

## DESIGN AND IMPLEMENTATION OF AN ONLINE KNOWLEDGE BASED SYSTEM FOR AN ELECTRONIC PATIENT MANAGEMENT SYSTEM.

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### ABSTRACT

*This project title is written to help hospitals in the areas they encounter problems in keeping their attendance scheme for patient and the solution given to tackle problem such as transforming the existing manual attendance scheme for patients system in which the existing problems involved at the time was laziness of the Doctors to work, misplacement of files, excessive loitering around of patient for their files and loitering of paper in the office. This software reports on our pilot evaluation of AN ON-LINE KNOWLEDGE-BASE FOR PATIENT MANAGEMENT SYSTEM and their Doctors. The aim is to improve the quality of care to patient and the information about them, as indicated by an improvement in the effectiveness and efficiency of care and in an increase in patient's satisfaction. This study makes clear that a thorough exploration of users needs before building the system, using qualitative research methods may be crucial because it can prevent data mismatch and maximize the chance that the eventual management system meets its most important aim: to enhance patient's empowerment and improve the quality of care services. In order to handle this, I decided to introduce a new patient management system for patients. The project dwells more on Computer duty schedule. This is implemented with Python programming language and Microsoft Access for effective information keeping.*

### INTRODUCTION

An online knowledge base is the body of questions, answers, documentation, best practices, tips and tricks, in short, knowledge that an enterprise creates, collects and stores over time. The main idea of a knowledge base is to preserve that information long-term and make it accessible both internally and externally.

### Background of the Study

Usage of Information Technology (IT) remained comparatively very less in Health sectors that other sector despite having more potential. Health Institution, which is an important sector, should encourage IT usage resulting better productivity, effectiveness, efficiency and economics leading to better health care of all. This paper tells a success of implementation of ICT (Information Communication Technology) in monitoring of medicine in health institution. System work on low end resources and E-mail (Electronic mail) based data transfer from District Head Quarter to State Head Quarter. Implementation of Med-Centre in all the district of result in checking on pilferage (the act of stealing amounts or small articles) for medicine, increase in availability of medicine at Government institution, increase in

attendance of patients/doctor in health institution, optimal utilization of medicine and data capturing at source, resulting in availability of error-free data at Head Quarter. An online knowledge base for Patient Management System is a certified automated payment processing software. It is used by hospitals to input, process and display their patient information. This system is used to manage and maintain electronic medical records, patient information, prescriptions, lab reports etc. It is an effective tool in the hand of the hospital management.

The Hospital is a very important part of our society and it is imperative for healthcare providers to do their jobs in an efficient and effective manner. Each day hundreds of thousands of patients enter healthcare facilities challenging the administration to run the show smoothly. The employees have to manage and integrate clinical, financial and operational information that grows with the practice. Information technology has made a significant impact on the healthcare sector. The past decade has witnessed the foray of numerous information systems and their resultant products into the hospital scenario. The number of investments in computers and types of hospital systems has increased. This is because paper medical records are cumbersome, bulky to use and difficult to manage. On the other hand digital records are much easier to handle and improve the workflow efficiency by integrating various tasks. The ultimate objective therefore, is to build a network of interdependent centers such as the clinical laboratory, radiology department, pharmacy, and so on in order to effectively meet the needs arising within the hospital. Despite the fact that these individual centers are autonomous, they are interdependent in terms of delivering services and to ensure effectiveness of providing care. All this can be achieved through hospital information systems that have formed the cornerstone of today's modern hospital.

A patient is any person who receives medical attention, care or treatment. The person is most often ill or injured and in need of treatment by a physician or any other medical professional whereas an outpatient is a patient who is not hospitalized for 24 hours or more but who visits a hospital, clinic, or associated facility for diagnosis or treatment. Treatment provided in this fashion is called ambulatory care.

