

Designing and Implementation of a Computerized Patient Management System for University Health Service of Federal University Of Technology Akure, Ondo State

T. T., Adebayo^{1*} and M. B. Ilori²

¹Health Information Management, Federal Medical Centre, Owo, Ondo State, Nigeria

²Health Information Management, Federal University of Technology Health Centre, Akure, Ondo State

*E- mail address: adebayott@gmail.com

Submitted: January 15, 2021, Revised: March 17, 2021, Accepted: June 3, 2021, Published: June 28, 2021

ABSTRACT

Hospitals are the key institutions in providing relief against sickness and disease. They have become an integral part of the comprehensive health services in the community, both curative and preventive. Significant progress has been made in improving their efficiency and operations. Effectiveness of a health institution – hospitals or nursing homes, depends on its goals and objectives, its strategic location, soundness of its operations, and efficiency of its management systems. The administrator’s effectiveness depends upon the efficiency with which he is able to achieve the goal and objectives. Some of the major factors determining the effectiveness of a health institution include patient care management and patient satisfaction. Hospitals are very expensive to build and to operate. Administrators and professionals have to be extremely cost conscious. Effective computerized system and procedures need to be implemented to ensure proper utilization of limited resources toward quality health care. It becomes even more important when an in-house medical facility is provided by a university for its employees, as is the case for Federal University of Technology, Akure. Patient care (student and staff) management in FUTA needs fully utilized power of computers in Medicare, whereby network of integrated systems maintaining patient database for the hospital services in the areas of Pathology, Radiology, Medical Research, In-patient Admission and Billing, Medical Stores and Pharmacy are operational. The implementation of the above modules will evolve user-friendly computerized system which are loved and cared by all. This project tries to cover giving an insight to the Hospital Information system which can be implemented at the FUTA health centre and fully utilized to provide quality service. The Computerized system will enable the medics to serve their customers with a smile and to meet the corporate objective set by the University.

Keywords: Computerized Systems; FUTA; Health Institutions; Hospitals

1. Background of the Study

Generally, computer has played an important role in global economy in various ways. The Computer is used in many different fields such as in education for learning, in entertainment industries,

for management, for problem solving and in business etc. Due to its importance it has been recognized world-wide. One of its vital roles is in management systems.

AJOSR Vol. 3, Issue 1. 2021

Hospitals, both public and private, create, receive and maintain records as evidence of their functions, activities and transactions. Any information documented as a result of processes and activities of a particular business is a vital asset of an organization as any other vital assets including finance and human resources. Moreover, records in an organization are a unique and irreplaceable source of information about its work, achievements, and continuity. Record serves as a reliable and an authentic source of information which must retain its originality throughout its use. Dikopoulou et al., (2010) pointed out that organizations keep their records to promote accountability and also are important in the planning and decision making processes. Kemoni and Ngulube (2007) opine that an effective records management programme is a key component of any public sector for efficient and enhanced service delivery.

Service delivery is important to both public and private organizations. Arries, Ebin and Newman (2008) assert that service delivery has become an increasingly important concern of public healthcare services. The authors maintain that healthcare service delivery can be measured by reliability, responsiveness, courtesy, customer orientation, confidentiality, and caring. To promote efficient healthcare service delivery, healthcare facilities need to create people driven services that are characterized by quality, equity, timeousness and a strong code of ethics (Arries, Ebin and Newman, 2008). Records management is vital to service delivery by any institution or organization. Kemoni and Ngulube (2007) pointed out that misfiled and lost records are likely to delay the service delivery and hence dent the image of any service provider. Today in health services, management of patient records requires a process and keeping of records from different departments in the hospital. All these records are very vital information needed by the organization for efficient and effective operation.

Patient Management Systems (PMS) are extensive, coordinated information systems designed to manage patient's data in hospitals with the administrative process. Health care centres depend on patient

Adebayo and Ilori (2021)

information, for the efficient of administrative process, for better management. The principle objective of PMS is to streamline the stream of data from the hospital towards decision making for patient planning and management in an enhanced and effective ways. Recording of data, be it medical, individual, money related or lawful, or recording of medicinal faculty data on paper is at danger of thieves, fire, mislay by the staff and even altering the content. A Computerized PMS will be important in light of the fact that, there are a considerable measure of challenges in keeping up a lot of data on paper, particularly as there is usually no backup for the data, access to data can be tedious in the event that require for the search of a file, and accuracy is required in the recording of key data, and the administrator cannot manage all that is composed on the tremendous measure of paper to be utilized. Hence, it is very important for health organizations like hospitals and clinics to have a computerized patient management system.

