

**DESIGN AND IMPLEMENTATION OF DATABASE MANAGEMENT SYSTEM
FOR STUDENT'S REGISTRATION**

BY

SALIHU, Abdulrasheed

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**DEPARTMENT OF EDUCATIONAL TECHNOLOGY
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA**

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ABSTRACT

The study designed and implemented a database management system for student's registration. This study became necessary due to time consuming manual process of manual registration. The study employed experimental design. Fifty (50) students from the Department of Educational Technology. The experts validated the instrument Educational Technology Work Efficiency Test (ETWET). Three research questions were answered and one hypothesis was tested. The researcher designed the database management system using HMTL, PHP and MySQL programming languages and successfully implemented the system on 25 students who formed the experimental group for the study. The data were analyzed using mean, standard deviation. The results revealed that students who made use of the database management system had better work efficiency than students who made use of the manual registration method; The mean scores were higher for students who made use of the database management system; there was significant difference in the work efficiency mean score of students who made use of the database management system. Based on the findings and implications, it was recommended amongst others that seminars, conference and workshops should be organized and put in place for the teachers on the use of Database Management System

CHAPTER ONE

1.0

INTRODUCTION

1.1 Background to the Study

The use of ICT tools has reshaped the work place and fostered proficiency and efficiency in the handling of tasks (Prasad, 2018). Information and communication technologies (ICTs) are one of the most important driving forces promoting economic growth in the economy. However, there is less of a consensus among economists on whether the impact of ICT also stems from higher total factor productivity (TFP) growth and improved efficiency of production (due to a better educated population) (Aristovnik, 2012).

Information and Communication Technology (ICT) can be defined as all communication technologies, including the internet, wireless networks, cell phones, computers, software, middleware, video-conferencing, social networking, and other media applications and services enabling users to access, retrieve, store, transmit, and manipulate information in a digital form (Christensson, 2010). ICT can also be referred to as the convergence of media technology such as audio-visual and telephone networks with computer networks, by means of a unified system of cabling (including signal distribution and management) or link system. ICT can be defined as “anything that allow us to get information, to communicate with each other, using electronic equipment” and permitted adopting a flexible, constructivist learners friendly and multi-perspective approaches to teaching learning process which is essential for creativity, leadership and scholarship leading to total development of human personality and in responding appropriately to the challenges (Kumar, 2015). Witte and Rogge (2014) observed that ICT infrastructure investments in educational institutions have been one of the key priorities of education policy during the last decade.

ICT has been identified to drastically reduce teacher's workload and administrative burden (TheHeadTeacher, 2018). ICTs in schools are used mainly to increase access to and improve the significance and quality of education. Aristovnik (2012) observed that in some country's schools have embedded ICT into the curriculum, and demonstrate high levels of effective and appropriate ICT use to support teaching and learning across a wide range of subject areas. However, in other countries schools are in the early phase of adopting ICT, characterised by important enhancements of the learning process, some developments of e-learning (ICT-enabled learning), but without any profound improvements in learning and teaching (Aristovnik, 2012). One puzzling question concerns the effective impact of these technologies on educational outputs and outcomes.

As ICTs are being increasingly used in education, indicators to monitor their impact and demonstrate accountability to funding sources and the public are ever more needed. Indicators are required to show the relationships between technology use and educational performance. There is also a need to show that education should be seen as using technology not only as an end in itself, but as a means to promote creativity, empowerment and equality and produce efficient learners and problem solvers (Aristovnik, 2012). Ghavifekr et al. (2013) noted that Information Communication Technology (ICT) plays an important role in enhancing the quality of education. Administration and management applications of ICT are currently popular in schools due to its capabilities in facilitating administration activities from data storage to knowledge management and decision making.

ICTs have demonstrated the prospective to increase the options, reach, involvement, and achievement for all students. The speed and general accessibility of various information because of ICT, provides educational opportunities to all. ICTs have the prospects to enhance the educational experience for students who live in rural locations, have physical disabilities

and for those having special learning needs. In sub-Saharan Africa, with countries like Nigeria not been an exception, ICTs have been resorted to promote primary and secondary education (Burns, 2019). This is supported by Kayisire and Wei (2016) that noted that during the last two decades, most developing countries (including African nations) have demonstrated a significant improvement in information and communication technology (ICT) adoption and usage. Sanchez and Aleman (2011) encouraged the integration of ICT in every area where it is possible, with the aim objectives of increasing access to learning, providing equal educational opportunities for all and ensuring lifelong learning. Razak et al. (2019) argued that the major role of ICT tools is a means to communicate and collaborate in a globalized, technological world in the knowledge society. In education, the role of ICT is paramount, especially for supporting teachers in ICT integrated teaching.

We need to have a proper and well laid down ICT architecture that can provide strong technology framework for e-government initiatives. It should lay down the design imperatives and constraints each project must adhere to and ensure that various projects and initiatives are interoperable and capable of being combined in a logical and cohesive manner to add value to each other. It should ensure that the architecture components are extensible and scalable to adapt to the changing environments.

ICT architecture encompasses the following components the application-software application, which includes database programmes, word processors and spreadsheets, Information-processed data, the groupware- also known as collaborative software, is an application software that integrates work on a single project by several concurrent users at separated workstations, the component ware-computer and associated physical equipment directly involved in the performance of data processing or communication functions and shared database especially pertaining to citizens, organizations or establishments.

The Middleware- in a distributed computing system, middleware is defined as the software layer that lies between the operating system and the applications on each site of the system.

The role of ICT in administration is, the fact that an application is usually made up of many interconnected parts running in distributed locations; hiding the heterogeneity of the various hardware components, operating systems and communication protocols; providing uniform, standard, high-level interfaces to the application developers and integrators so that applications can be easily composed, reused, ported and made to inter operate; and supplying a set of common services to perform various general purpose functions in order to avoid duplicating efforts and to facilitate collaboration between applications. Hence, the role of middleware is to make application development easier by providing common programming abstractions, by masking the heterogeneity and the distribution of the underlying hardware and operating systems, and by hiding low-level programming details;

- Integration-combining software or hardware components or both into an overall system;
- Network- Wide Area Network, Local Area Network ensuring connectivity;
- Platform- it describes some sort of framework either in hardware or software, which allows software to run. Typical platforms include a computer's architecture, operating system or programming languages;

Teachers are often required to manually set work for a range of abilities in their class, or constantly monitor their students' involvement and separately track the results, thus increasing their administrative burden. Hence, the need for management system to address issues related to administrative duties. There is need for the collection, organization, storage and retrieval of student's data, this is regarded as database.

