# APPLICATION OF DATABASE MANAGEMENT SYSTEM (D BMS) TO LIBRARY FUNCTIONS IN THE NATIONAL LIBRARY OF NIGERIA

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#### Abstract

This study discusses database and database management system and its utilization in National Library of Nigeria using Microsoft Access as software for designing the general purpose database. It states how the database can be used to manipulate library functions such as cataloguing and classification, acquisition and issuance of standard number etc. Microsoft Access components, which are table, form, report, query and relationship as well as some basic terms such as entity, attributes, keys etc were explained in the paper. Benefits of using database management system such as single database, balancing conflicting requirement, share data, improve integrity etc as well as constraints of using database like larger file size, increase in complexity, power supply, and technical knowhow were discussed. Recommendations were made that the National Library of Nigeria should adopt the simple general purpose database to increase production, avoid redundancy, for easy access, for data security, consistency and for information tracking etc. Conclusion was drawn that, the use of this general purpose database will increase input especially in area of cataloguing and classification and that acquisition librarians will avoid repeating acquisitions. The International Program Department will be able to have track of standard numbers issued out and also help the legal deposit department to have the records of publishers and authors who made deposits to the National Library of Nigeria at a particular year.

### Keywords

Database, Database Management System, Library Functions, National Library of Nigeria, Microsoft Access.

### Introduction

According to Ramakrishnan (2014), a database is an organized collection of data. It is a structure that stores information about multiple types of entities, attributes and relationship. Database is manipulated by software called database management system (DBMS). Pratt and Adamski (2010) stated that database management system is computer software that interacts with the users, other applications and the database itself to capture and analyse data. The actual manipulation of the underlying database is handled by the database management system. Feather (2005) supports that managing a database is inherently a complicated task, but fortunately, the database management system help to do the job of manipulating databases. In some cases, users may interact with the database management system (DBMS) directly and obtain the information contained in the database.

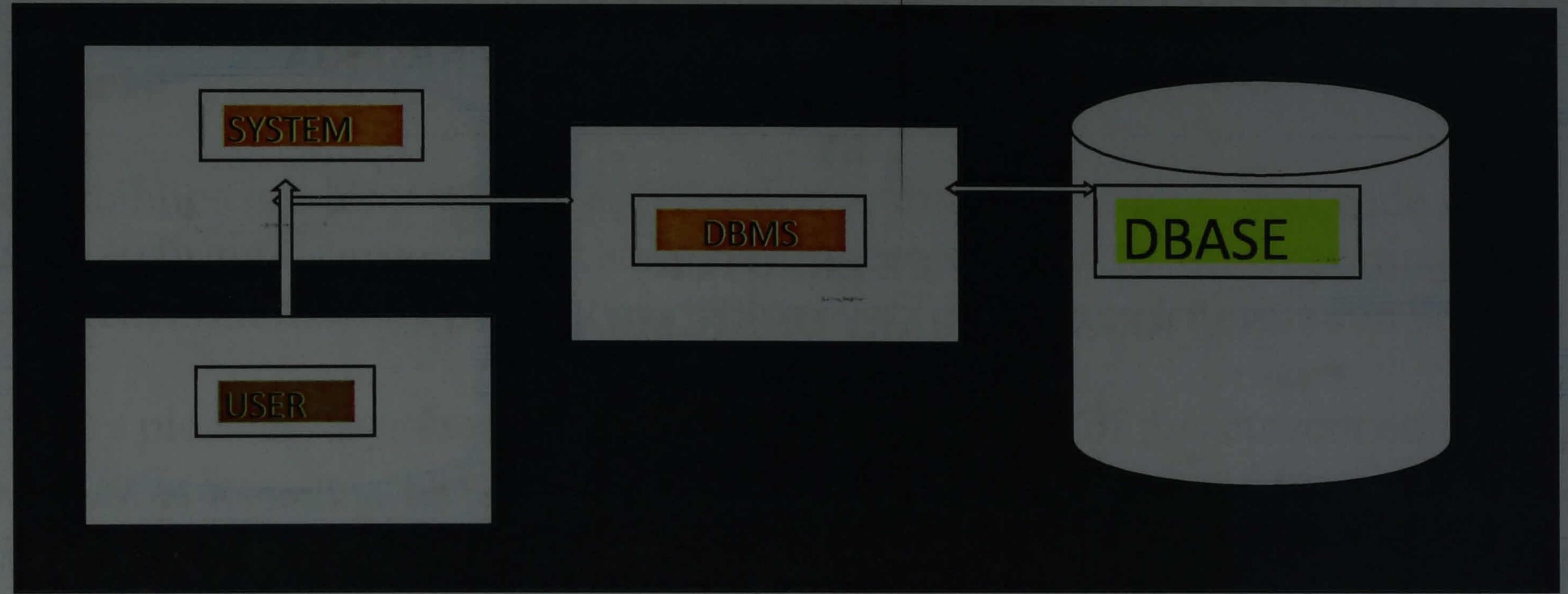


Fig 1: A Database User Interacting with the Database Management System.