Duty is a term that conveys a sense of moral commitment to someone or something. The moral commitment is the sort that results in action, and it is not a matter of passive feelings or mere recognition. When someone recognizes a duty, that person commits himself/herself to the cause involved without considering the self-interested courses of actions that may have been relevant previously. This is not to suggest that living a life of duty precludes one from the best sort of life, but duty does involve some sacrifice of immediate self-interest. Cicero is an early philosopher who acknowledged this possibility. He discusses duty in his work "On Duty". He suggests that duties can come from four different sources: 1. It is a result of being human 2. It is a result of one's personality place in life (your family, country, and job) 3. One's own moral expectations for you can generate duties

From the root idea of obligation to serve or give something in return, involved in the conception of duty, have sprung various derivative uses of the word; thus it is used of the services performed by a minister of a church, by a soldier, or by any employee or servant. Nurses today have a broad scope of responsibility as health care providers that require them,

under some circumstance, to exercise independent professional judgment. When nurses exercise their judgment negligently, they may be held liable because courts hold them to a correspondingly higher level of accountability. Nurses have been held liable for their failure to monitor and/or promptly respond to patients by informing physicians of significant changes in patient's condition. Under these types of circumstance, nurses have an affirmative duty to exercise their professional judgment to ensure that all adequate steps are taken to treat patients appropriately.

This New Patient Management System is necessary to ensure the medical practitioner to maintain its operations in an organized and well-coordinated manner. These solutions save time and run the operations using the best mechanisms against liabilities. This system is especially helpful in organizing and keeping patient records up-to-date. Patient names, records of treatment and medicine given records are well maintained. Maintaining patient records is really helpful when you are allowed to refer to the patient's old history. Say for example, you want to refer your old patients for mouth cancer or jaw piece ulcers and cancers, you may be able to locate such records on the basis of their symptoms or conditions as you had entered in the database in the past. By law hospitals are required to record in the outpatient information register once at the beginning of the morning session and once during the afternoon whether the pupil is present, absent, engaged in an approved, or unable to attend due to exceptional circumstances as defined in regulation. If compulsory hospital patients are absent the register must show whether the absence is authorized or unauthorized. It must also record the nature of any approved activities. By using this Electronic Patient Management System, the department will provide the patients with convenience and security of having their payment records been stored automatically into the database for further processing. This automated method is the most advanced and least expensive way to maintain and process patient's payment records. If a patient's payment record is not found in the database, definitely that patient's fees have not yet been paid.

### **Statement of the Problem**

Prior to the problem encountered with patient's attitude to their check up and treatment, the nurse's laxity (laziness) over their duties, the need arose to develop software that will be able to solve the problem. The problem caused by the use of manual method of keeping outpatient information and the use of manual method of keeping attendance scheme for patients can only be solved by computerizing the hospital attendance scheme for patients and computerizing the hospital outpatient information system. The problems that this project is set to solve in the manual method of keeping outpatient information are:

1. Improper documentation of patient payment record.
2. Difficulty in retrieving patient payment record.

### **Objectives of the Study**

The primary purpose of this project is to enhance the reliability, security, and convenience in the administration of health services, and to have a database that contains complete and comprehensive details of patient departmental payment records as well as a computer based attendance scheme.

The subsidiary objectives of this project are:

1. To improve checkup and treatment load functionality: Staffing level and appropriate skill-mix per shift can be more easily determined by the shift modules. This leads to less time spent in designing and amending rosters.
2. Better care planning: Time spent on care planning is reducing, while the quality of what is recorded improved. This makes for more complete care plans and more complete assessments and evaluations.
3. To facilitate diagnosis of patients thereby reducing patients wasting time
4. To exploit the use of ICT as a platform for medical services
5. To better drugs administration
6. For better maintenance of duty rosters

### LITERATURE REVIEW

According to David (1992), an electronic based attendance scheme for patients provides the information necessary to begin an effective attendance management program, which will yield long-term results. The electronic based attendance scheme for patients is intended to be a guide rather than an instruction manual or policy. To make an attendance management program truly successful, it will require insight into the special dynamics present in my work place. It will require two-way communication, as both the needs of the employees and of management must be met if good attendance is to be achieved.