A database Management System (DBMS) is a set of programs that manages any number of databases and is equally application software that interacts with the user. In addition to that, Database Management System is responsible for accessing data, inserting, updating and deleting data, security integrity, facilitate by logging, application-defined rules, including triggers, supporting batch and on-line programs, facilitating backups and recoveries, optimizing performance, maximizing availability, managing the buffer pools, acting as interface to other system programs and supporting user interface package, such as the popular SQL interface for relational database systems (Anigbo & Orie, 2018). A Database Management System is a single or set of computer programs that are responsible for creating, editing, deleting and generally maintaining a database or collection of data records (Funmilayo *et al*, 2012). Muntjir and Aljahdali (2013) defined a database management system is a collection of programs that enables you to store, modify, and extract information from a database. A database is a collection of related data which represents some aspect of the real world (Guru99, 2021). A database management system (DBMS) is a software for storing and retrieving users' data while considering appropriate security measures. It consists of a group of programs which manipulate the database (Guru99, 2021). The database management system (DBMS) accepts the request for data from an application and instructs the operating system to provide the specific data. Subbiah et al. (2016) defined a database management system is an automation of manual performance record management which enables the user to assess necessary data at any place and any time through internet. In large systems, a DBMS helps users and other third-party software to store and retrieve data. Database management system for student registration deals with all kind of student detail and other resource related details it tracks all the detail of student from the day one to the end of his studies which can be used for all reporting purpose this design can facilitate to produce a system that will eliminate the difficulties and unnecessary protects inherent in the existing

system and it will inflate the time need for processing registration to attend to other and subsequent activities.

The database management system for student registration is an automated computer programme that allows for entry, organizing, updating and retrieval of student's data (Nuwabasa, 2019). It can handle all the biographical and academic data of a student, the data includes student first name, middle name, last name, course and course combination etc. and it also have the ability to provide fast retrieval, update and storage of information and restrict unauthorized users so that access to information can be done with greater ease.

The efficiency of an organization or establishment would be enhanced if it utilizes a computer-based system in place of the manual system. This research proffers an approach in processing registration and suggests a complete efficient and reliable approach that will be of immense benefit to Department of Educational technology, Federal University of Technology Minna.

1.2 Statement of The Problem

The students' registration process and entering of data into school records is always tasking due to manual mode of registration which involves the writing down of students biographical and academic data that may become cumbersome and time consuming to achieve. Yang (2014) observed that a student database management system should be able to provide users with sufficient information and access to students record that is well organized and presentable. But people still make use of the traditional manual management of paper files, this management approach, there are many shortcomings, such as: low efficiency, poor security, considerable time spent required to produce a large number of files and data, which may be difficult to update and maintain (Yang, 2014). The major problems associated with database management system for student registration include improper registration, late

release of students' results, inaccuracy due to manual and tedious calculation, retrieval difficulties and inefficiency. This research project is aimed designing and implementing a database management system that can be used for registration of student so as to reduce the work load and improve efficiency in the student registration process.

1.3 Aim and objective of the Study

The aim of this study is to design and implement a database management system for student's registration. Specifically, the study sought to:

- i. Design a database management system for student's registration.
- ii. Implementation of a database management system for student's registration.
- iii. Determine the effectiveness of the developed database management system

1.4 Research Questions

The following research questions were asked to guide the study

- i. Can a database management system be designed for student's registration?
- ii. Can a database management system be implemented for student's registration?
- iii. To what extent does the designed database management system affect efficiency of the registration of students?

1.5 Research Hypotheses

H₀: There is no significant difference in the work efficiency of those using the database management system to register students and those using the manual means of registration.

1.6 Significance of The Study

The findings of this study would be of benefit to teachers, students, the government, school administrators and fellow researchers.

The result of this study would be of significance to teachers as they would be able to input student's data and update their records without a hitch, teachers will be able to carry out registration process without using the manual registration process that is time consuming and prone to errors.

The result of this study would also be of great benefit to students as precious time will be saved during the registration process, the database management system will hasten the process of student's registration and provide accurate data as the records can be easily updated without errors or mistakes.

The findings of this study will be of great benefit to government because they will implement standards on the registration process for students as will shape the manner in which data are being handled in institution all over the country.

School administrators will find this study to be resourceful since they will realize the importance of a database management system that can effectively handle students record, save time and money.

The findings of this study will also be of great benefit to fellow researchers as it will help build upon existing literature and contribute to new and current body of research work.

1.7 Scope of The Study

The scope of this research is centered on the registration process of the student of education technology department Federal University of Technology Minna. This research work which automates the student's registration process, monitors the movement of electronic form and also maintains the integrity of information being processed by using password to limit access only approved individual the system also creates automatic database for the storage of successfully registered students. Hence, this research work is aimed at designing and

implementing a database management system for student's registration under the department of Educational Technology. This study will last for a period of two (2) weeks.

1.8 Operational Definition of Terms

Information and communication Technology (ICT): ICT are all communication technologies, including the internet, wireless networks, cell phones, computers, software, middleware, video-conferencing, social networking, and other media applications and services enabling users to access, retrieve, store, transmit, and manipulate information in a digital form.

Database: A database is a collection of related data which represents some aspect of the real world

Database Management System (DBMS): A database management system (DBMS) is a software for storing and retrieving users' data while considering appropriate security measures

CHAPTER TWO

2.0 REVIEW OF RELATED LITERATURE

The aim of this study is to design and implement a database management system for student's registration. Thus, the literature relevant to this study will be reviewed accordingly.

2.1 Conceptual Framework

2.1.1 Concept of a Database and database management system.

A database is an integrated collection of data usually so large that it has to be stored on secondary storage device such as disk or tapes. This data can be maintained as a collection of operation system files or store in a database management system.

