LAFIA JOURNAL OF LIBRARY AND INFORMATION SCIENCE
Volume 3, Number 1, 2023.
https://lalibjournals.org/index.php/LJLIS
ISSN: Print - 2814-0702, Online - 2814-0710
LJLIS

LIBRARIANS' AWARENESS AND USE OF BIG DATA ANALYTICS AS A STRATEGY FOR INFORMATION MANAGEMENT IN STATE UNIVERSITIES IN NORTH-EASTERN NIGERIA

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Abstract
Big data analytics can contribute immensely toward information management in academic libraries. However, its awareness and rate of use are not fully ascertained especially in Nigeria. This research, therefore, is devoted to assessing the librarians' awareness and use of big data in some selected University libraries in North-East Nigeria. The population of the research comprise all librarians in the selected libraries and they were all considered as respondents of the research because they are not too much to be managed. Questionnaires were used for data collection and Statistical Package for Social Sciences (SPSS) was used to analyse the data. Mean and frequency counts were chosen as metrics to measure the responses. Findings revealed that most librarians are aware of big data analytics and have a good perception of its use in academic libraries. Findings also show that though big data analytics is associated with challenges, still the extent to which it is used for managing information in academic libraries is high. The research recommended among others that more periodic training should be given to the librarians and robust strategies should be devised to curtail the challenges that hindered the smooth use of big data analytics.

Keywords: Big data, Big data analytics, Academic libraries, Northeast Nigeria, Information management, University Libraries.

Introduction

Libraries have been storing and cataloguing their print and electronic resources using databases over the years just to meet the information needs of their patrons (Hussain & Shahid, 2022). Apart from that, they also capture and store each user's actions and transactions related to their services using several methods with not much problem. As time goes on, the scenario began to change due to the proliferation of technologies as well as the increased number of users

and the altering nature of services needed (Gabay and Shoham, 2019). Additionally, academic libraries' services have now gone beyond the wall that indicates their physical existence as a result of various technological advancement which changes not only the roles of librarians but the acquisition, processing and dissemination style of the library collections to be used by users (Kairigo, 2019). Data regarding users' access, borrowing, requesting of materials and other transactions related to library services are always increasing as users can now utilize the libraries' services both physically and virtually (Kairigo, 2019). This gives birth to the accumulation of large quantities of data by librarians that tend to be beyond the normal information system used to handle the data (Islam et al., 2021). Such huge data are referred as to big data and the technique used to analyse it is analytics.

Big data is regarded as voluminous structured and unstructured data that exceeds the handling capability of conventional data processing tools (Anna & Mannan, 2020). Big data is data that requires a special, systematic and strategic approach to handle and process it as a result of its huge quantities (Hussain & Shahid, 2022). Library users nowadays supply their biodata as registered users, make requests for new library materials and website links to various libraries' subscribed databases (Doty, 2015). All these lead to the accumulation of huge amounts of data of varying formats, volumes and behaviour that cannot be handled by just a mere traditional or unsophisticated data processing technique and hence can affect the efficiency of the libraries' services (Hamad et al., 2022). Librarians are finding it very difficult to systematically collect and analyse data for improved service delivery (Islam et al., 2021), which left them with no option but to source a superior means of mining and analysing the data more efficiently (Anna & Mannan, 2020). Big data analytics which aim at systematically extracting and classifying vital information from the accrued data can have a vital role to play in academic libraries, hence the need to be considered by the librarians (Hussain & Shahid, 2022).

Despite the roles of big data analytics in mining vital information for informed decisions and better services delivery in academic libraries, studies revealed that most parts of the world's academic libraries are yet to implement it effectively (Aliyu et al., 2020), likewise in the African context, only a few researches were discovered on big data analytics in academic librariesand the attempt to improve the research is very limited (Kairigo, 2019), the story goes down to the Nigerian context and only to found that big data analytics research is still at the crawling stage and with no realistic results (Aliyu et al., 2020; Owolabi et al., 2021). Hamad et al. (2022), submitted that generally, the number of

investigations conducted in academic libraries' use of big data are insufficient when compared with other domains. Additionally, librarians have traditionally assumed that their existing data management tools are adequate to serve them, which of course is a wrong perception. Islam et al., (2021) submitted that there is an extreme need for librarians to expand their data management research and other scientific data services that can pave way for innovative support to users. Likewise, it has been seriously emphasized that more should still be investigated about big data analytics in relation to academic libraries in Nigerian context (Owolabi et al., 2021). .This therefore, gives rise to the need for this research to be undertaken to investigate the awareness and use of big data analytics in some selected academic libraries of Northeast Nigeria.

