the Study
The importance of staff management system cannot be overemphasized in an organization as it helps to assuage the workloads of staff in human resources department. This will also ease processing of documents such as manual generation of reports and employees data. This research will help this organization to
organize staff information by providing a database for easy access, monitoring, controlling and updating their personal information. This research work will computerize the conventional paper-based operations of human resources and management office of Lagos Waste Management Authority (LAWMA) in terms of staff management system. Also, the research work will enable the staff information to be easily tracked for editing staff information. The proposed information system is a stepping stone and a challenge for the researcher to continuously improve their knowledge on research and system analysis, design and implementation. This will also serve as a basis for future system development.

2. REVIEW OF LITERATURE

The governments of most industrialized nations in the world are investing heavily in research programs to address the issues of conventional paper records, but yet there is no comprehensive technical solution. However, a fundamental strategy is emerging that involves refreshing the storage media, migrating the data onto a new hardware and software; and all necessary steps to validate their integrity, authenticity and addressing issues that has to do with the context of the data which preserve the meaning of the data. The objective is to retain the ability to display, retrieve, manipulate and use digital information in the face of constantly changing technology. These strategies require the development of highly specialized techniques which are also often relative expensive. The management of these electronic records is a relatively new issue for developing countries, but the governments are already beginning to address these challenges.

The existing literature on Human Resources and Information System (HRIS) suggests that they have different impacts on HR across organizations; but provides little explanation for this variation. Early surveys suggested that HRIS were used predominantly to automate routine tasks and “to replace filing cabinets” (Martinsons, 1994). Ball (2001) submitted that HR had missed the strategic opportunity provided by HRIS. More recent research shows greater use of HRIS in support of strategic decision-making by HR (Hussain et al., 2007). However, the extent to which HRIS is used in a strategic fashion differs across organizations, with the vast majority of organizations continuing to use HRIS simply to replace manual processing and to reduce costs (Bee et al., 2002; Brown, 2002). The last decade has witnessed a significant increase in the number of organisations gathering, storing and analysing human resources data using Human Resource Information Systems (HRIS) (Dery, 2006; Ball, 2001; Barron et al., 2004; Hussain et al., 2007; Ngai et al., 2006). In this paper we showed that the study of the impact of HRIS is of direct significance to the ongoing debate about the extent to which Human Resources (HR) can play a strategic role in the organization (Dery, 2006; Becker et al., 2001; Hewitt Associates, 2007; Lawler et al., 2003; Sheehan et al., 2006). Specifically, we examine the argument that through its capacity to deliver accurate and timely metrics, HRIS has the potential to assist the HR function in developing business strategy and thus enhancing organizational performance (Barney et al., 1998; Broderick et al., 1992; Gueutal, 2003; Lawler et al., 2004; Lengnick-Hall et al., 2003).

Albert et al (1977) conducted their study when human resources information system (HRIS) was a new concept and just came into the market. They portrayed HRIS as a system useful in planning and accountability of human resources and as a staff management tool too. The authors also specified various modules, advantages and uses of HRIS at that time and future expectations from HRIS in human resource management. Kirstie (2001) explained the dearth of research in Human Resources Information Systems (HRIS) in her work by quoting that the gigantic information system related literature including its implementation, use and impact clarifies that it is a healthy researched area but its implementation with human resource is a scarce. Initially staff systems were developed to stockpile the records and reports allied
with staff administration, but with time call for efficacy increases and thus computer-based HRIS is developed (Khera et al., 2012; Martinsons, 1997).

Beckers et al. (2002) avowed that the main obstruction in the implementation of a HRIS is the sky-scraping cost of setting up and maintaining a HRIS which is in line with Kovach et al. (1999) affirmed that a lack of funds and support of top management are the stumbling blocks in achieving the full potential of HRIS. Due to this obstacle, in order to embrace HRIS operations, it is necessary to make certain that bankers or organizations are agreeable to give their support for setting up a HRIS (Ngai et al., 2006). Apart from these difficulties HRIS has various advantages and the most crucial is the employee retention as employees themselves are crucial for the organization; this is also supported by Beulen (2009) as he contended that an HRIS blunt the edge of staff attrition by providing HR officers with the information they need.