A database management system (DBMS) is computer software designed for the purpose of maintaining database base on a variety of data model. A database management system is a complex set of software programs that controls the organization, storage, management and retrieval of data in a database management system are categorized according to their data structure or types, sometime database management system also known as database manager. It is a set of prewritten programs that are used to store update and retrieve a database (Okeke, 2009).

When a database management system is used, information system can be changed much more easily an organization information requirement change. New categories of data can be added to the database without disruption to the existing system. Organization may use one kind of database management system for daily transaction processing and then move the detail onto another computer that uses another database management system better suite.

2.1.2 Components of the Database System Environment

Czar (2013) noted that there are twelve components in the database system environment and their interrelation which are; Hardware, Software, Data. Users and Procedures, database access language, query processor, runtime database manager, data manager, database engine, data dictionary and report writer.

2.1.2.1 Hardware: The hardware is the actual computer system used for keeping and accessing the database conventional database management system hardware consist of secondary storage devices usually hard disks, on which the database physically resides together with the association input-output devices controllers etc.

2.1.2.2 Software: The software is the actual database management system between the physical database itself (i.e., the data as actually stored) and the users of the system is a layer of software usually called the database management system or DBMS. All requests from users for access to the database are handled by the DBMS thus the shielding of database users from to complex hardware level detail.

The database management system allows the users to communicate with the database in a sense, it is the users. The database management system controls the access and help to maintain the consistency of the data. Utilities are usually including as part of database management system.

2.1.2.3 Data: it is the most important component of database management system environment form the end user point of view as shown in observes that data act as a bridge between the machine components and the user components. Database contains all the data needed by organization one of the major features of database is the actual data are separated from programs that use the data. A database should always be designed, built and regulated for a particular audience and for specific purpose.

2.1.2.4 Users: there are number of users who can access or retrieve data on demand using the application and interfaces provided by database management system. Each type of user needs different software capabilities. The users of a database system can be classified in the following groups depending on their interactions with the database management system. The users can be: native users, online users, application programmers, sophisticated users, database administrator (DBA)

i. Native users: are those users who need not to be aware of the presence of the database system or any other system supporting their usage. Native users work through a menu driven application program, where the type and rang of response is always indicated to the user.

A user of an automatic teller machine (ATM) falls in this category the user is instructed through each step of a transaction. He or She then responds by pressing a coded key or entering a numeric value. The operations that can be performed by value user are very limited and affect only a precise portion on the database for example, in the case of the user of the automatic teller machine, users action affects only one or more of his/her own account

Online users: are those who may communicate with the database directly via an online terminal or indirectly via a user interface and application program. These users are aware of the presence of the database system and many have acquired a certain amount of expertise within the limited interaction permitted with a database.

ii. Sophisticated users: such users interact with the system without writing program. Instead they form their request in database a very language. Each of such a very is submitted to a very processor whose function is to breakdown DML statement into instruction that the storage manager understands.

iii. Specialized users: such users are those who write specialized database application that do not fit into the fractional data processing framework. For example, computer aided design system, knowledge base and expert system that store data with complex data types (for examples, graphics data and audio data).

iv. Application programmers: professional programmers are those who are responsible for developing application programs or user interface. The application programs could be written using general purpose programming language or the commands available for manipulating a database.

v. Database administration: the database administrator (DBA) is the person or group in charge for implementing the database system within an organization. The DBA has all the system privileges allowed by the DBMS and can assign (grant) and remove (revoke) levels of access (privileges) to and from other users. DBA is also responsible for the evaluation, selection and implementing of database management system package.

2.1.2.5 Procedures: Procedures refers to the instructions and rules govern the design and the use of database. The user of the system and the staff that manage the database require documented procedures on how to use or run the system. These may consist of instruction on how to log on the database management system. Use of particular database management system facility or application program start and stop the database management system make backup copies of the database. Handle hardware or software failures.

2.1.2.6 Database Access Language: This is used to access the data to and from the database, to enter new data, update existing data, or retrieve required data from databases. The user writes a set of appropriate commands in a database access language, submits these to the DBMS, which then processes the data and generates and displays a set of results into a user readable form.

2.1.2.7 Query Processor: This transforms the user queries into a series of low-level instructions. This reads the online user's query and translates it into an efficient series of operations in a form capable of being sent to the run time data manager for execution.

2.1.2.8 Run Time Database Manager: Sometimes referred to as the database control system, this is the central software component of the DBMS that interfaces with user-submitted application programs and queries, and handles database access at run time. Its function is to convert operations in user's queries. It provides control to maintain the consistency, integrity and security of the data.

2.1.2.9 Data Manager: Also called the cache manger, this is responsible for handling of data in the database, providing a recovery to the system that allows it to recover the data after a failure.

2.1.2.10 Database Engine: The core service for storing, processing, and securing data, this provides controlled access and rapid transaction processing to address the requirements of the most demanding data consuming applications. It is often used to create relational databases for online transaction processing or online analytical processing data.

2.1.2.11 Data Dictionary: This is a reserved space within a database used to store information about the database itself. A data dictionary is a set of read-only table and views, containing the different information about the data used in the enterprise to ensure that database representation of the data follow one standard as defined in the dictionary.

2.1.2.12 Report Writer: Also referred to as the report generator, it is a program that extracts information from one or more files and presents the information in a specified format. Most

report writers allow the user to select records that meet certain conditions and to display selected fields in rows and columns, or also format the data into different charts.

2.1.3 Features of Database Management System

A DBMS can be characterized as an attribute management system where attribute are chunks of information that describe something for example “colour” is an attribute of a car the value of the attribute may be colour such as “red” blue or silver.

Alternatively, and especially in connection with the relational model of database management the relation between attribute drawn from a specified set of domains can be seen as being primary for instance the data might indicate that car that was originally “red” might fade to “pink” in time provided it was of some particular “make” with an inferior paint job. Such higher clarity relationship provides information on all of the under lying domain at the same time none of them being privilege above the other. Throughout recent history specialized database has existed for scientific geospatial, imaging and document storage and like uses. Functionally drawn from such application has lately begun appearing in main stream DBMS as well. However, the main focus there at least when aimed at the commercial data processing mark is still on descriptive attribute on repetitive structure.