This paper specifically made us to understand that there are two types of databases, 'general purpose database and specific database'. General purpose database is designed to allow the definition, creation, querying, updating and administration of databases. It handles the storage, retrieval and update of data in a computer system and also a programme or a collection of programme through which users interact with the database. Specific database is built specifically to carry out certain functions. Such databases are library software e.g. Koha, Law or Medical databases or software built specifically to carry out certain functions in certain field of learning. In creating general purpose database, software called database management system (DBMS) is required. Microsoft access is used to design this database. It is a package that provides the software tools an organization needs to organise their data in a flexible manner. It includes facilities to add, modify or delete data from the database, ask question or queries about the data stored in the database and produce reports summarizing selected contents.

### Database Management System Terminologies

Redundancy: Redundancy is the duplication or repetition of information in more than one place.

Entity: An entity in a database is a person; place, object event or idea for which you want to store and process data. Example of an entity in a library setting is book, clientele etc.

Attribute: An attribute is the characteristic or property of an entity. Example of an attribute in a library setting is title of a book, author, publisher etc. An attribute is also called a field or column.

Database application: A database that is made easier to use by the inclusion of queries, forms, reports, custom categories and groups, macros, and other tools.

Relational database: A type of database that stores information in related tables. Relational databases use matching values to relate data in one table to data in the other table.

Sorting: A method of arranging data based on the order of specified information.

Keys: The term key is used in database to carry out some functions in the system, in database; we have primary, secondary, composite, foreign keys. Primary key serves as unique identifier in a database.

Database Engineer: This is the person behind the database software. They create and design the software that will manipulate the database

Database administrator: This is the person responsible for designing a database in an organization. They design the database in the system to suit the need f the organization Database user: This is an individual who manipulates the database for result. Examples are the cataloguer, acquisition librarian, etc.

### Components of Microsoft Access

Microsoft Access consists of many components; our study at this level is basically on the creation of table, form, query, report and relationship

Table

Form

Report

Relationship

Query

Table: A table is the main avenue through which data is stored in the database. It is the fundamental building blocks of any database. Table is a structured arrangement of one or more rows and one or more columns that contained the information in a database. Database are not meant to store information alone but are also meant for easy information retrieval. Microsoft access allows you to open the table and scroll through the records in the database.

Form: A form is an organized and formatted view of some or all of the fields from one or more tables or a query. They are used to view, enter, and edit information in a database. Form works interactively with the table in a database, data is entered into the database directly into the tables using forms which allow for quicker and more visual data entry. Cox and Lambert (2013) ascertained that a form acts as a friendly interface for a table. Through a form, you can display and edit the records of the underlying table, or create new records. Forms are essentially collections of controls that either accept information or display information. Microsoft Access form provides a quick and easy way to modify and insert records into your databases. They offer an intuitive, graphical environment, easily navigated by anyone familiar with standard computer techniques

Report: A database object used to display table information in a formatted, easily accessible manner, either on the screen or on paper. It can include items from multiple tables and queries, values calculated from information in the database, and formatting elements such as headers, footers, titles, and headings. Report summarizes and displays the data in your database, it is for analysing data and returning answers to specific questions, such as, how many books was acquired or how many catalogued. Cox and Lambert (2013) maintain that reports are often used to group and summarize data in a database. Reports are often for people who do not work with the database but who use the information stored in the database for decision making.

Relationship: A relationship is an association that links the primary key field in one table to a field that contains the same information in another table in relational database. There is a one-to-one relationship, a one-to-many relationship and a many-to-many relationship. Creating a relationship in database gives room for all the tables in relational database to interact, and it enables easy access to all the information in the database.