There are various clinic administration applications, open source and non-open source, yet they are generally hard to modify or restrictive and immoderate, and their plans are not promptly accessible for upgrades. The aim of this project work is, to design and implement a patient record management system that would upgrade data integrity, avoid translation slips by minimizing the risks of wrong documentation, decrease duplication of data, avoid the risk of pilferage as related information would be promptly accessible electronically, and keep records of in and out patients.

Effective management of data in organization is important for the ideal upkeep and development of that organization. Management of data in health organization can in some cases be the difference between life and death. Hospitals will benefit from the proposed system.

Medical Records

A medical record is an important document that is used by healthcare institutions and practitioners to record patient history, illness, and treatment (Mogli, 2009). A medical record is created as evidence of an interaction between a patient and

AJOSR Vol. 3, Issue 1. 2021

healthcare personnel during a patient's visit to a healthcare facility. The interaction may involve, among other things, the recording of information about a patient's biographic data as well as temperature, blood pressure, and diagnostic test results. It also may document operations and other forms of treatment. Steward (2005) points out that medical records form an integral part of healthcare service delivery as they contain critical information whose primary purpose is to facilitate continuum of care and treatment of patients.

Management of medical records

The management of medical records has a long history. For a long time medical records have been in paper format. However expansion in the healthcare service delivery has seen paper format becoming more problematic. In the United States of America (USA), for example, the amount of patient information on paper and the lack of a central storage system led to large volumes of medical records being stored in various locations. It was also noticed that the storage often had fragmented, inaccurate, incomplete, duplicative, and poorly documented information (Steward, 2005). According to Syed-Mohamad et al. (2010) in Malaysia the paper-based records had problems in communicating essential information necessary for quality and efficient patient care. The filing system created problems in retrieving medical records. In Hong Kong the paper based medical records posed some challenges of retrieval and sharing of patient medical information due to lost and misplaced records (Ting et al., 2011a). To overcome problems associated with paper based records many countries, especially in the developed world, adopted the use of information technology for better and effective use of medical information to improve healthcare service delivery (Al-azmi et al., 2009). An initial data or information received and stored at the initial stage is called record. Records Management is the discipline of professional or their practice of governing and controlling the most vital information throughout the records life cycle for the organization. Unarguably, the provision of quality healthcare service cannot be delinked from, among other things, sound records management

Adebayo and Ilori (2021)

programmes. Kemoni and Ngulube (2008) opine that there is a direct link between effective records management and enhanced service delivery, hence good record keeping is the key to enhanced public healthcare service delivery. This then suggest that for the organization to render quality and efficient service to its users need to have good record keeping system. Hospitals just like any other organization has to adopt the effective records management system for the quality healthcare service delivery as the medical records have a direct link to the delivery of healthcare services.

Most hospitals today still keep the manual method of operating (paper and pen) and strategies for keeping records. This procedure may include use of printed forms that incorporate all the important fields for the medical process of medical department, the development of computerized world and the presence of modern day devices which work at high speeds recommend that this manual method can be enhanced and be more productive. Digital advancements of this methodology can reduce expenses, enhance patient safety and increase the pace of the manual method, thereby making it more proficient.

The University Health Service (UHS) of Federal University of Technology Akure as a case study uses manual process in gathering data and managed their patients, which in some cases they encountered loss of patients files, the card unit where the patients files are being stored are not well arrange because of multiple patient files. Implementation and uses of Computerized Patient Management System in Federal University of Technology Akure Health Services will provide a lot of benefit to the staff and management.

1.2 Statement of the Problem

Patient records is vital information that involves recording information, images generated based on fact, signs, and history of patient record and treatment received, which is of legal, confidential that makes it possible to have communication among members of the hospitals team and the continuity of the care given to the individual. The current paper based records is faced with several problems. These include lacked of uniformity

AJOSR Vol. 3, Issue 1. 2021

across departments and patient information was captured differently. Similar problems were experienced in many countries which include Kuwait where the study by Al-azmi et al., (2009) revealed that records officers took time in locating records. Other shortcomings include difficulties in retrieving files during routine and emergency services, long queuing during registration, poor documentation, poor communication between staff and patient among others. In addition, leveraging electronic data from numerous sources and integrating it into a centralized repository can help improve the quality and consistency of patient care delivery (Bochantin, 2011). The project therefore wishes to propose solutions to these problems for efficient and effective health service delivery

1.3 Aim and Objectives of the Study

The aim of this study is to design and implement a Computerized Patient Management System for University Health Service of Federal University of Technology Akure, Ondo State.