Thus, the DBMS of today roll together frequently needed service or feature of attribute management by externalizing such functionality to the DBMS, applications effectively share code with each other and are relieved of much internal complexity. Features commonly offered by database management system include:

i. Query ability:

A querying is the process of requesting attribute information from various perspectives and combinations of factors. Example how many 2-door car in taxis are green?

A database query language and report writer allow user to interactively interrogate the database, analyze its data and update if accordingly, to the user's privilege on data. It also controls the security of the database.

Data security prevent unauthorized user from viewing or updating the database. Using password, users are allowed access to the entire database or subsets of it called schemes for example an employer database can contain all the data about an individual employee, but one group of users may be authorized to view only payroll data, while others are allowed access to only work history and medical data.

If the DBMS provides a way to interactively enter and update the database as well as interrogate it. This capability allows for managing personal database. However, it may not leave an audit trail of action or provide the kind of controls necessary in a multi user's organization. These controls are only available when a set of application programs are customized for each entry and updating function.

ii. Backup and Replication

Copies of attributes need to be made regularly in case primary disks or other equipment fails a periodic copy of attributes may also be created for a distant organization that cannot readily access the original. DBMS usually provide utilities to facilitate the process of extracting and disseminating attribute sets.

When a data is replicated between database services, so that the information remains consistent throughout the database system and users cannot tell or even now which server in the DBMS they are using, the system is said to exhibiting replication transparency.

iii. Rule Enforcement: Often one want to apply rules to attributes are clean and reliable for example we may have a rule that say each car can have only one engine associated with it

(identified by engine number). If somebody tries to associate a second engine with a given car, we want DBMS to deny such a request and display an error message. However, with changes in the model specification such as in this example, hybrid gas-electric cars, rules may need to change. Ideally, such rule should be able to be added and removed as needed without significant data layout redesign.

iv. Security: Often it is desirable to limit who can see or change a given attributes or groups of attributes. This may be managed directly by individual or by the assignment of individual and privileges to groups or (in the most elaborate models) through the assignment of individuals and groups to roles which are the granted entitlement.

v. Computation: There are common computations requested on attributes such as counting, summing, averaging, sorting, grouping, cross referencing etc. rather than having each. Computation application implement these from scratch, they can rely in the DBMS to supply such calculation.

vi. Change and Access Login: Often we want to know how to access attribute, what was changed and when was it changed. Logging service allow this by keeping a record of access occurrences and changes.

vii. Automated Optimization: if there are frequently occurring usage patterns or requests, some DBMS can adjust themselves to improve the speed of those interactions in some cases DBMS will merely provide tools to monitor performance, allowing a human expert to make necessary adjustment after reviewing the statistics collected.

2.1.4 Challenges of Database Management System

A Database Management system (DBMS) is basically a collection of programs that enables users to store, modify and extract information from a database as per the requirement.

DBMSM, is an intermediate layer between programs and the data. Program access the DBMSM, which then access the data. There are various challenges of database management system which are summarized as follows:

i. Complexity: The provision of the functionality that is expected of a good DBMS make the DBMS an extremely complex piece of software. Database designers, developers, database administrators and end-user must understand this functionality that take full advantage of it failure to understand. The system can lead to bad design decisions which can have serious consequences for an organization. The complexity and breath of functionality makes the DBMS an extremely large piece of software occupying many megabytes of disk space and requiring substantial amount of memory to run efficiently.

ii. Performance: typically, a file-based system is written for a specific application such as invoicing. As result, performance is generally very good. However, the DBMS is written to be more general to cater for many applications rather than just one. The effect is that some applications may not run fast as may use to. Higher impact of a failure the centralization of resources increases the availability of the DBMS the failure of component can bring operations to a halt.

iii. Cost of DBMS: The cost of DBMS significantly depends on the environment and functionality provided.

iv. Additional Hardware Costs: The disk storage requirement for the DBMS and the database may necessitate the purchase of additional storage space. Furthermore, to achieve the required performance it may be necessary to purchase a large machine, perhaps, even a machine dedicated to run the DBMS the procurement of additional hardware results in further expenditure. Cost of conversion in some situation, the cost of the DBMS and extra hardware may be insignificantly compared with the cost of covering existing application to run on the

new DBMS and hardware. This cost also include the cost of training to this new system and possibly the employment of specialist staff to help with conversion and running of the system. This cost is on the main reasons why some organization feels tired of their current system and cannot switch to modern database technology.

2.2 Theoretical Framework

2.2.1 Technology Acceptance Model

The technology acceptance model (TAM) is an information systems theory that models how users come to accept and use a technology (Cegarra-Navarro et al., 2013). The actual system use is the end-point where people use the technology. Behavioral intention is a factor that leads people to use the technology. The behavioral intention (BI) is influenced by the attitude (A) which is the general impression of the technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it, notably:

- Perceived usefulness (PU) – This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance". It means whether or not someone perceives that technology to be useful for what they want to do.
- Perceived ease-of-use (PEOU) – Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Davis 1989). If the technology is easy to use, then the barriers conquered. If it's not easy to use and the interface is complicated, no one has a positive attitude towards it.

Technology Acceptance Model (TAM) is theory majorly in the information system. It focuses on modeling computer users and showing them on how they can accept and adopt a new technology. It was designed to predict the technology adoption decisions of users.

Technology Acceptance Model is usually used to predict. It indicates that there are only two components that determine the users' acceptance of a computer system. The two components that determine computer acceptance are the perceived usefulness and the perceived ease of use of the system. The main aim of this model is that it emphasizes the potential of the users. In other words, it underscores, for example, when a developer of a given technology believes that his or her system is friendly to the users. Inversely, the system is not be accepted by the users not unless the developers share the benefits and advantages of the technology system, as stated by Ibrahim et al. (2017).

The perceived usefulness component in Technology Acceptance Model is the degree to which a computer system user believes that using a particular computer system will enhance his or her performance (Opoku, 2020). It usually refers to consumers' perceptions based on the outcome of their experience. The existence of perceived usefulness has significantly been recognized in many businesses, primarily in the banking sector. In other occurrences, it is regarded and taken as a determinant of actual behavior whereby a user is encouraged to use an innovative and user-friendly self-service technology to improve and establish greater autonomy in performing some banking activities such as transactions. However, in the banking industry, the perceived usefulness component is based. It depends on the services offered by the bank, such as applying for loans, checking balances, checking, and paying utility bills. For instance, it is a critical component in this sector since it determines the adaptation of innovation.

