

## **Application of library database management systems in university libraries in Southeastern Nigeria**

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### **Abstract**

This study assessed the applications of library database management systems in academic libraries in Southeastern Nigeria. Two research questions bordering on the objectives of the study and two hypotheses drawn from the study research questions were formulated to guide the study. The study employed survey research design of the inferential type. The area of the study is the Southeastern Nigeria. The population and sample of the study comprises thirty-nine (39) academic libraries, consisting of 17 federal and 22 state owned university libraries. The sampling technique employed is census enumeration method due to the population size. The instrument used for data collection is a researcher-made rating scale entitled “Application of Database Management System Rating Scale (DBMSRS)”. The instrument was validated by three experts and found to have face validity. The internal consistency coefficient of 0.84 was computed for DBMSRS using Kuder-Richardson formula twenty. Data were analyzed using descriptive statistics (frequency count and proportion) and t-test statistics. The finding of the study revealed among others that the proportion of university libraries that adopt library database management systems is low and less encouraging and that academic libraries in federal universities make use of library database management systems more than academic libraries in state universities. Based on the findings it was recommended that academic libraries both federal and state should be funded properly, and staff trained to adhere to global services obtained in academic libraries by adopting library database management systems, in order to shift away from the traditional print materials.

**Keywords:** University libraries, database, management, applications of library database, management systems

### **Introduction**

Libraries, especially university libraries, play an important role in the Nigerian education system. According to Obiano (2021), academic libraries are libraries in universities, colleges, polytechnics and other institutions of higher learning that have students enrolled for academic studies to aid teaching and learning. The main function of the academic libraries is to provide materials that are used for teaching, learning, and research purposes by both instructors and learners. The library is the nerve center and focal point educationally in every learning institution. As a warehouse for the storage of information resources, the library enhances the dissemination of knowledge and spiritual civilization among the students, (Shanmugam, Ramalakshmi, Sasthri and

Baalachandran, 2020). Libraries play a vital role at different levels of education and in the society. There are different types of libraries for different purposes such as school libraries, academic libraries, public libraries, special libraries etc. (Nwosu, 2000). Libraries in higher institutions of learning are called academic libraries, the main responsibility of academic libraries, such as university libraries, is that of providing information services to the library users. Libraries render varied services which depend on the type and nature of the library. However, some services are common in all the libraries, and they include but are not limited to reference services, technical services, current awareness services, selective dissemination of information services, reprographic services, provision of information resources etc. These

responsibilities of the library, however, cannot be achieved without the necessary information resources kept in the libraries. Library users visit the library to retrieve accurate, adequate, relevant, and up to date information. This means that, if the information resources are not adequate, the services rendered by the library will also be inadequate. According to Omosekejimi, Ijiekhuamhen and Ojeme (2015) information resources are the information bearing materials which enable the library to fulfill its goal of satisfying the information needs of its users.

To provide these many services to its users, the libraries acquire information resources in various sizes, types, and formats. These information resources are stored in the print and electronic formats for effective teaching, learning and research purposes. Information is an indispensable ingredient for social, economic, industrial, political and technological purposes. Kumar and Singh (2021) opined that electronic information resources have become well known and used in the library due to the current trends and introduction of digital/virtual library. Current research shows that library users now prefer the use of electronic information materials because they are easily accessed from anywhere one might be, hence, the importance of library database management to ensure that electronic information resources are stored for a long time. According to Ogbodo (2010) information is knowledge communicated or recorded in relation to a particular subject or mankind that could help its users to bridge their knowledge gap. Information resources that are already in the libraries need to be secured from improper use or handling, poor weather conditions, and theft. This shows that security is an integral part of every library and management of the libraries spend considerable amounts of money to provide security.

Database management systems are used in libraries to ensure that the major objective of the library (which is to serve

users' information needs) is achieved and because, for the vast arrays of information resources in the libraries to be easily accessed by the library users, they need to be properly stored and organized. Information resources in the libraries also need to be preserved because of the importance of the information contained in them. One reason why information resources need to be preserved is because it often takes a long time and a lot of money to purchase them from overseas due to distance and high exchange rates. The way these information resources could be stored, organized, and preserved is through the adoption of information and communication technology (ICT). Information and Communication Technology can be employed to automate an extensive range of administrative and technical processes using databases. With the advent of technology, there is a need to review the activities and aspects of the libraries. It saves a lot of time and energy of the library users and library staff when computers are used for storing, organizing and preserving activities of the information resources in the libraries.