Query: It is a database object that locates specific information stored in a table and allows you to view and manipulate the results. The results of a query can be used as the basis for form and report. Query serves as a tool for retrieving and filtering your data, it is used to display specific entries from multiple tables. Cox and Lambert (2013) said that you can locate specific information stored in a table, or in multiple tables, by creating a query that specifies the criteria you want to match. It is also used to create and update data. Query is a way of searching for and compiling data from one or more tables. Running a query is like asking a detailed question of your database. When you build a query in Microsoft access, you are defining specific search conditions to find exactly the data you want. Query is far more powerful than the simple searches or filters you might use to find data within a table. This is because query can draw its information from multiple tables e.g. you could use a search in the catalogued books table to find the name of an author in the acquisition table, or filter on the reference table to view only the publisher or place of publication. However, you could easily run a query to find the ISBN or edition statement. Well-designed queries can give information you might not be able to find out simply by checking through the books you have catalogued or acquired.

# The Use of Database Management System in National Library of Nigeria

The application of database management system are for the following library functions:

Selection and Acquisition, Cataloguing and Classification, Legal Deposit, Issuance of Standard

Numbers

Database management system will help our acquisition Librarian to avoid unnecessary duplication of materials. The system can easily be queried to know what title and subject that has been purchased and how many. In the accessioning unit, the database management system will also be queried to know what book has been accessioned and what state branch hold particular materials and so on.





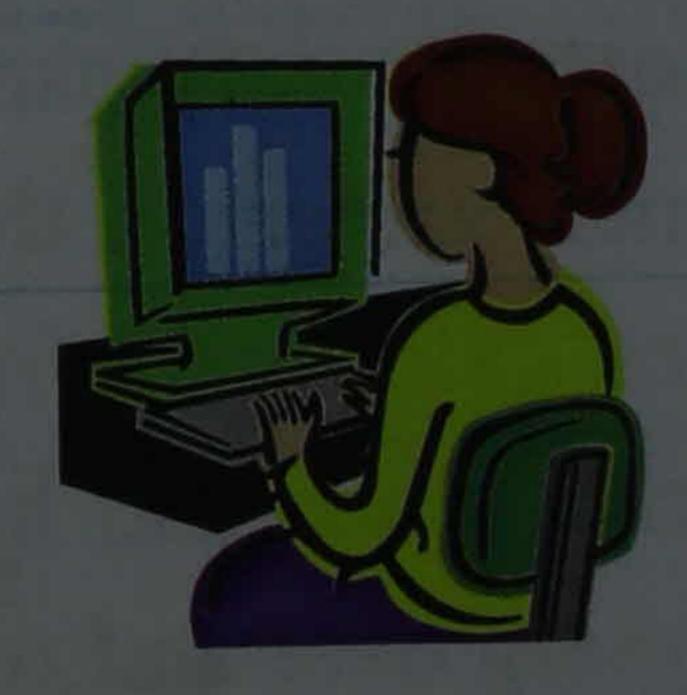


Fig. 2 Acquisition Librarians Querying the Database for Acquired Books.

Cataloguing and Classification: application of database to cataloguing and classification will eliminate the challenges of repetition and inconsistency. It will enhance standardization and

promotes production. With database management system and availability of computer system, a relationship between cataloguers' computer systems will enable them interact with each other for easy workflow.