On the other hand, the perceived ease of use of the system is how a user accepts and agrees that using an existing model is not costly. Therefore, it is not hard or difficult to understand the perceived innovation. In this model, consumers perceive a new service better than its substitutes. This is because they can easily experiment with the latest innovation and evaluate

its benefits. In the e-commerce industry, perceived ease of use is widespread. Many consumers believe that after online shopping, their performance will increase. Therefore, perceived ease of use is a practical aspect that has an impact on online shopping.

TAM impacts on educational settings: With the incorporation of the Technology Acceptance Model in schools, the main aim of the model is to change how students and teachers analyze, determine and organize information. It has democratized information in a school setting. It has also helped in differentiating instructions, especially for students with disabilities. Lubis et al. (2019) argued that many schools today are privileged to integrate Technology Acceptance Model into their systems. Technology Acceptance Model has been used in special needs children to maintain, increase and improve the capacity capabilities of the students. Thus, incorporating the Technology Acceptance Model has also benefited the students with disabilities, specifically those who are in a better position to interact with the lesson using this model. On the other hand, teachers are also in a better place to customize and change the learning process for students with special needs, as Louissaint et al. (2020) stated.

Also, with the widespread of databases in educational settings, Technology Acceptance Model is used to track individual progress. However, teachers and the staff are encouraged to identify and differentiate the learning objectives and instruction, respectively, based on the student's needs. Also, teachers and the team use TAM to attempt to present education. It makes it easy for them to learn new teaching styles. Students with special needs are educated alongside their non-disabled peers in their entire schooling activities through the Technology Acceptance Model. Therefore, it leads to increased knowledge, personal control, and flexibility among the students. It also impacts the teachers since it makes them have a clever use of information which leads to better productivity in the educational setting.

The acceptance of the Technology Acceptance Model has wide-ranging applications in the educational setting. Applying a well-developed model, the Technology Acceptance Model, in the academic environment significantly influences the students and the teachers. Besides, much research between the students who are the consumers and the information systems is devoted to classification systems. Therefore, the development of a classification system is usually developed for domestic technologies to impact a valuable paradigm for future research positively. On the findings, it is clear that an emerging within the domain of assistive technologies such as the Technology Acceptance Model is usually designed to allow disabled and people with disabilities to gain knowledge and live independently. Thus, this critical aspect of increasing integration through TAM has increased complexity in an educational setting (Tan & Hsu, 2018).

The technology acceptance model (TAM) is a critical aspect in many sectors, including the education setting. When it is in place, people have the intention and attitude to use technology. However, they may have different perceptions regarding the model based on their age, gender, and other unique differences. For instance, in an education setting, the technology acceptance model (TAM) has been used by teachers to change their teaching styles. This has dramatically impacted the students. It has given students the critical knowledge they need to depend on themselves.

External variables such as social influence is an important factor to determine the attitude. When these things (TAM) are in place, people will have the attitude and intention to use the technology. However, the perception may change depending on age and gender because everyone is different.

The TAM has been continuously studied and expanded—the two major upgrades being the TAM 2 (Venkatesh & Davis 2000 & Venkatesh 2000) and the unified theory of acceptance

and use of technology (or UTAUT, Venkatesh et al. 2003). A TAM 3 has also been proposed in the context of e-commerce with an inclusion of the effects of trust and perceived risk on system use (Venkatesh & Bala 2008).

2.2.2 Unified theory of acceptance and use of Technology (UTAUT)

The unified theory of acceptance and use of technology (UTAUT) is a technology acceptance model formulated by Venkatesh and others in "User acceptance of information technology: Toward a unified view" (Venkatesh *et al*, 2003) The UTAUT aims to explain user intentions to use an information system and subsequent usage behavior. The theory holds that there are four key constructs: 1) performance expectancy, 2) effort expectancy, 3) social influence, and 4) facilitating conditions.

The first three are direct determinants of usage intention and behavior, and the fourth is a direct determinant of user behavior. Gender, age, experience, and voluntariness of use are posited to moderate the impact of the four key constructs on usage intention and behavior. The theory was developed through a review and consolidation of the constructs of eight models that earlier research had employed to explain information systems usage behaviour (theory of reasoned action, technology acceptance model, motivational model, theory of planned behavior, a combined theory of planned behavior/technology acceptance model, model of personal computer use, diffusion of innovations theory, and social cognitive theory). Subsequent validation by Venkatesh et al. (2003) of UTAUT in a longitudinal study found it to account for 70% of the variance in Behavioural Intention to Use (BI) and about 50% in actual use.

2.2.2.1 Application of the Unified Technology Acceptance Model (UTAUT)

Koivimäki, et al. (2008) observed that Koivumäki et al. applied UTAUT to study the perceptions of 243 individuals in northern Finland toward mobile services and technology

and found that time spent using the devices did not affect consumer perceptions, but familiarity with the devices and user skills did have an impact.

Eckhardt et al. applied UTAUT to study social influence of workplace referent groups (superiors, colleagues) on intention to adopt technology in 152 German companies and found significant impact of social influence from workplace referents on information technology adoption (Wikipedia, 2021).

Curtis et al. applied UTAUT to the adoption of social media by 409 United States nonprofit organizations. UTAUT had not been previously applied to the use of social media in public relations. They found that organizations with defined public relations departments are more likely to adopt social media technologies and use them to achieve their organizational goals. Women considered social media to be beneficial, and men exhibited more confidence in actively utilizing social media (Curtis *et al*, 2010)

Verhoeven et al. applied UTAUT to study computer use frequency in 714 university freshmen in Belgium and found that UTAUT was also useful in explaining varying frequencies of computer use and differences in information and communication technology skills in secondary school and in the university (Verhoeven et al., 2010).