The current generation of HRIS automate and transfer routine administrative and compliance functions traditionally performed by corporate HR departments and can facilitate the outsourcing of HR (Barron et al., 2004). In doing so, HRIS does not only make it possible for organizations to significantly reduce the costs associated with HR delivery, but also to reassess the need for retaining internal HR capabilities. However, HRIS also provide HR professionals with opportunities to enhance their contribution to the strategic direction of the firm. Firstly, by automating and devolving many routine HR tasks to line management, HRIS provide HR professionals with the time needed to direct their attention towards more business critical and strategic level tasks, such as leadership development and talent management (Lawler et al., 2003). Second HRIS provides an opportunity for HR to play a more strategic role, through their ability to generate metrics which can be used to support strategic decision making (Hendrickson, 2003; Lawler et al., 2004; Lengnick-Hall et al., 2003).

3. METHODOLOGY OF THE STUDY

3.1 Design Method
System Development Life Cycle (SDLC) which is a framework that describes the activities performed at each stage of a software development project shall be employed in this study which involves software development. It starts with system analysis, design and implementation, and continues through the maintenance and disposal of the system. The design of this project would be on Windows platform. Web based technologies like HTML, Unified Markup Language (UML), Cascading Style Sheet (CSS), C# Scripting Language, MySQL and Apache Web Server would be utilized in this design. The understanding of database management system (DBMS) and data modeling is very crucial in this study.

3.2 System Analysis
Analysis involves a detailed study of the existing paper-based system, which leads to the specifications of the new computer-based system management system. During analysis, data were collected on the available files, decision points and transactions handled by the present system. Interviews and on site observations were the tools employed for this system analysis of the present system. The system analysis in this research work also includes sub-dividing complex process that involves the entire system, identification of data store and manual processes. The main purpose of analyzing the existing system is to produce clear requirement specifications of the proposed system to be designed.
3.3 System Design
The purpose of this phase is to transform the identified requirement statements into system design specification for construction. At this stage the researcher would be able to construct the initial prototype of interface and database, although this would only be used to discuss the logical flow of operations. The following subject matters are very crucial for discussion under system design:

(i). Design Goals
This describes the qualities of the system that should be optimized. These types of goals are usually derived from the non-functional requirements of the system such as security and user validation.

(ii). System Architecture
The proposed system is to replace the existing paper-based system by a computerized system in all areas. The architecture used for this system is a 3-tier Client/Server architecture where the staff or user can use internet browsers to access the online report provided by the system within the local area network (LAN) of the organization or anywhere using the internet. The data tier maintains the applications data such as staff data, leave credits, travel order etc, and stores these data in a relational database management system (RDBMS). A relational database is the most popular database management system (DBMS) in use today by computers. It stores data in a series of two dimensional tables called relation, which is in tabular form. The middle tier (Web/Application Server) implements the business logic, controller logic and presentation logic to control the interactions between the applications clients and data. The business logic dictates how clients would be able or not to access the application data and how applications would process data. The controller logic processes client requests include request to view staff records, to record attendance or to retrieve information from the database.

Moreover, the web server in architecture is a program that runs on a network server (Computer) to respond to hypertext transfer protocol (HTTP) requests. The commonly used web servers are Internet Information Server (IIS) and Apache. The web server used in this system is IIS. HTTP is a standard protocol for transferring data across the internet and intranet. On the other, the client tier is the application user interface that contains data entry forms and clients side applications. It displays data to the user and it is the interface where the user interacts directly with the application. Also, the client tier interacts with Web/ Application Server to make requests and to retrieve data from the database and then displays the retrieved data from the server to the user.