Many researchers have written articles on database management in the libraries but not much articles have been written on the assessment of database management in academic libraries in Southeastern Nigeria, Nigeria, hence the reason for this study on "Assessing the applications of library database management systems in academic libraries in Southeastern Nigeria". The researcher therefore wishes to fill the gap in the literature.

### **Objectives of the study**

The major objective of this study is to assess the applications of library database management systems in academic libraries in Southeastern Nigeria. The specific objectives are to:

1. determine the frequency and proportion of university libraries in the Southeastern Nigeria that employ database management systems (DBMS); and
2. explore the frequency and proportion of state and federal university libraries in the

Southeastern Nigeria that employ database management systems (DBMS).

### Research questions

The following research questions guided the study:

1. What is the proportion of university libraries in Southeastern Nigeria that apply database management systems (DBMS)?
2. What is the proportion of state and federal university libraries in Southeastern Nigeria that employ database management systems (DBMS)?

### Hypotheses

The following hypotheses were formulated and tested at a set probability value of 0.05.

1. The proportion of university libraries in Southeastern Nigeria that apply database management systems (DBMS) is not significantly do not differ significantly.
2. The proportion of state and federal university libraries in Southeastern Nigeria that apply database management systems (DBMS) do not differ differently.

### Literature review

A database is a setup for easy accessing, managing, and updating of information. According to Lukteovich and Hughes (2021) computer databases commonly store conglomerations of information records or documents that contain data, like deals exchanges, client information, financials and item information. Databases are characterized by the type of data that is stored in them which could be words, data, numbers, or subject matters (Abubakar & Akor, 2017). According to Igere (2022) database system is a computer-based system that stores, records, and maintain data or information which is retrieved when needed for decision making. Database is important in the library because a library has a lot of files and information resources stored for the services it renders to users, with the use of a database system, these

files and resources can be stored online where they can be easily accessed by the library users, (Mullins, 2021).

Databases are utilized for putting away, keeping up with and getting any kind of information. They gather data on individuals, places, or things. Such data is assembled in one place, so it can be noticed and examined. Databases can be considered a coordinated assortment of data (Lukteovich and Hughes, 2021).

Library database is an electronic outlet for storage and transmission of information resources. According to Igere (2022) is a collection of different programmes gathered to manage and control access to stored data. Libraries utilize information put away in databases to go with informed library judgment. Obi and Nzerim (2022) posited that the library database is a repository that stores reliable electronic information resources which can be accessed by users through the library's dedicated access point. There are different types of information materials stored in the library database which includes e-books, academic journals, periodicals, magazines, conference proceedings etc.

Library database management system is a collection of interrelated data and a set of programs used for accessing data stored (Khaing, 2009). A portion of the manners in which libraries use databases as pointed out by Lukteovich and Hughes incorporate the following:

- i. *Further develop business processes:* Libraries gather information about library administrations, for example, data administrations, loaning administrations, client instruction administrations and dispersal of information administration. Library staff and the executives examine the information to further develop these library administrations, extend their library and create more income.
- ii. *Monitor clients:* Data sets are in many cases used to store data about

individuals, for example, library staff, and clients. For instance, college libraries can utilize databases to store library client data, for example, names, email locations, office and workforce, and client conduct. The information is utilized to prescribe content to clients and further develop the client experience. (Luktevich and Hughes, 2021)

The facts really confirm that various kinds of databases vary in composition, information construction and information types most fitted to them, yet they all contain similar five fundamental parts. The parts are as per the following:

- *Hardware*: This is the actual gadget that database programming runs on. Database equipment incorporates PCs, servers, and hard drives.
- *Software*: Database programming or application gives clients control of the data set. Database Management System (DBMS) programming is utilized to oversee and control databases.
- *Data*: This is the crude information that the database stores. Database directors coordinate the information to make it more significant.
- *Data access language*: This is the programming language that controls the data set. The programming language and the DBMS should cooperate. One of the most well-known database languages is Structural Query Language (SQL).
- *Procedures*: These standards decide how the database functions and how it handles the information. (Luktevich and Hughes, 2021)