The specific objectives of this project work include the following

- I. To review and analyze the existing manual process of registration.
- II. To design a computerized Patient Management system.
- III. To implement the designed system.

1.4 Significance of the Study

Presently the University Health Service (UHS) of Futa operates on a manual records system; with the implementation of this project work, the benefits listed below will be achieved;

- I. It will provide security i.e. adequate security to loss of patient file to those that are directly involved so that information will not be divulged.
- II. It will reduce queuing during registration
- III. It will enhance, improve and ease medical services.
- IV. It will minimize the use of paper in making records.

Adebayo and Ilori (2021)

- V. It will reduce the cost of money spent on purchasing written documents like paper, pen, files printing of patient card etc.

Literature Review

Patient Management Systems (PMS) are extensive, coordinated information systems designed to manage patient's data in hospitals with the administrative process. Health care centers depend on patient information, for the efficiency of administrative process, for better management. The principle objective of PMS is to streamline the stream of data from the hospital towards decision making for patient planning and management in an enhanced and effective ways. Recording of data, be it medical, individual, money related or lawful, or recording of medicinal faculty data on paper is at danger of thieves, fire, mislay by the staff and even altering the content. A Computerized PMS will be important in light of the fact that, there are a considerable measure of challenges in keeping up a lot of data on paper, particularly as there is usually no backup for the data, access to data can be tedious in the event that require for the search of a file, and accuracy is required in the recording of key data, and the administrator cannot manage all that is composed on the tremendous measure of paper to be utilized. Hence, it is very important for health organizations like hospitals and clinics to have a computerized patient management system.

2.3 Electronic Medical Record Contrast with Paper-Based Record

An electronic medical record (EMR) is a computerized medical record created in an organization that delivers care, such as a hospital and doctor's surgery, Perlin JB (2006). Electronic medical records tend to be a part of a local stand-alone health information system that allows storage, retrieval and modification of records.

Paper based records are still by far the preferred method of recording patient information for most hospitals and practices in the U.S New England Journal of Medicine, (March 25, 2009). The majority of doctors still find their ease of data entry and low cost hard to part with. However, as easy as they are for the doctor to record medical data at the point of care, they require a significant amount of

storage space compared to digital records. In the US, most states require physical records be held for a minimum of seven years. The costs of storage media, such as paper and film, per unit of information differ dramatically from that of electronic storage media. When paper records are stored in different locations, collating them to a single location for review by a health care provider is time consuming and complicated, whereas the process can be simplified with electronic records. This is particularly true in the case of person-centered records, which are impractical to maintain if not electronic (thus difficult to centralize or federate). When paper-based records are required in multiple locations, copying, faxing, and transporting costs are significant compared to duplication and transfer of digital records. Because of these many "after entry" benefits, federal and state governments, insurance companies and other large medical institutions are heavily promoting the adoption of electronic medical records. Congress included a formula of both incentives (up to \$44K per physician under Medicare or up to \$65K over 6 years, under Medicaid) and penalties (i.e. decreased Medicare/Medicaid reimbursements for covered patients to doctors who fail to use EMR's by 2015) for EMR/EHR adoption versus continued use of paper records as part of the American Recovery and Reinvestment Act of 2009. One study estimates electronic medical records improve overall efficiency by 6% per year, and the monthly cost of an EMR may (depending on the cost of the EMR) be offset by the cost of only a few "unnecessary" tests or admissions, Perlin JB 17(2006). Jerome Groopman disputed these results, publicly asking "how such dramatic claims of cost-saving and quality improvement could be true". Hartzband (2009). However, the increased portability and accessibility of electronic medical records may also increase the ease with which they can be accessed and stolen by unauthorized persons or unscrupulous users versus paper medical records as acknowledged by the increased security requirements for electronic medical records included in the Health Information and Accessibility Act and by recent large-scale breaches in confidential records reported by EMR users, Institute of Medicine (1999). Concerns about security contribute to the resistance shown to their