2.3 Empirical Studies

Foo and Hepworth (2000) provided an overview of a methodology used to elicit the information needs of an organisation. The focus however is on the design and implementation of two databases that were used to support this process. These databases proved to be extremely useful for organising the qualitative and quantitative data derived from the information needs analysis research and also for analysing and presenting the findings. The organization, namely, the Singapore Productivity and Standards Board, whose role is to enhance the productivity of business and industry in Singapore, employs approximately 1000

people. The use of database technology combined with networked access to staff facilitated the capture and analysis of the information needs of a large number of people in a short period of time. A description is given of the database design; database implementation; the queries supported by the database as well as the exporting of data to other applications to help visualize information needs.

Mahmood and Okumus (2017) identified that most of the developing countries use traditional paper documents management system (DMS), but also the electronic form of the documentation has increased including e-mails, web pages, and database packages, which have been stored in workstations and servers. For integrated data gathering in an institution or organization, electronic document management system (EDMS) often becomes one of the most required tools for management. However, this requirement should be implemented carefully depending on the institution or organization need. Therefore, organization should have an EDMS for creating, keeping and organizing data in the organization and handle all synchronization process. In their research, system requirements for computer science institution of polytechnic university is analyzed, software design and identifying available resources is determined and a desktop-based application is developed and implemented successfully. Distinguishing the developed EDMS from other management systems is that it adds document notation for external documents and existing digital signature technique has been modified and new features added for improving security level. In addition, security of archived files is increased by monitoring the contents of the documents. Finally, institution structure is customized and can be modified based on the system administrator's request.

Julius (2018) carried out a study centered on database management system for student registration system. The current process of registration is being operated manually and due to this procedure numerous problems are been encountered. A design was taken to

computerized the manual process in order to check this problem. The problems were identified after series of interviews and examination of documents after which analysis was made and a computerized procedure recommended. This project will also suggest how to successfully implement the computerized procedure and to overcome the obstacle that would hinder the successful implementation of the system. The new system was designed using PHP programming language. This language was chosen because of its easy syntax and features for developing online applications.

Udezi et al. (2017) designed an automated Students' Results Management Information System (SRMIS) was carried out to automate the manual processes of compiling Students Examination Results. It was necessitated because of some setbacks in manual result processing. The system was designed to automatically take raw scores from excel files and store them in a database. It used past processed results to help the next course registration prior to results upload. Its result processing features includes the computation of grade point average (GPA), generation of result reporting sheets and transcripts. Every session, it keeps track of student's status information as recorded in the student files, specifying if a student is legitimate. The database also holds the lists of admitted students each year and records their school fees payment status. The software engineering was done with the Incremental model using an object-oriented programming approach. Raw data input to the SRMIS is one of the most cumbersome tasks. A computerized input using file upload saves lecturers a lot of effort and time of data entry. This system uses the student's course registration data to match the uploaded results. The essence is to design an efficient computerized system that will replace manual result processing which is prone to lot of paper work and errors. This reduces the tedious tasks involved, and enhances students' performance through timely publication of results.

2.4 Summary of Literature Reviewed

From the literature reviewed, the researcher uncovered the concept of database management systems, components, features and challenges encountered with the design and implementation of database management systems for student's registration. The researcher also reviewed two theories that advocated for the use of technological based tools in the workplace, they include; Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). These theories/models highlighted the need for technology in the lives of individuals and explained how technology maybe perceived amongst users. From the empirical studies, it was revealed that researchers recommended the use of database management systems were effective and reduces the tedious tasks involved in student registration.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter presents the research methodology employed by the researchers and therefore provides information on the research design, population and sample size, sampling technique, data collection instrument, procedure for data collection, procedure for data analysis.

3.2 Research Design

The researcher used the experimental design in studying the impact of an independent variable (database management system) on dependent variable (student's registration), a comparison was made between the experimental group who computed given student data by using a database management system which makes use of a computer, and the other group is a control one who computer students data using the manual method of registration. Three conditions were taken into consideration, the speed, accuracy and organization of the data between both groups.

3.3 Population of the Study

The study population was all the students in the Department of Educational Technology, under the School of Science and Technology Education (SSTE), Federal University of Technology Minna in the second semester for the academic year 2020–2021 and they were 526 students in total.

3.4 Sample and Sampling Technique

A sample refers to a small group of elements drawn through a definite produce from a specific population. Shapiro (2008) refers sample as the “number of units that were chosen from which data were gathered”. The sample was randomly taken from the department but

final year (500L) students under the department of Educational Technology were purposively selected to partake in the study. The researchers divided them into control group and experimental group. The experimental group was access to compute student's data into the database management system, whereas the control group were to use the manual registration system of pen and paper. A sample size of 50 final year (500L) students was drawn from the department of Educational Technology, physics option. To produce the sample, the simple random sampling technique was employed to select the subjects from the purposively selected level (500L), balloting was used to represent the experimental and control groups. The sample for the experimental group of the level was used as experimental group and the other as the control group. Twenty-five (25) students formed the experimental group and another twenty (25) students formed the control group making a total of fifty (50) students for the study.

3.5 Research Instrument

The researcher designed a database management system for student's registration. The database management was used as the treatment instrument to computer student's registration data. The Educational Technology Work Efficiency Test (ETAT) was used for data collection.

3.5.1 Procedure for Developing the Database Management System

The researcher developed a web powered database management system that comes with a ton load of features. The programme was developed using html, php, CSS and MySQL programming languages.