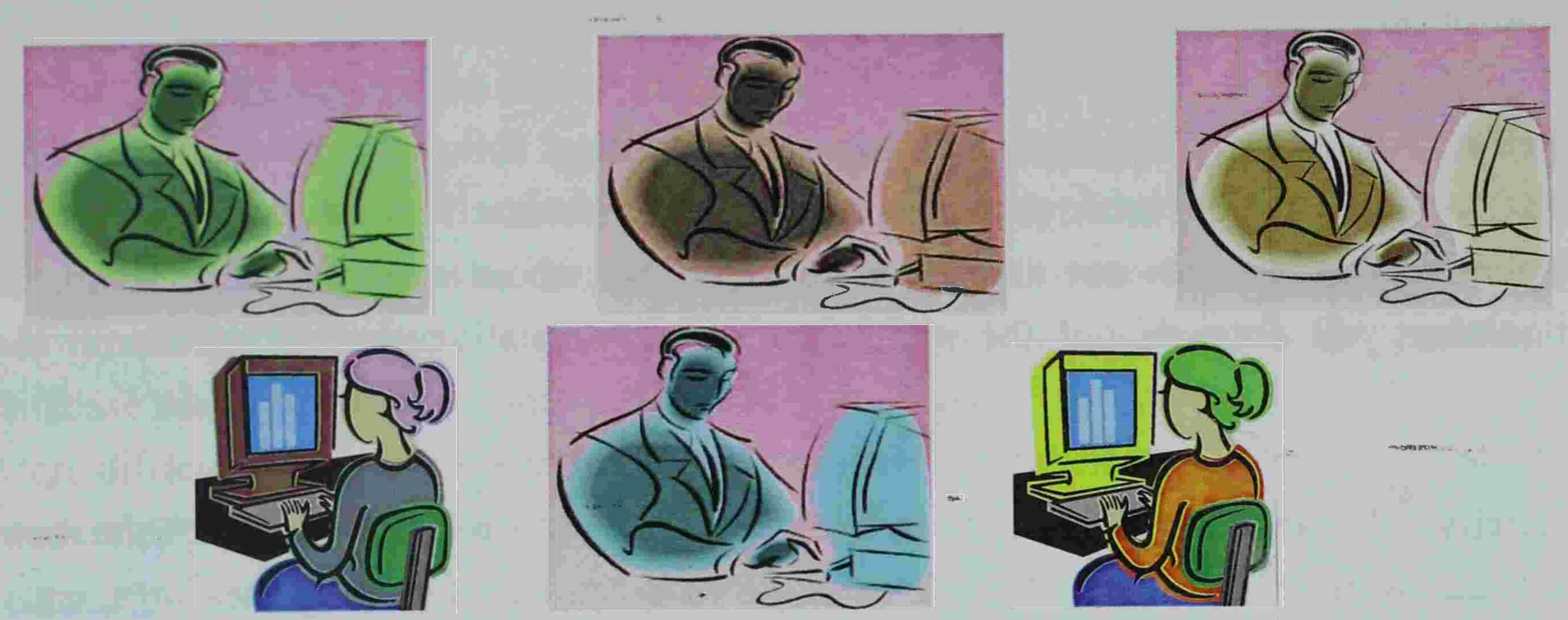


Fig. 3 Cataloguers Querying the Database for Catalogued Books.

Legal deposit: Database management systems will track records of authors and publishers who deposited their books for posterity. Information about materials deposited can easily be retrieved and depositors be identified in case of any eventuality. It will also help in knowing when a material was deposited or number of copies deposited.

Issuance of standard numbers: The International standard serial number (ISSN) and International standard book number (ISBN) divisions generate their numbers from an existing database to meet the need of their clients. It is very important if a database management system is designed for them to help store the information about numbers and title issued to authors and publishers. Most time, title check takes ages because they depend on manual checking of existing title in ISSN. This could easily be avoided if there is database management system which allows the querying of the database for existing title within few minutes. It will also serve as an encouragement for publishers who will want their book number to be in the database.

### Benefits of Database Management System

The benefits of using database management system outweigh the constraints encountered using database. Pratt and Adamski (2015) listed nine clear advantages over alternative data management methods such as the file oriented environment.

Single database: Database management system makes information easily available because files are stored in a single database. It makes the retrieval of information easy and quick.

Share data: In database management system, data of various users can be combined and shared among authorized users allowing all users access to a greater pool of data. Several users can have access to the same piece of data at the same time.

Balancing conflicting requirements: A Database Administrator (DBA) in an organisation can structure the database in such a way that it benefits the entire organisation and not a single group.

Controlling redundancy: Database management system controls redundancy or duplication because scattered files are brought together and treated once without repetition. It helps the system to add or delete information easily without complication.

Facilitating Consistency: Database management system creates uniformity and consistency; it brings together all information concerning an individual entity thereby facilitating consistency.

Improve Integrity: An integrity constraint is a rule that data must follow in the database. This means that users cannot enter an incorrect or non-existent representative number for an entity. Database management system does not allow you to store data about a given entity when the representative number you enter is not the number of a representative that is already in the database.

Expanding Security: This is the prevention of an unauthorised access to the database. A database management system has many features that help ensure the enforcement of security measures, e.g. a database administrator can assign a password to authorize users to have access to the database. Increasing productivity: A database management system frees the programmers who are writing database access programmes from having to engage in mundane data manipulation activities such as adding new data and deleting existing data, thus making the programmers more productive.

Providing data independence: The structure of a database often needs to be changed, e.g. changing users' requirements might necessitate the addition of an entity, an attribute or a relationship, a change might be required to improve performance. A good database management system provides data independence which is a property that lets you change the structure of a database without requiring you to change the programme that accesses the database. Examples of these programmes are the form you use to interact with the database, and the report that provides information from the database. Without data independence, a great deal of effort can be expended in changing programmes to match the new database structure. With data independence, management is more likely to make the decision to change the database.