widespread adoption. Handwritten paper medical records can be associated with poor legibility, which can contribute to medical errors. Pre-printed forms, the standardization of abbreviations, and standards for penmanship were encouraged to improve reliability of paper medical records. Electronic records help with the standardization of forms, terminology and abbreviations, and data input. Digitization of forms facilitates the collection of data for epidemiology and clinical studies. In contrast, EMRs can be continuously updated (within certain legal limitations). The ability to exchange records between different EMR systems ("interoperability") would facilitate the co-ordination of healthcare delivery in non-affiliated healthcare facilities. In addition, data from an electronic system can be used anonymously for statistical reporting in matters such as quality improvement, resource management and public health communicable disease surveillance, Judy (2006).

System Analysis and Design

In the system analysis, the total set of functional and non-functional requirements are defined. The issues of why the system is needed, what the system will do, and how the system will be accepted is clearly separated. The software piece that meet the requirement and the framework into which this piece fix to act as working whole are clearly defined. The products of design describe such thing as software module, data passed and shared among modules, and database organization.

Objectives of the Existing System:

The hospital management information system is one of the major sub-systems that make up the FUTA health centre recognized in the country. It was created for reintegration of patients into community.

Problems of the Existing System: There are many problems affecting the effectiveness and efficiency of the current system, here are some basic problems identified.

- Delay in production of patient information.
- Duplication and omission of names.
- Late submission of list.

- Poor communication between parties involved.

Elimination of Duplication of Error

The new system will provide room to eliminate the duplication problem.

Proposed New System

With the investigation carried out on the existing system and having identified various operational and logical problems, it is suggested that a new system is necessary which would transform the FUTA health centre from a largely paper work-based organization to one that leverage on real time information technology to achieve operational efficiency (Figure 1). The proposed system must be able to fulfil the following;

Accuracy

The problem of inaccuracy and data error be easily checked and corrected.

High Speed Of Processing

The new system should be able to analyze and process the data within a very short period of time to eliminate the problem of delay, since the new system will be automated (Computerized).

Flexibility

The new system will provide a conducive environment for more with less boredom. It will be user friendly and produce a comprehensive output.

A network system is proposed for the system. In view of this, data access shall be controlled and protected. This approach is proposed to ensure the integrity, confidentiality, and authenticity of data being transmitted within the network. Each user shall be granted access privilege subject to their protection attributes. In proposed system, the keyboard and the disk are the input media. This implies that input into the system shall be at the keyboard by the user directly from the input file stored on the disk. When inputs are read, they are processed and stored in a database file for future retrieval and use. The output media could be either the visual display unit of printer depending on the choice of the user

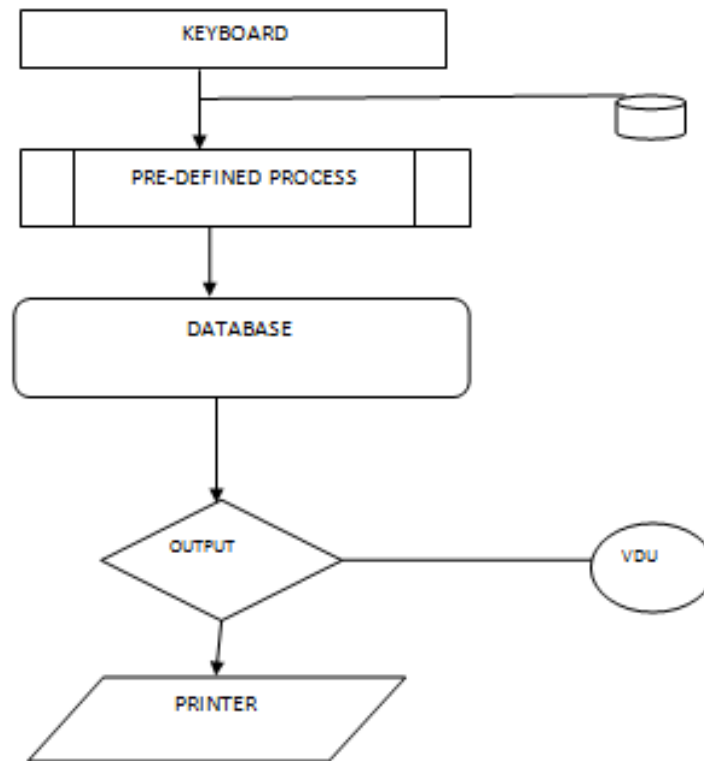


Figure 1: Flowchart for the new proposed system

Design of Proposed System

In the design of hospital management information system, three important issues of the practical implementation of the system that are addressed are:

- The data constraints.
- Information requirement for the system.
- Data formatting for organization.