Attendance is the responsibility to everyone, especially those who directly manage the human resources of my organization. Attendance is not only an expectation; employers have the right to receive good attendance. Each and every employee has a contractual obligation to attend work regularly. All levels of management must believe in, be committed to, and communicate their expectations of good attendance. If a specific number of sick days are considered acceptable per employee, at best that will be the result. Employees will live up to the expectations that will be set for them. Expectations must be clear to both management programs to get maximum results. Goals must be tangible. Attendance expectations must be clearly communicated and followed.

According to Sandra (2007), the patients' registration regulations govern the admissions and attendance registers that all hospitals must keep. They also regulate the power of special hospitals and maintained hospitals to grant leave of absence. By the law, hospitals are required to record in the attendance register once at the beginning of the morning session and once during the afternoon whether the patient is present, absent, engaged in an approved, supervised activity off-site, or unable to attend due to exceptional circumstance as defined in regulation. If a compulsory patient is absent the registers must show whether the absence is authorized or unauthorized. It must also record the nature of any approved, supervised activities. Reduced patients' absence and persistent absence to treatment and checkup is a vital and integral part of hospitals' and local authorities' work to: Promote patients' welfare and safeguarding. Ensure every patient has access to the full-time to which they are entitled. Ensure that patients' succeed whilst at hospital. Ensure that patients have access to the widest possible range of opportunities when they leave school.

According to Charles Bugger (2000), nursing attendance scheme for patients information system are computer systems that manage clinical data from a variety of healthcare environment, and made available in a timely and orderly fashion to aid patients in improving patient care. To achieve this, most nursing attendance scheme for patients information systems are designed using a database and at least one nursing classification language such as North American Nursing Diagnosis (NANDA), Nursing Intervention Classification (NIC) and Nursing Diagnosis Extension and Classification (NDEC).

Patient Management System, according to Wikipedia.org, An Electronic Patient Management System (PMS) is a comprehensive, integrated information system designed to manage the medical, administrative, financial and legal aspects of a hospital and its service processing. It can be composed of one or a few software components with specialty-specific extensions as well as of a large variety of sub-systems in medical specialties, e.g. Laboratory Information System (LIS), Radiology Information System (RIS) or Picture archiving and communication system (PACS).

An Electronic Patient Management System is essentially a computer system that can manage all the information to allow health care providers to do their jobs effectively. These systems have been around since they were first introduced in the 1960s and have evolved with time and the modernization of healthcare facilities. The computers were not as fast in those days and they were not able to provide information in real time as they do today. The staff used them primarily for managing billing and hospital inventory. All this has changed now, and today hospital information systems include the integration of all clinical, financial and administrative applications. Modern Electronic Patient Management Systems' includes many applications addressing the needs of various departments in a hospital. They manage the data related to the clinic, finance department, laboratory, nursing, pharmacy and also the radiology and pathology departments. The hospitals that have switched to electronic Patient Management System have access to quick and reliable information including patients' records illustrating details about their demographics, gender, age etc. By a simple click of the mouse they receive important data pertaining to hospital finance systems, diet of patients, and even the distribution of medications. With this information they can monitor drug usage in the facility and improve its effectiveness. As an area of medical informatics, the aim of an Electronic Patient management System is to achieve the best possible support of patient care and outcome and administration by presenting data where needed and acquiring data when generated with networked electronic data processing.

### **PRPOPOSE SYSTEM**

It is expected that the introduction of the new system, a lot of positive changes will be noticed. The numerous problem associated with the manual system will be minimized, if not totally put to an end. The hospital staff that previously had difficulties in carrying out their work will now have to appreciate it. Head nurses supervise nursing activities in a variety of settings. While some patient care is usually required, the nursing supervisor's new duties to a

nursing staff, and ensuring that each member of the nursing team is adequately trained. Head nurses are ultimately responsible for the performance of the nurses on their team. This means that they must ensure that nursing records are correctly maintained, that report is correctly given at the shift change, and that equipment and other supplies are in stock.