## Constraints of Database

According to Pratt and Adamski (2015) as you would expect, when there are advantages/benefits to doing something in a certain way, there are also constraints/ disadvantages, database processing is no exception. The constraints of using database are listed below.

Larger file size: It occupies a great deal of disk space as well as a substantial amount of internal memory.

Increases complexity: The functions provided by a database management system make it a complex product. Users must learn a great deal to understand the features of the system in order to take full advantage of it.

Greater impact of failure: The failure of any single users' system affects other users because several users are sharing the same database.

Finance: The management of database system requires money for it to function well. It is important to note that it cannot function without internet supply and this require fund for installation and maintenance.

Power supply: For database to function very well power supply must be very high, database cannot function without the internet and intranet.

Technical know-how: Database management requires personnel to handle it; there should be enough trained staff/users to handle the database. It is obvious that there are not enough personnel who know the rudiment of database. For a database to function well, the organization must have database administrators, technical staff and trained users.

More difficult recovery: Because of the complexity of database management system, the process of recovering a database in the event of a catastrophe also is more complicated.

## Precautions in the Use of Database Management System

For a database to be effective, the administrator should initiate some precautions. According to Coronel (2017) Database administrator determines the privileges for all users and enters the appropriate authorizations rule in the database management systems to ensure that users access the database only in ways to which they are entitled

Security: Security in database management system is the prevention of unauthorized access, either intentional or accidental to a database. He/she takes the steps necessary to ensure that the database is secured. He/she is responsible for determining the access privileges for each user, and also creates security policies and procedure for authorized users. He/She does this by using features such as encryptions, authentication, authorizations and views. Database administrator determines who breached security, how the violation occurred and how to prevent a similar violation in the future. Disaster planning: Apart from the violation by authorized and unauthorized users, damage can also occur through a physical incident such as an abnormally terminated programme, a software virus or worm, a disk problem, a power outage, a computer malfunction, a hurricane, a flood, a tornado or another natural disaster. Jukiv, Vrbsky and Nestorov (2017) statethat to prevent damage; the database administrator creates and implements backup and recovery procedures as part of a disaster fecovery plan.

Recommendations: It is recommended that National Library of Nigeria should create a simple general purpose database management system to handle these functions, such as selection and acquisition of materials, cataloguing and classification, legal deposit and issuance of standard number. This recommendation is basically for the National Library of Nigeria to achieve the following:

Increase production: it is important to note that, the application of database in the various schedules will help to increase production.

Discourage redundancy: the main reason for database is to avoid repeating task already done by others.

Easy access: database will help the users to easily access all their information without delay.

Security: database discourages unauthorized users.

Consistency: database promotes consistency; it does not give room for mistakes here and there.

Keeping track of issued numbers.

Keep records of publishers and authors.

Knowing the number of materials received as legal deposit at a particular period.

Standardization: database promotes standardization in cataloguing and classification.

Keep tracks of purchased books.

To help in evaluation of purchased materials and allocation to state branches.

### Conclusion:

Databases are designed to offer an organized mechanism for storing, managing and retrieving information. According to Feather (2005) in an organization where large quantities of data need tracking, and a paper filing system, text document, or a spreadsheet is used to keep track of this critical information, a database might just be the solution the organization needs to keep track. Database is useful because it stores information in an electronic format. Henderson (2014) stated that the real power of a database is ability to quickly retrieve exactly the information one wants from the database. Database also enables editing, deleting, addition and reorganisation of information. According to Jukiv, Vrbsky and Nestorov (2017) with the use of database, scattered data can be reorganised and stored for future reference and for decision making. The use of this general purpose database will increase input especially in area of cataloguing and classification. There will be no room for repetition of catalogued books. The acquisition librarians will not in any way repeat the listing of already acquired books as long as he/she searched the database for clarification. The database will also enable the staff in allocation division to know which state branch has which materials and those whose turn it is to have the next available material. With the use of general purpose database, the International program department responsible for the issuance of standard number will be able to have track of the number issued out, this will discourage fake numbers and repetition of numbers by authors and publishers. Legal deposit department whose major schedule is to receive legal deposit materials from publishers and authors will be able to have a database of publishers and authors to enable them keep records of what have been deposited to the National Library of Nigeria at a particular year. The National Library of Nigeria is therefore encouraged to create a simple general purpose database to handle these functions for easy workflow and also to increase production.

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