The Data Constraints

A database model defines the rate that binds the logical relationship and constraint among data; it gives adequate interpretation of the meaning of data and how they are being used. In the real sense, the constraints binding on the system can be classified into two main categories namely;

- Integrity constraint
- Semantic constraint

Integrity Constraint

Integrity constraint is concerned with area of the system that is applied to individual. They also concerned with rules that bind the value of data.

A Semantic Constraint:A semantic constraint is concerned with the rules that bind the meaning of data with a view of reflecting the naturalness of data representation. Database rules provide the mechanism that enforced data integration and enforcement of standard and central control.

The semantic of the operational data of hospital management information system are spelt out below.

- Registration cannot be made twice.
- A case number is allowed for a patient and two cannot have the same case admission card number.
- The users of the system must be dully authorized and code, report code, and password must be assigned to them before they can make use of the system.

Formation Requirement for the System

This is the software requirement for the system. It is an abstract description of the services is expected to provide in order to operate under the constraint mention above. It specifically specifies the external behaviors of the system and is concerned with design characteristics.

Data Formating and Organization

After determining the data for the hospital management information system, this data will be formatted and organized into tables. Formatting the data simply involves determining the data type of each patient, whether numeric, character, variable character, integer value etc. in organizing the data the tabular format was used in which case the data type and size of each data are defined during tables creation.

Design of the Proposed System

System design activity focuses on the decomposition of the system into modules. The aim is to produce software structure that implement the function expressed in the system specification. This activity no doubt involves a planning and skillful conception of the software product. This is true because the software developer would need to have a conceptual view of the system, identify the internal processing functions, as well as specifying the algorithm that implements the functions. In realization of the design objective, therefore, the researcher focuses attention on two aspects of software design:

Architectural and Detailed Designs

Detailed Design

Detailed design is connected with the specification of algorithms that implements the functions and the actual interconnections among functional and data structures. A function is designed in terms of their inputs and output at each level of the hierarchy. While describing a function, emphasis is the description of what is done rather than how it is done. The input-process-output of HIPO is a good tool for documenting detailed design of a system. For each box in the hierarchy, an equivalent input-process-output is developed. At this

level of design, the HIPO may contain structure English (Pseudo-code) statements to explain complex logic.