Notwithstanding the library database itself, a bunch of projects is important to work with adding new information as well as changing and recovering existing information inside a library database. This arrangement of projects is alluded to as library Database

Management System (DBMS). Before the presentation of the DBMS, libraries depended on the manual strategy for information handling and storage. Each record was particular to be utilized with a particular application. This was in accordance with Okore's (2006) outline that document handling becomes cumbersome, exorbitant, and non-adaptable with regards to providing required information precisely and expeditiously. According to BasuMallick (2022) Database Management System (DBMS) is an electronic arrangement that helps store data in a way that is not difficult to peruse, alter, erase, and scale, with the essential goal of drawing relationships, controlling analysis, and supporting data-driven work processes. It has a backend stockpiling framework as well as a front-end user interface (UI). Mullins (2021) characterized DBMS as system software for making and overseeing databases. A DBMS makes it feasible for library staff to make, safeguard, update, and erase information in a database. With respect to library clients, DBMS makes it workable for them to peruse information in a database. Being the most common kind of information management platform, the DBMS basically fills in as a connection point among databases and clients or application programs, guaranteeing that information is reliably coordinated and remains effectively open. Databases are organized alongside the sorts of content: repositories, text, pictures, numeric and alphanumeric images it contains.

As indicated by Farid (2012) the plan of a DBMS includes three contemplations:

- Library clients' necessities or application programs
- Library database handling system
- Library database itself.

DBMS commonly depend on a standard working framework or operating system to give these capabilities including capacity to accommodate various clients to share information and interaction assets. This

interaction includes the assortment of projects that gives a database professional chance to program a database. As per Jeffrey (2007), the database management system has fluctuated functionalities, ways of overseeing data and how that data is managed. A portion of the DBMS software for making and overseeing databases are spreadsheets, data management, word handling, desktop publishing, designs programming, interactive media program, and groupware. Many studies have been done on the use of DBMS in libraries, yet none has been completed in the Southeastern Nigeria of Nigeria. Besides, most of the investigations basically centered around hardware utilized as database. The requirement for the utilization of DBMS in libraries can't be overemphasized and consequently, the need for additional studies in this area.

The Library Database Management System (DBMS) is expected to computerize the library services, for example, creating new borrower, giving books to the borrowers, and keeping up with the subtleties of the multitude of things that were accessible in the books. This likewise helps the librarians by giving information, for example, complete duplicates accessible of each book, rundown of books that have a place with a specific classification (Short and Long Loan, Reference etc ). A normal table in a library data set has the accompanying segments:

- i. Book\_details
- ii. Binding\_details
- iii. Category\_details
- iv. Borrower\_details
- v. Student\_details
- vi. Staff\_details
- vii. Shelf\_details

Data maintenance is the adding, erasing, changing, and refreshing of binary and undeniable level records, and this present reality information related with those documents. Information can be stored physically as well as through an automated system, but at the starting and interpretation/conveyance point, it is converted into a binary representation for

easy storage. Information is typically altered at a marginally more significant level in a configuration pertinent to the items in the information (like text, pictures, or logical or monetary data, etc). It is additionally the support, stockpiling, and general upkeep of this information in the long run (Farid, 2012).

In this 21st century and period of cutting-edge improvement in the space of Information and Communication Technology (ICT), it will be backward to in any case have academic libraries that keep themselves to the old strategy for print materials alone. To be more exhaustive in their data administrations, academic libraries ought to take on the advanced computerized or electronic strategy for information services or administrations. That is why Nworie, Okonkwo, Ogueri and Obiano (2022) opined that gathering together of already published works by an institution, on an institution and its staff into a database called institutional repository is very necessary for archiving. Present day academic libraries need to choose, gather, coordinate, keep up with and serve digital documents, notwithstanding print materials, to arise themselves as basic partners in the academic activities of their organizations in a universe of plentiful digital documents. So, Librarians of present-day libraries need to acquaint themselves with, learn and use new advances that would help them in the dissemination of information. Lately, there are numerous software packages that can be utilized for data capacity and recovery as well with respect to library automation. These software packages have become common in many nations of the world, including Nigeria. Accordingly, there is not a remotely good reason for libraries that have still not moved up to computerized strategies for data administrations. Subsequently, data administrators today need to go with fitting choices regarding the decision of software packages. The most generally utilized software packages in libraries across the world are the CDS/ISIS, SANJAY, WINISIS, FILEMAKER, STYLIS, IDAMS, SOUL, LIBSYS, Greenstone, and Dspace.