Statement of the Problem

Globalization bring changes and challenges to the management of information resources in academic libraries, which in turn make it difficult for some librarians to handle the information more properly. Moreover, the available technologies such as big data analytics have not been fully employed by the librarians in discharging their roles on information management. This could be associated with lack of awareness and knowledge of the big data analytics by some librarians. Furthermore, studies revealed that the use of big data analytics by some librarians is too low, likewise the challenges associated with its implementation is skyrocketing. In order to arrest and address the situation, the need to assess librarians' level of awareness and use of bigdata analytics in some Nigerian university libraries is essential.

Objective of the Research

The main objective of this research is to assess the librarians' awareness and use of big data analytics as a strategy for information management. The specific objectives are:

1. to assess the level of librarians' awareness of the big data analytics use in Academic Libraries in North East Nigeria.
2. to assess the librarians' perception toward using big data analytics in academic library services in North East Nigeria.
3. to assess the extent to which librarians use big data analytics in their academic libraries in North East Nigeria.
4. to ascertain the challenges that are associated with the use of big data analytics academic libraries in North East Nigeria.

Research Questions

1. What is the level of librarians' awareness of the big data analytics use in Academic Libraries in North East Nigeria?
2. What is the librarians' perception toward using big data analytics in academic library services in North East Nigeria?
3. What is the extent to which librarians use big data analytics in their academic libraries in North East Nigeria?
4. What are the challenges associated with the use of big data analytics in academic libraries in North East Nigeria?

Review of Related Literature

Librarians' Awareness and Use of Big Data Analytics

Now that investigation into data accumulation, propagation, storage and dissemination advances, researchers believed that librarians' perspective toward having more experience in the data field is very important (Islam et al., 2021). Academic libraries being an important part of higher educational institutions plays an essential role in proving timely, accurate and reliable information for their users to accomplish research purpose and other needs (Owolabi et al., 2021). Rapid advancements in technologies which gave birth to social media and cloud computing have led to the generation of a vast amount of data of very high volume, variety, value and velocity (Liu, 2018). Data generated by Libraries include paper copies, CD-ROMs, database resources, and other unstructured data from the daily users' browsing, borrowing and maintenance of management staff. (Liu, 2018). Therefore, this necessitates the need to employ analytical techniques to take care of the data for improved information management and better-informed decisions. Researchers have undergone various investigations to examine the utilization of big data analytics in academic libraries with the view to understanding the extent to which it is used. Faten et al. (2020) conducted research in Jordanian academic libraries and discovered that they use big data analytics in their libraries for record organization and assembly. More over revealed that some libraries just started using big data analytics in their libraries for synthesizing vital information that can lead to initiating better decisions. Likewise Owolabi et al. (2021) indicated that the usage of big data in academic libraries reaches a certain stage, but more effort and awareness need to be put in place to improve the usage in order to gain more benefits from the analytical potential.

In the same vein, investigations revealed that organizations including academic libraries need serious awareness to improve the adoption rate of big data analytics for harnessing its benefits. Anna and Mannan (2020) revealed that

the level of big data analytics awareness among librarians is very low as the adoption process is still in the early stage. Likewise, Kairigo (2019) acknowledged that the awareness that librarians have regarding the use of big data analytics is inadequate, but efforts are underway to enlighten them about the need to be fully aware of it. Correspondingly, Esomonu et al., (2020) conducted a study on assessment of big data in Nigeria: identification, generation and processing in the opinion of the experts and their results revealed that the respondents have only a little awareness of the use of big data analytics. However other studies conducted by Raguseo (2018), Tella (2021) and Ahmad et al. (2019) revealed that the respondents surveyed in their respective studies are well aware of the use of big data analytics in their libraries. In fact, they even testified that the use of big data analytics for improving their service delivery and managing their information more rightly. Therefore, there are varying results regarding the use and awareness of big data analytics in academic libraries, hence the need for further research especially where such type of investigation has not been done.