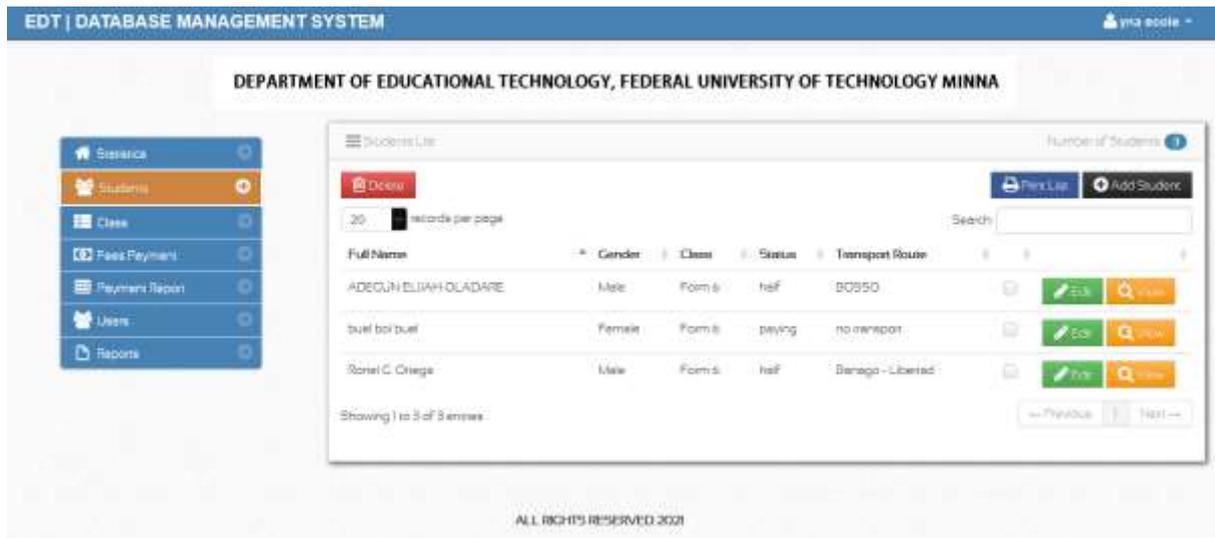


Fig 3.1

Fig 3.1 shows an array of student data that have inserted into the database

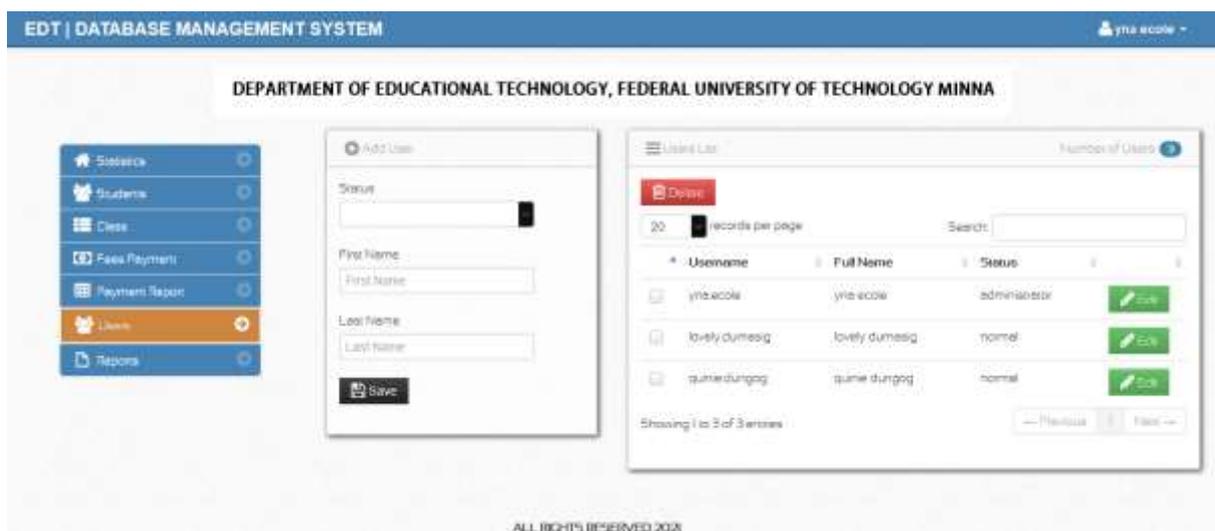


Fig. 3.2

Fig 3.2 displays admin panel and access to the database.

3.6 Validity of Instrument

The Educational Technology Achievement Test (ETWET) and the Database Management System software was validated by two experts in the department of Educational Technology.

These experts scrutinized the instruments and made necessary corrections and modification to the subject, proper wording of the items, appropriateness and adequacy of the items for the study, structure and adequate timing. The comments and recommendations of these experts helped to identify and correct the items in the instruments.

3.7 Reliability of the instrument

The database management system software was determined through a pilot test by administering the instrument to 20 500L students in the department of Science Education, School of Science and Technology Education (SSTE), Federal University of Technology Minna, Niger State which is not among the sampled department for the study, a reliability coefficient of 0.89 was determined from the data using Kuder Richardson 21.

3.8 Method of Data Collection

The department selected was visited by the researcher. Permission was taken from the HOD of the department, which was given. The aim and mode of research was explained to the students for their maximum cooperation. Thereafter, the students were sampled; the students were sampled from the two created groups (control and experimental); The instrument (ETWET) was used to assess the experimental group after exposure to it while the control group was assessed with the manual registration. Both groups were assessed based on speed, accuracy and organization of the data used for student's registration. The researcher scored the groups on the above conditions and compared the scores of both the control and experimental group.

3.9 Method of Data Analysis

Mean and standard deviation were used to answer the research questions while t-test was used to test the hypotheses at 0.05 level of significance. This level of significance formed the

basis for rejecting or accepting each of the hypotheses, from which findings, discussions and summary will be arrived at. Computer software Statistical Package for Social Science (SPSS) version 25.00 was used for the analysis.

CHAPTER FOUR

4.0 PRESENTATION AND ANALYSIS OF DATA

4.1 Introduction

In this chapter, data for the study were analyzed and presented based on the research questions and hypotheses that guided the study. The research questions were answered using mean and standard deviation while t-test statistics was used to test the research hypotheses. All the hypotheses were tested at $P < 0.05$ level of significance.

Research Question One: To what can a database management system be designed for student's registration?

The researcher designed a computerized database management system using HTML, PHP, CSS and MySQL programming languages, the researcher programmed the package by carefully making a framework by including graphical and textual elements using HTML and CSS which enabled for an appealing user interface to allow for integration, logos and text were also applied and download to the system. The PHP programming language enabled the researcher to build the dynamic part of the website, the PHP which is server-side scripting language allowed the researcher to develop dynamic content including database entry and session tracking.

The database management system had key features such as; login and logout system that allows for the administrator to successfully login into the system, the database management system also comes with data entry environment where users can input student's data and successfully register them. The system also comes embedded with a summary and stats view that displays the total number of students registered into the system. Data fields can also be updated using the system, it makes possible to delete entries too if required. The system can

also generate printable reports of student’s record at the request of the user. The database management system is flexible and can be used by administrators and teachers who choose to register students records.