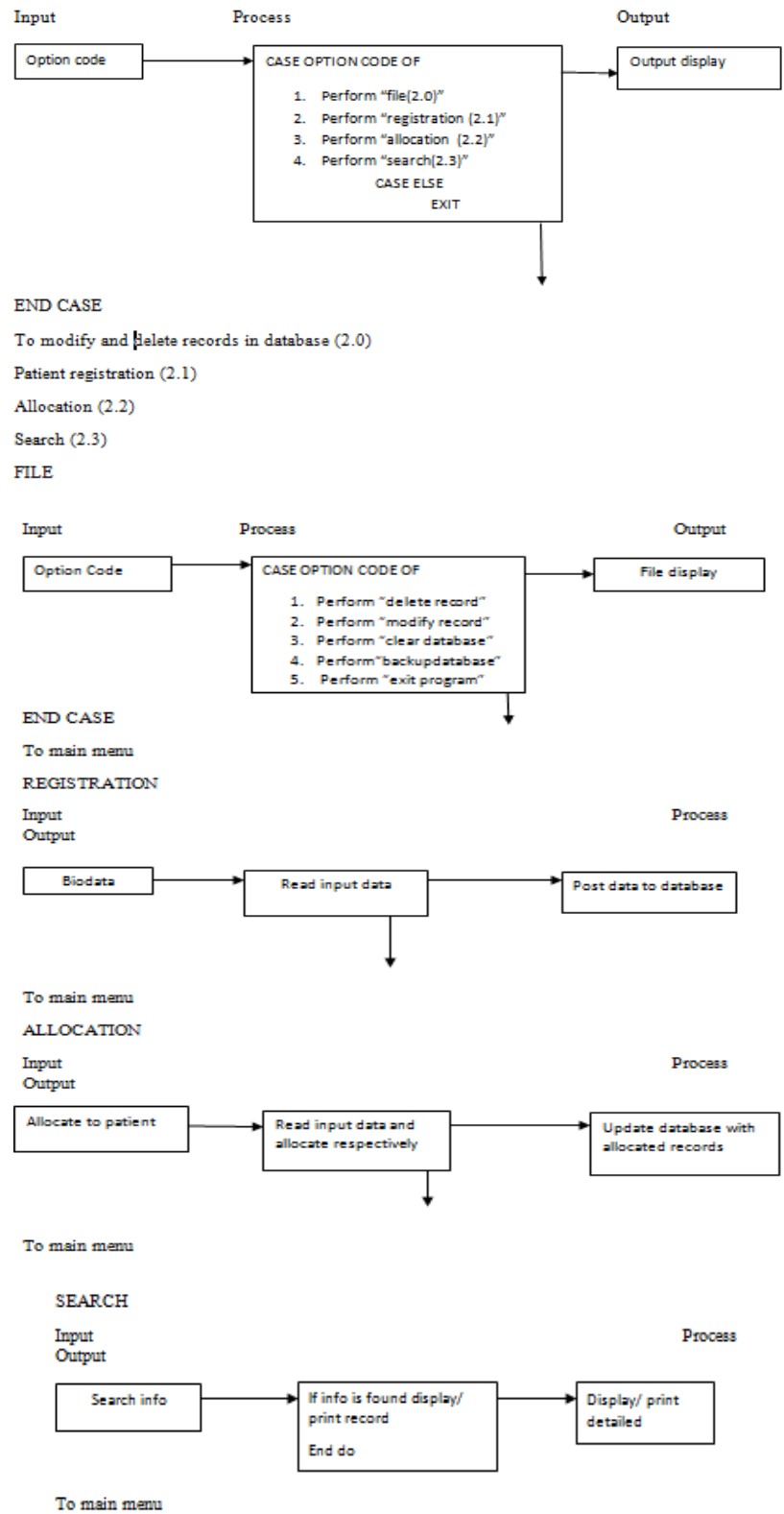


Figure 2: Flowchart of HIPO system

Input Form Design

In the system I have form designed, which are respectively for patient registration that is to add record into the database.

The interface below is the user interface where she/he logs in with the aid of password, if the password is incorrect, the access is denied.

Implementation, Documentation and Testing

System implementation is a crucial phase in software development and address issue of programming language syntax, coding, internal documentation, testing and debugging, other languages also addressed include training and conversion. Most of these activities are not done in sequence, in the most often they occur simultaneously. However, each of these activities is discussed.

Language of Implementation

The system is implemented on the platform of Visual Basic (Version 6.0), an Object Oriented Programming language. Visual Basic is an easy to use programming language. Visual Basic is an easy to use programming language with enhanced human-Computer interface. Its interface is similar to that provided by window application and thus any user already familiar with windows can easily handle VB application.

Database manipulation is another powerful feature of VB that attracted researcher for considering it as a candidate for this project. VB has very rich facilities for manipulating database as well as data shearing in network environment. This feature satisfies the mass storage requirement of the new system-maintaining management information on Computer.

VB also allow for scalability, a feature which support incremental delivery. The intention of the researcher is to produce a prototype copy of the software which will later evolve to the final product. Scalability therefore satisfies this need as addition of model can be made without destroying the structure of the application. With scalability, many version of the software can be release at different times.

Documentation

Code readability was a major concern of the developer. To ensure this vital quality, symbolic names were used throughout the program. Name that suggests their content was used. The prefixes show that it is a text box control. Prefixes were used throughout indicate to indicate the type of object used. The use of symbolic names was intended to improve documentation of the software and to ensure code readability. Comments were also used to improved documentation of the program. Good commentary no doubt makes the program intelligible to person other than the developer to enhance readability. This is evidenced by the way control statements were structured throughout the program. This style of code arrangement enhances debugging of the program.

Training

All categories of users shall be properly trained to use the software. The training shall be in three parts; top-level, mid-level and lower-levels. Top-level training is that given to the Chief Medical Director and Head of Department. A one to one training shall be given to this category. The mid-level consists of nursing staff, while the lower-level consists of medical recorder/ computer operators. The mid-level and lower-level shall be given group training due to their large number.