### **PROGRAM IMPLEMENTATION**

Implementation is the realization of an application or execution of a plan, idea, model, design, specification, standard, algorithm or policy. It is also the realization of a technical specification or algorithm as a program, software component or other computer system through programming and deployment. The purpose of system implementation is to make the new system available to a prepared set of hospitals, patients and medical consultants, and positioning an on-going support and maintenance of the system within the hospital. This entails that all steps would be taken to educate both the primary, secondary and tertiary health doctors etc. on the use of the new system and confirming that all data required at the start of operations is available and accurate, and validating that the functions that interact with the new system are functioning properly.

### **LANGUAGE JUSTIFICATION**

The choice of programming language used in this project work is the PHP. It is a server-side Scripting language usually written in an HTML context. PHP code in a script can query databases, create images, read and write files, talks to remote servers, the possibilities are endless. The output from PHP code is combined with the HTML in the script and the result sent to the user. It is an open source Web scripting language that has joined Perl, ASP, and Java on the select list of languages that can be used to create dynamic online environments. Also, it is well suited to the creation of programs for supporting business operations and it has gained considerable acceptance in various companies and organizations around the world because of its following characteristics:

- It is an object oriented language
- It is flexible. Its flexibility allows modular programming techniques.
- Applications written in PHP are interactive easy to use and understandable.
- It enables input and output statement to function in window statement.

### **HARDWARE AND OPERATING SYSTEM REQUIREMENT**

#### **HARDWARE REQUIREMENT**

The hardware components of a computer system refer to the physical part that makes up the computer system. For an effective operation, the system can be implemented provided the following hardware components are at least met. The following hardwires are required for the efficient work of the system:

1. Storage: 13-20 gigabyte of storage
2. Memory: 128MB of RAM and above
3. Keyboard: Enhanced Keyboard
4. Mouse: Enhanced serial or parallel mouse

5. Monitor:
6. Model: Pentium 580 mml and above

### **SOFTWARE REQUIREMENTS**

Computer software is a collection of computer programs and related data that provides the instructions to telling a computer what to do and how to do it. In other words, software is a set of programs, procedures, algorithms and its documentation concerned with the operation of a data processing system. Program software performs the function of the program it implements, either by directly providing instructions to the computer hardware or by serving as input to another piece of software. The following list of software are needed for adequate implementation of the system

1. Window 7
2. Notepad
3. Anti-virus program (updated)

### **SOFTWARE TESTING**

System testing involves the various activities carried out to uncover possible problems that might still be found in the designed system. Program testing involves the testing of the programs designed to see how they work individually. It also involves the testing of different programs, the system and how they interact with one another. System testing uncovers weakness that was not found in earlier testing normally. This can include system failure. The testing normally starts with low volumes of data to the upper bond. This test is carried by a System Analyst or System Designer. The system as a whole is tested for recovery and fall back after various major features to ensure that no data had been lost during the emergency.

### **UNIT TEST**

This is the process of educating the user on how to operate the system. Orientation is to be organized for the user, to educate them on how the system works. Documentation at the end of this work can be of such help. It also involves all the forms of training given to the user to acquaint them with the way the system works. The system will be used after the users have gone through some series of training concerning how the system works for a unit system.

### **SYSTEM TEST**

At this stage, I wanted to be sure that the format and the language of each documentation organization is in line with the system standard. Test was conducted by the user to ascertain whether the system is working according to its specification. The proposed system was tested by the user during the implementation phase and all the features of the system as required are in place.