Research Question Two: To what can a database management system be implemented for student’s registration?

The researcher implemented the database management system by carrying out an experimental study which made use of twenty-five (25) students in the Department of Educational Technology. Prior to the experiment, the database management system was validated by experts in the department of Educational Technology who made corrections, recommendations and adjustments before the administration. The database management system was used to input students records and was effective in doing so as records were successfully inputted and stored into the system’s database. The researcher utilized the power of a local host which does not require internet connection, this allowed for speedy implementation and the analysis of inputted data which led to the analysis of efficiency against the control group who made use of the manual student registration method.

Research Question Three: To what extent does the designed database management system affect efficiency of the registration of students? The answer is shown below on table 4.2

Table 4.1 Mean and Standard Deviation of posttest scores of the experimental and control group

Group	N	Posttest	
		\bar{x}	SD
Experimental	25	18.36	1.72
Control	25	13.88	0.88

Table 4.1 indicates that experimental group who made use of the Database Management System to register student’s data has a mean achievement score of 18.36 with a standard

deviation of 1.72 at the posttest while those who made use of the conventional method had a mean achievement score of 13.88 and a standard deviation of 0.88. from the posttest mean scores, it is revealed that the experimental group who made use of the Database Management System were more efficient than the control group who made use of the manual method as revealed by the posttest scores. The level of significance was presented in table 4.2

4.2 Hypothesis Testing

HO₁: There is no significant difference in the work efficiency of those using the database management system to register students and those using the manual means of registration

Table 4.2 T-test for the posttest scores of the experimental and control groups

Group	N	Df	\bar{x}	SD	t-value	p-value
Experimental group	25		18.36	1.72		
		48			11.54	0.00
Control group	25		13.88	0.88		

Significant at $p < 0.05$

The t-test for table 4.2 shows the posttest scores of the experimental and control groups. There was a significant difference between the posttest scores of the experimental group that utilized the Database Management System to register student's data and the control group who made use of the traditional manual method of student registration using pen and paper as determined by the t-test statistics with a t-value at 11.54 and a p-value of $0.00 < 0.05$. Experimental group (M=18.36, S.D=1.72) scoring higher than students taught using the conventional method (M=13.88, SD=0.88). Therefore, the null hypothesis was rejected which implies there is a significant difference in the work efficiency of those using the database management system to register students and those using the manual means of registration.

4.3 Discussion of Findings

The research designed and developed a database management system using HTML, CSS, PHP and MySQL programming languages to allow for student registration. This is in line with the findings of Oluwanbe (2018) and Udezi *et al.* (2017) who designed a student registration system.

The database management system was implemented by administration to twenty students who made use of it to input students records successfully which is in line with the design and implementation work of Oluwanbe (2018).

The data analyzed in this chapter were interpreted and discussed on the results derived from the research question and hypothesis. The main objective of the research is to design and implement a database management system that can be used for registration of student so as to reduce the work load and improve efficiency in the student registration process. The posttest scores in table 4.2 experimental group who made use of the Database Management System to register student's data has a mean achievement score of 18.36 with a standard deviation of 1.72 at the posttest while those taught using the conventional method had a mean achievement score of 13.88 and a standard deviation of 0.88. from the posttest mean scores, it is revealed that the experimental group who made use of the Database Management System were more efficient than the control group.

The hypothesis testing also revealed that there was a significant difference in the work efficiency of those using the database management system to register students and those using the manual means of registration as the p-value $(0.00) < 0.05$ which indicated there was a significant difference as it was below the 0.05 level of significance. This implied that the experimental group had a greater work efficiency as compared to the control group who made use of manual registration method. This is in line with the findings of Udezi *et al.* (2017) who revealed that the use of database management system reduced tedious task and increased

efficiency. Hence, the database management system is efficient and will help reduce workload as compared to the manual registration process.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The research is aimed at designing and implementing a database management system that can be used for registration of student so as to reduce the work load and improve efficiency in the student registration process. This chapter contains the summary, conclusion, recommendation, major findings of the study, contribution to knowledge, implications of the findings and suggestions for further studies.

5.1.2 Conclusion

Based on the findings and discussion of the study, the following conclusion were drawn;

The effective and adequate use of Database Management System improves the work efficiency of users. The evidence of the experimental group that used the Database Management System in student's registration. It was revealed that users who made use of the Database Management System had a greater work efficiency as compared to the control group who utilized the manual registration method.

5.2 Recommendation

In view of this project findings, the following recommendations was made;

1. Experts and lecturers in the Department of Educational Technology should be enlightened on the benefits and use of computerized and automated Database Management System that will improve work efficiency and drastically reduce their workload.
2. Seminars, conference and workshops should be organized and put in place for the teachers on the use of Database Management Systems.

3. The Government should make available the necessary infrastructure and facilities that will produce the environment for the use of Database Management Systems
4. Computers and other relevant mobile devices that will support the use of Database Management Systems should be made available by the Government.
5. Internet and adequate electricity should be provided by the school administrators and governmental bodies
6. Good maintenance culture should be encouraged to ensure the proper running of the Database Management System
7. Experts and technicians should be hired to quickly address technical issues that may arise

5.3 Major Findings of the Study

The following findings have been made from the research work

1. There was significant difference in the work efficiency of those using the database management system to register students and those using the manual means of registration.

5.4 Contribution to Knowledge

The result of the study has contributed to knowledge in the following ways

1. Designing and development of Database Management System
2. Implementation of a database management system to register student's data
3. Improving the existing architecture used for student's registration
4. Adequate use of the Database Management System will help save the teacher's time and energy
5. It helps to contribute to the existing literature and use to provide platform for further research.

5.5 Implications of the Findings

Various implications have been adopted but the most important is the use of Database Management System to work efficiency in student's registration. Therefore, teachers and experts should be encouraged and enlightened on the use of database management system as it is shown to improve work efficiency and reduce workload.

5.6 Suggestions for further Research

Areas where further research could be done are as follows;

1. Problems associated with the use of Database Management System for Student Registration
2. Lecturers attitude towards the adoption of Database Management System for student registration.
3. Further research should not be limited to a specific area, it should cover a wider geographic area

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