CDS/ISIS, created by UNESCO, is one of the known freeware, extraordinarily intended for dealing with bibliographical data. CDS/ISIS is not a turnkey instrument for the automation of libraries. Notwithstanding, it gives a bunch of instruments, which can be utilized to create library software packages. Larger part of the current library software databases has been created utilizing CDS/ISIS. SANJAY, created by NISSAT as a team with DESIDOC, is one such application. Winisis - window adaptation of the CDS/ISIS software of UNESCO-is a phenomenal data tool initially produced for production of cataloging (bibliographic) databases, which is in wide use in numerous institutions all over the world. Winisis is a free copyright safeguarded software. This study is therefore, set out to investigate the application of database management systems in university libraries in Southeastern Nigeria.

### Methods

The study employed survey research design of the inferential type. The area of the study is the Southeastern Nigeria of Nigeria. The population of this study is 39 academic libraries, consisting of 17 federal and 22 state

owned academic libraries. The sample for the study is 39 which corresponds with the population. This is because the population is not large and can be conveniently studied by the researcher. Hence, the sampling technique employed is census enumeration. The instrument used for data collection is a researcher-made rating scale titled: Application of Database Management System Rating Scale (ADBMSRS). The rating scale is made up of ten (10) items structured on dichotomized response options of “Applied (Ap) or “Not Applied (NA)”. The instrument was validated by three experts and found to have face validity. The internal consistency coefficient of 0.84 was computed for DBMSRS using Kuder-Richardson formula twenty. The research questions were answered using descriptive statistics (frequency count and proportion), while the hypotheses were tested using t-test of significant sample proportion at the set probability value of 0.05.

### Results

**Research question one:** What is the frequency and proportion of university libraries in Southeastern Nigeria that apply database management systems (DBMS)?

**Table 1: Frequency and proportion of university libraries that apply the various database management systems in their libraries in Southeastern Nigeria**

Library databases	<i>f</i>	Proportion
CDS/ISIS	5	0.13
SANJAY	1	0.03
WINISIS	1	0.03
FILEMAKER	0	0
STYLIS	0	0
IDAMS	0	0
SOUL	0	0
LIBSYS	2	0.05
GREENSTONE	2	0.05
DSPACE	1	0.03
Others	2	0.05
None	25	0.63

**Table 2: Proportion of university libraries that apply library database management system**

N	f	P	F	q
39	14	0.36	25	0.64

Table 1 shows the library database management system adopted by academic libraries. The data shows that five academic libraries representing a proportion of 0.13 adopted CDS/ISIS, one representing a proportion of 0.03 adopted SANJAY, WINISIS, and DSPACE. Similarly, two academic libraries representing 0.05 applied LIBSYS, GREENSTONE and others. In all, as shown in Table 2, only 14 academic libraries representing a proportion of 0.36

apply database management systems (DBMS). On the contrary, 25 representing a proportion of 0.64 academic libraries do not apply database management systems (DBMS) at all.

**Hypothesis one:** The proportion of university libraries in Southeastern Nigeria that apply database management systems (DBMS) is not significantly do not differ significantly.

**Table 3: Summary t-test Statistics on the proportion of university libraries in Southeastern Nigeria that apply database management systems (DBMS)**

N	$t_{cal}$	df	$t_{crit}$	Decision
39	-3.746	38	1.684	accept $H_{01}$

As shown in Table 3, the calculated t-test statistic -3.746 is less than the tabulated t-value 1.684 at 38 degree of freedom and set probability value 0.05. Therefore, the null hypothesis one is accepted. Hence, the proportion of university libraries in the Southeastern Nigeria that employ database

management systems (DBMS) is not significantly greater than 0.5.