System Coding

This is the act of writing Computer codes in other to carry out the system requirement. Codes are series of command written to make the system do what you want it to do. Such collection of code is called program. The aim of system coding is to accomplish the objectives that were aforementioned during system analysis. The coding which was carried out in VB 6.0 was done using modular design; a method where the system is broken down into functional unit known as modules (called procedures in VB) and each module developed separately.

System Compilation and Debugging

Compilation is the process of translating the source code, (that is the programming language

AJOSR Vol. 3, Issue 1. 2021

code) into its equivalent object code (machine language). The process of correcting error encountered during compilation is known as debugging. System compilation and debugging occurs simultaneously in VB, in which each module was checked separately for validity.

System Testing

System testing involves test run of the integrated program (system). A complete life data was used to run each program. This sample data was adequately enough to test all aspect of the program in other to guide against program explosion in later years of the system implementation. Testing activity spans throughout the development of the entire program. Testing in the small strategy was adopted. The addresses testing of individual modules. While ad opting the strategy of testing in the small; a particular preference was given to black box testing approach. Black box testing also called functional testing involves testing a piece of software without relying on the way it has been designed and coded but solely evaluates result on the basis of the specification. Put differently, black box testing is based on the definition of what a piece of program is expected to do (i.e. on the program specification), rather than on it is structure.

Implementation Requirement

The following are the hardware requirement of the hospital management information system.

- 32 bit- x86-based microprocessor.
- VGA
- 16MB RAM
- Hard Dick with minimum 450 disk space

Adebayo and Ilori (2021)

- A CD-ROM drive
- A printer that supports 80 columns printing page.
- A keyboard.
- Mouse.

Software Requirements

The operating system (OS) required running the package is either Window 95 or 98 since they offer 32-bit multi-tasking capabilities. The hospital management information system interface with this OS for effective memory management while in operation.

Installation Procedure

- Put on the system and from the window taskbar, click on the start button.
- Click on “run” from the main menu display.
- Type a:/setup.
- Press enter or select OK.

Starting The System

This section presents how to start the software it has been installed. To start it after booting the system, point to start and to program, locate the program icon and click.

After a while, the system welcome screen will appear and stay for some seconds. Then we have the user login form asking you to enter your password and name, after which press “enter” key button. If the user password is valid the main mean appears, else are error messages, invalid password will displayed and the system will allow for a second trial.

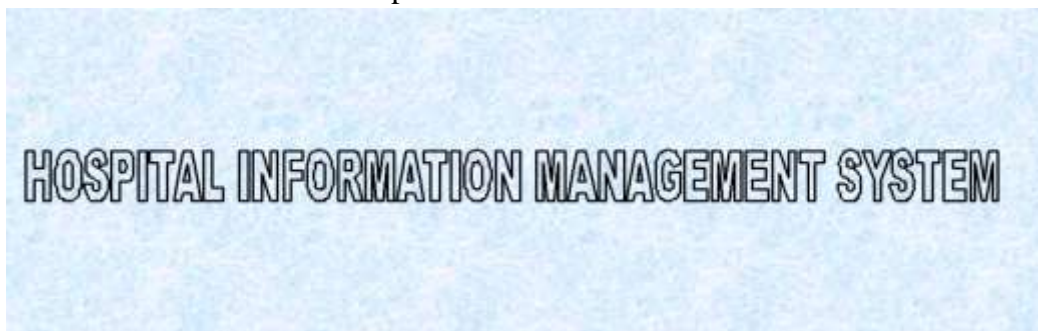


Figure 3: Hospital Information Management Systems

Conclusion and Recommendations

The summary of major achievements of this project work is presented in this chapter; also the recommendations for future development are given as well.

Conclusion

The role of computer in our day to day activities cannot be over emphasized as it plays a very important role in improving efficiency, reducing mental and physical efforts, increasing productivity and overall output. Certainly, Computers with their intrinsic power can play a major role in a hospital. It can act as a communication link between departments and allows the common database to be shared by them. They can perform the complex task of matching, tabulating, calculating, retrieving, printing and securing the data as required. Well designed, integrated Computer system can be a great tool in the hands of the hospital management in improving services, controlling cost, and ensuring optimal utilization of facilities.