## Training

The training of staffs or the medical attendants for the diagnostic system needs to be swift in order to lecture the users the “technical knowhow” of the system. Manuals will be given to all staffs to equip them with the “technical knowhow” of the system

## System Changeover Plan or Schedule

There are three various forms or types of changeover which are as follows:

1. **Direct Changeover:** under this method of changeover, the old system is permanently disconnected and the new system is fully implemented or installed for use.
2. **Parallel Changeover:** in this method of changeover from an old system to a new system, both the old and the new system are allowed to run concurrently over a period of time before the old system is disconnected.
3. **Phased Changeover:** in this method of changeover, the changeover may involve several installations. This method therefore emphasizes the complete and successful installation of one location before advancing to the next location to commence installation.

The kind of changeover is that to be implemented in this kind of system is that of the parallel changeover which allows the old system to work concurrently with the new system before the existing system is dropped and the new system being implemented.

## Maintenance

The accuracy of the program was tested with some varying data. This gives the assurance that the new system has achieved its purpose and objectives. Although, maintenance is ought to be carried out monthly to increase performance of the system.

## Documentation

This has to do with usage of system’s program. This program is an objected oriented. This program is divided into two main sections:

- i. Login menu
- ii. Main menu

### Login menu

This is the first section to be seen when the software is loaded on the screen. It is a menu where the user finds a box with username and password. This menu requires the user to input the right username and password in order to gain access to the main menu utilize the powers of the diagnostic system.

### Main Menu

The main menu is further subdivided in other forms which are as follows:

- i. **Doctors Detail and personal data form:** The doctors detail and personal data form is used to fill in doctors personal data form to accept the doctor as a staff of the hospital as it is been done by the administrator. You must first click to add doctor to generate a doctors identity number automatically before filling other data

- pertaining his qualification before finally clicking on add to ensure it is completely sent to the database.
- ii. **Doctors Appointment Form:** The Doctors appointment form is used to view as well as book an appointment schedule for in and out patients who may want to see the doctor for a routine check up or for an illness both now and in subsequent time at their convenience.
  - iii. **Room Detail Form:** The room detail form is a function of the hospital management. it generates a room identity number automatically when you click on add to register the numbers of rooms available in the hospital and in use by patients before adding it to save it in the database
  - iv. **Ward detail Form:** The ward detail form registers the number of ward in the hospital as there are many types like the Aid ward for Aids patient, Burnt ward for accidental victims and Emergency ward for the critically unconscious victim who may soon be operated upon or need close watch. It also generates identity number automatically before adding it to the database.
  - v. **In Patient Detail form:** The in patient detail form registers the in patients to be admitted in the hospital depending on their cases and consequently register them into their duly ward after filling up their detail as well as clicking on add to send it to the database.
  - vi. **Guardian detail form:** The guardian detail form is responsible for registering and admitting the patients to a ward/room because each patient is entitled to a guardian. The guardian's data are as well filled and sent to the database when clicked on add to generate a new guardian identity number so when matters arise the patient's family can be of reach quickly as possible too.
  - vii. **Discharge Detail Form:** The discharge detail form guarantees that the patient has fully recovered and as well been duly treated. After registering a patient, the patient will get an admission identity number and its presumed discharge date will be filled depending on his recovery speed.
  - viii. **In Patient Billing form:** The In patient Billing form does bill the total amount to be paid by the patient or guardian to the billing department before been cleared to leave the hospital. Charges are made through the medical care or attention given, drugs and accommodation too with the admission identity number for accuracy.

### Summary

The essence of this project work takes a look at the various problems associated with the existing system which are improper documentation, loss and mismatch of patient data, time wastage etc. With all these problems being critically analysed, a solution was embarked on, to eliminate these problems. With the design of this new patient management system such problems are considered to be history, in the sense that this new system is able to provide as well as guarantee the following:

1. Easy documentation.
2. Eliminate loss of payment records.
3. Reduction of time spent during payment.

4. Reduces the number of errors made during calculation.

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