**Research question two:** What is the frequency and proportion of state and federal university libraries in the Southeastern Nigeria that employ database management systems (DBMS)?

**Table 4: Frequency and proportion of federal and state university libraries that apply the various database management systems in Southeastern Nigeria**

Library databases	State	Federal	f	Proportion
CDS/ISIS	2	3	5	0.13
SANJAY	0	1	1	0.03
WINISIS	0	1	1	0.03
FILEMAKER	0	0	0	0
STYLIS	0	0	0	0
IDAMS	0	0	0	0
SOUL	0	0	0	0
LIBSYS	1	1	2	0.05
GREENSTONE	0	2	2	0.05
DSPACE	0	1	1	0.03
Others	0	2	2	0.05
None	17	8	25	0.63

**Table 5: Frequency and proportion of academic libraries that apply library database management system**

Federal University Libraries			State University Libraries		
		$nfP_1$			$nfP_2$
17	9	0.53	22	5	0.23

As shown in Tables 4 and 5, out of the 17 federal university libraries, 9 representing a proportion of 0.53 adopted DBMS, while 8 did not. On the other hand, out of the 22 state university libraries only 5 representing a proportion of 0.23 adopted a database management system, while 17 did not. The proportion of federal university libraries that

apply DBMS is higher than the proportion of state university libraries.

**Hypothesis two:** The proportion of state and federal university libraries in Southeastern Nigeria that apply database management systems (DBMS) do not differ significantly.

**Table 6: Summary t-test statistics on proportion of state and federal university libraries in Southeastern Nigeria that apply database management systems (DBMS)**

N	$t_{cal}$	df	$t_{crit}$	Decision
39	2.661	38	2.021	fail to accept $H_0$

The data in Table 6 shows that the calculated t-test statistics 2.661 is greater than the tabulated two-tailed t-test statistic 2.021. The researcher, therefore, fails to accept the null hypothesis, one which states that “the proportion of state and federal university libraries in Southeastern Nigeria that apply database management systems (DBMS) do not differ significantly”. Therefore, the proportion of state and federal university libraries in the Southeastern Nigeria that apply database management systems (DBMS) differ significantly.

### Discussion

The finding of the study revealed that the proportion of university libraries that adopt library database management systems is low. The statistical test carried out revealed that the proportion of university libraries in the Southeastern Nigeria that employ database management systems (DBMS) is not significant. This shows that so many university libraries do not adopt database management systems (DBMSs). It means that these university libraries that do not make use of library database management systems and are still depending so much or completely on

printed information materials instead of a more easily accessible electronic information material. In this era of information and technology, academic libraries need to move away from the traditional print materials alone, if they want to include everything that is necessary in their information services. Modern academic libraries need to select, collect, organize, maintain and serve digital documents, in addition to print materials, to emerge themselves as critical partners in the academic activities of their institutions in a world of abundant digital documents. This finding is in line with the findings of other researchers, for example, the finding gives credence to the findings of Ivongbe, Abdulsalami and Omorogbe (2021) and Aliyu and Nock (nd) who found that most academic libraries have not upgraded to the use of library database management system in their rendering of information services. Another finding of the study revealed that academic libraries in federal universities make use of library database management systems more than academic libraries in state universities. This shows that federal universities are putting more efforts in upgrading to modern

ways of rendering information services, combining both digital and print materials.

### Conclusion

In conclusion, there is a need for widespread use of library database management systems in academic libraries in Southeastern Nigeria universities. From the findings above, academic libraries in federal universities are applying library database management systems more than state universities. Finally Obiano, et al (2021), explained library services in academic libraries to be all encompassing by defining it to be services provided by the library to the users which include instructions on how to access and use library materials. So if library resources are well preserved in different databases without users having access to them or being properly managed then there is no quality service to the users. Therefore, academic libraries' databases management whether in state or federal university should be well managed by qualified librarians who are computer compliant for quality services delivery to users.

Based on the findings of the study, the following recommendations are made:

1. Academic libraries should be funded properly, and staff trained to adhere to global services obtained in academic libraries by adopting library database management systems, to shift away from the traditional print materials.
2. Since funds are often the problem, academic libraries in state universities as well as in federal universities should adopt the free versions of library database management systems such as CDS/ISIS and WINISIS.

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