(iii). Hardware/Software Platform
One of the main tasks in system design is the software and hardware platform required for the application. This system is a client-server application with a system unit in the General Manager Administration office which will be the client. MySQL was used to develop the database for greater and reliable security purposes. This can easily be downloaded from the Internet; consequently there is no need for licensing fee. On the other hand, Microsoft Windows (such as Vista and Windows 7) and Windows 2000 server serves as the operating system. For the hardware requirements, a hard disk with a capacity of 40GB for holding all the files that would be stored; another 40GB mobile hard disk drive is needed as backup. Other hardware requirements are the monitor, keyboard, mouse, printer, Internet access, Pentium 4 GHZ processor and Uninterrupted Power Supply (UPS). All these defined the hardware and software requirements needed to complete the proposed system.
(iv). Database Design

Database design can be used to depict the various parts of the designs of an overall database system. It is mainly the consideration of the logical design of the base data structures that is used to store data. The database deals with how data such as file and database are stored and managed; and it goes beyond a single execution of the system. Information related to staff basic information, assessment form, service records, attendance, leave credits and other related information are persistently stored on a database management system. The database allows all the programs that operate on the staff management system to be consistent and to perform complex queries on a large data set. In practice, there are only few things that can be done with databases which are to view the data, find data of interests, modify the data, add or delete some data.

![Figure 1. Entity Relationship Diagram](image)

The design of database system is far from being a trivial operation as much analysis of the particular application is necessary to determine the data that are required and how they would be linked together. Once this is done, an appropriate database model can then be chosen. In order to store information consistently, the researcher map objects into tables and the attributes into fields to the specific table based on the objects found in the system. Therefore, major tables that will be implemented on the selected database management system (DBMS) would be identified. The DBMS ties together the logically related data in one or more files by using hierarchical structure or relational structure.

A hierarchical database system exhibits a data hierarchical whereby each record is owned by another record, and each member record type can be owned by only one owner record type. With records placed at multiple levels a record at a lower level is subordinate to a record above it. The only way to get to a subordinate record is by entering at the topmost record and working down through the levels until the required record is reached. A relational database is the most popular type of DBMS in use today by computers. It stores data in
a series of two dimensional tables called relation, which is in tabular form. A relation is just a table containing rows (records) and columns (fields) and the referral of one table to another through a common field is also called a relation. These groupings of tables are called relational databases. By and large, there are three types of relationships in a relational database system. These are one-to-one, one-to-many and many-to-many relationships. The design under consideration has one-to-many and many-to-many relationships. The staff and staff records tables have many-to many relationships. And one of the aims of database system is to reduce redundancy for this reason, many-to-many relationships has to be reduced to one-to-one relationship. The table relationship generated in this database is shown in figure 1.

(v). Coding
The system design needs to be implemented to make the proposed system a workable project. This requires coding of design into computer understandable language, which is programming language. The proposed system coding is done by using C#, MySQL, JavaScript and HTML. At this stage, the program specifications of the detailed design are converted into C#, MySQL, HTML and JavaScript instructions. The programs that are generated from these languages coordinate the data movements and control the entire process in the staff information system.

4. PROPOSED STAFF MANAGEMENT SYSTEM
4.1 System Implementation
System implementation is the delivery of fully tested system into production for its daily operation. The purpose of this phase is to smoothly changeover from the old existing system to a new system.

4.2 Installation Requirements
This includes the arrangement necessary in order to secure a site where the computer equipment will be physically placed and a connection to the internet service provider (ISP) or get connected through the VSAT (Very Small Aperture Terminal).
(i). Hardware Requirements
Computer such as an IBM desktop or Dell Laptop which must have the following configurations is required for the installation: Pentium processor (Preferably a Pentium IV), at least 1GB of RAM chip, 40GB hard disk, keyboard, mouse, 14 inch SVGA Color Monitor (for desktop), telephone line or modem and digital camera.

(ii). Software Requirements
The following requirements are needed for effective and efficient implementation of the developed prototype system: An operating system such as Windows XP, Windows Vista, 7 or 8, a central system that will act as the hosting server and runs on MySQL server and also IIS configured on it to host programming languages, WAMP/APP (This software houses the local web server “Apache” and the host database “MySQL”), and an internet browser such as Microsoft Internet Explorer, Firefox, Opera and Netscape Navigator which can be used to view the web application.