Hospital management information system was developed in order to curb the problems faced with the manual approach of the existing FUTA health centre. Visual Basic 6.0 was used in developing the system due to the fact that it is an object oriented programming tool which is user friendly, provides a graphical user interface (GUI), menu driven, into active and simple to run.

The aims and objectives of the system were realized after much effort and time had been put into the development.

Limitations

The scope of this project is limited to the hospital management information system of the health centre of Federal University of Technology, Akure.

Recommendation

It is recommended that the management (which is currently operating on its manual approach system) switch to the newly designed automated system. Secondly, the users of the system should be well trained before using the system. And thirdly, other

Adebayo and Ilori (2021)

areas of management practice not covered by this project should be considered

Reference

Adesina, A.O. 2011. Ensuring the security and privacy of information in mobile health-care communication systems. *South African Journal of Science*.

Al-azmi, S.F., Al-enezi, N. & Chowdhury, I., 2009. Users ' attitudes to an electronic medical record system and its correlates: a multivariate analysis. *Health information management journal*.

Andersson A., Vimarlund V., Timpka,. A. Andersson, V. Vimarlund, T. Timpka (2002): Management Demands on Information and Communication Technology in process Oriented health care Organizations. *Management in Medicine*:

Arries ,Ebin J. and Newman, O., 2008. Outpatients ' experiences of quality service delivery at a teaching hos- pital in gauteng introduction and problem state- ment. *Health SA Gesondheid*.

Bleich, H.L. & Slack, W. V., 2010. Reflections on electronic medical records: When doctors will use them and when they will not. *International Journal of Medical Informatics*.

Bless Claire, Higson-Smith Craig, A.K., 2006. *Fundamentals of social research methods: an African perspective*, Claremont: Juta.

Bochantin, F. (2011): "HIM Expertise Critical for the Advancement of Quality and Patient Safety Initiatives.

Carayon Pascale, Smith Paul, HundtSchoofs Anne, KuruchitthamVipat and Li, Qian. 2009. Implementation of an electronic health records system in a small clinic: the view point of clinic staff. *Behavior& Information Technology*.

Chachage, B. &Ngulube, P., 2006. Management of business records in Tanzania: An exploratory case

AJOSR Vol. 3, Issue 1. 2021

study of selected companies. SA Journal of Information Management.

Chikuni, R. & Mnjama, N., 2010. Management of medical records at gwanda provincial hospital , Zimbabwe. Mousaion.

Clayton P.D, van Mulligen E. (1996): The Economic motivation for clinical information system, In: JJ Cimino (eds), J Am Med Inform Assoc, Proceedings Annual fall Symposium: Datapro Research Corporation, Delarn, NJ 08075, USA: Application overview: Medical and healthcare.

Cramp, D.G. & Carson, E.R., 2001. A model-based framework for assessing the value of ICT-driven healthcare delivery. Health Informatics Journal.

Denzin N.K., Lincoln Y.S.: Entering the field of Qualitative Researchers Ur: (red) Denzin, Lincoln:

Dikopoulou, A., Mihiotis, A. & Dikopoulou, A., 2010. Records Management: A Key Element for Effectiveness, Accountability and Development in the Greek Public Administration Records Management: A Key Element for Effectiveness, Accountability and Development in the Greek Public Administration. International Journal of Public Administration.

Eike-Henner, K.W., 2001. The ethics of electronic patient records, New York: P. Lang.

Flarey D.L., (1995): Redesigning nursing care delivery, Philadelphia: J.B. Lippincott company.

Gilliland, A. & McKemmish, S., 2004. Building an infrastructure for archival research,

Gorman, G.E and Clayton, P., 1997. Qualitative research for the information professional: A practical handbook, London: Library Association.

Greenes R., Lorenzi N. (1998): Audacious Goals for Health and Biomedical Informatics in the New Millennium.

Henriksen E., (2002.) Understanding in Health care Organizations, Uppsala.

Adebayo and Ilori (2021)

Jain Vipul: Director kale consultants pvt Ltd. Bombay: Computers in health care.

Kaplan R.S., Norton D.P., (1996) Translating strategy into action the Balanced Scorecard, Boston, Harvard Business School Press.

Overhage JM, Perkins S, Tierney WM, McDonald CJ. (2001): Primary care internal medicine practices.