5. THE STAFF MANAGEMENT SYSTEM (SMS) LAWMA
Here, the implemented system is described. The way and manner in which the user interacts with the system and some of the results of the interactions with the system as well as the screen shorts would be expressed. The portal site has a number of pages. The Staff Management System (SMS) records, monitors, update
changes in staff information. It also creates and maintains a database of employment status, educational background, work experience, leave credits, service record and user maintenance.

**System Functions**
The following are the main menu and functions of the system with the appropriate brief description of the system.

(i). **Login Page**
When a user starts the application, a login page will be displayed as shown in figure 2 requesting the user to input username and password to login into the login screen shown in the figure below for a user that has already “Signed Up”. If the user types the correct user I.D and password to login screen, the system displays a menu which allows the user to choose menu of the system.

![Login Page](image)

(ii). **Personal Information Form**
This form allows the user to add and edit personal information of the staff.

(iii). **Educational Background Form**
This form allows the user to add and edit educational background of the staff.

(iv). **Work Experience Form**
This form allows the user to add and edit work experience information of staff.

(v). **Leave Form**
This form allows the user to add and edit application of leave of employee.

(vi). **Service Record Form**
This enables user to update status of employment of a staff.

(vii). **User Maintenance**
This allows user to add, edit and delete user accounts.

6. **RESULTS AND OBSERVATION**
The new computerized system is a web based system. The base of the system is a database which stores all the information pertinent to staff. It monitors and updates changes and developments in its profile and management, and statistical reports. It creates and maintains a database on employment status, educational background, staff information, service records and leave credit such as sick and vacation leave. Furthermore, the system generates reports based on defined information needs and also provides reliable statistical reports on staff profile in support of management planning and decision-making. Additionally, with the help of this system human resources can expedite the most time consuming aspects of the organization which is processing and maintaining accurate employee information. The system was developed with menu option for processing staff record, accessing and navigating through the whole system menu.
The result of the findings concluded that most of the research objectives had been met. These include the following.

(i) To develop a computerized staff management system for an agency of the government
(ii) Facilitate the input of data; the system will guide user in the correct order of entering data and by simply clicking the tab allows you to go to the next field
(iii) The system would automatically reports on staff related information such as sign up, application form and leave form.
(iv) The system would provide detailed list of official, casual or contractual staff and permanent staff
(v) Construction of an efficient database management system using MySQL
(vi) Monitoring the actions of the logged in users, log-in-time, date and remarks
(vii) Use of password as a security measured to the database.

7. CONCLUSION AND RECOMMENDATION

By implementing the computerized staff management system will help the organizations to plan their human resources both quantitatively and qualitatively. Being an information system of human resources, it can store voluminous data about the staffs; and assists not only in identifying the occupied and unoccupied position, but also whether the person is fit for the job or not. Other conclusions that can be drawn from the implementation of the staff information system include a healthier human resources decisions, enhanced supervision and control of man power. Also, the system being an automated one aids in reducing various costs such as labour and recruitment cost; and exert outstanding strategic activities such as training and development, succession planning, tracking of applicant recruitment and selection, manpower planning, staff information, attendance tracking, salary planning, absenteeism analysis and work scheduling. At this juncture, it can be accomplished that staff information system is an excellent tool for human resources management as it facilitates in generating primary reports, and important information could be stored and updated automatically.

The Staff Management System (SMS) is recommended for use in Lagos Waste Management Authority as they can be assured of reliability and security of staff information. Also the developed system can be packaged and improved upon to become a generic one that can be deployed for commercial use. To achieve this there will be need to carry out activities such as data test, user acceptance testing, system review and deployment. Albeit, there are some areas that needs further improvement for future researchers. Some of these areas are; since there are always changes and growth in requirements and these would automatically affect every software project, so there is need to timely updates them, updating of assets and liabilities, certifications, organizational and staffing pattern. The documentation processes in this study are also good source of information for further database system development and data analysis for academic work.

8. REFERENCES