Perception and Challenges of Using Big Data Analytics

Advancements in technology compel libraries to move their resources and services online leading to the accumulation of varying, voluminous and unprecedented data to form what is called big data (Esomonu et al., 2020). The evolution of big data creation, collection, storage, and flow has presented several challenges and opportunities for 21st-century libraries (Ahmad et al., 2019. Hamad et al. (2022) revealed staff incompetency and inadequate skill are some of the challenges of the big data analytics in libraries. Similarly, Gui et al. (2021) identified inadequate infrastructure as well as reliable internet bandwidth as some challenges that hinders the smooth implementation of big data analytics in academic libraries.

There are different perceptions regarding the big data analytics by librarians, however majority of librarians have a positive perception toward using the big data analytics in libraries. Librarians were able to dictate all users' need of information as well as their level of patronage through big data analytics that analysed and exposed every information regarding that (Islam et al., 2021). Aliyu et al. (2020) perceived that the upsurge of analytics into the huge amount of data accumulated from various sources especially online sources became necessary in order to have insight into the data for better-informed decisions. Likewise, Hussain and Shahid (2022) stressed that finding the way library users interact with the library resources and services through big data analytics is of paramount important. Kairigo (2019) concluded that big data analytics is a powerful tool and

Research Methodology

This section explains the approach used in conducting the research, in which the research design, population, samples, instrument for collecting data, questionnaire administration, and method for data analysis were superficially described. A descriptive survey approach was adopted for this research and the reason for choosing the survey approach is because it has been predominantly used in previous studies related to this one as well as giving an opportunity to generalize the sample results on the entire population Pallant, 2010. The target population of the study comprises para-professional library staff and professional librarians of the selected State Universities in North-East Nigeria which include Sa'adu Zungur University, Bauchi State, Gombe State University, Gombe and Borno state University, Maiduguri. Because the population of the study is not that much, the researchers decided to census all the population as respondents of this research.

Table 1.: Population and Sample Distribution of Respondents

S/N	Academic libraries	Population	Sample	Returned
1	Sa'adu Zungur University Library, Bauchi	46	46	43
2	Gombe State University Library, Gombe	42	42	40
3	Borno State University Library, Maiduguri	21	21	20
4	Yobe State University, Damaturu	40	40	39
	Total	149	149	142

A structured questionnaire was developed to serve as an instrument for data collection. The questionnaire has two parts, in which one part sought respondents' demographic information while the second part sought participants' responses from the designed questions that reflect the objectives of the research. The questionnaire responses were designed based on 5 points Likert scale, ranging from 5- strongly agree to 1-strongly disagree. The content and face validity of the questionnaire were checked and certified by experts in the fields of library & information science and information technology. Data were collected within the period of three weeks. Research assistants were used in distributing the questionnaire among the participants in the selected academic libraries.Out of the

149 questionnaires distributed only 142 were returned. Data analysis was finally conducted using Statistical Package for Social Science (SPSS) in which percentage, Mean, Standard Deviation and frequency count were used in determining the outcome of the results.

Data Analyses

The research data were analysed and the following findings were discovered which answered our outlined objectives.

Variables	Frequency	Percentage
Gender	ion of Respondents	
Male	98	69
Female	44	31
Total	**142**	**100**
Qualifications of Respondents		
PhD	3	2.1
MSC	18	12.7
Degree/HND	74	52.1
Diploma/NCE	32	22.5
Others	15	10.6
Total	**142**	**100**
Years of Experience		
1-5	12	8.5
6-10	74	52.1
11-15	48	33.8
16-20	8	5.6
20 and above	0	0
Total	**142**	**100**

Characteristics information of this research participants revealed that the majority of them are male represented by 98(69%) while their female counterparts constituted the minority represented by 44 (31%). Regarding the qualifications of respondents, the majority of them represented by 74(52.1%) had a Degree/HND, followed by diploma/NCE holders represented by 32(22.5%), then holders of other qualifications represented by 15(10.6%) and PhD holders constitute the minority represented by 3(2.1%). Going by the range of the qualifications of respondents, it is indicated that most of them have the necessary qualification that can enable them to utilize big data analytics in their respective libraries. On the

years of respondents' experience, finding revealed that those with 6-10 years of experience constituted the majority, represented by 74(52.1%), followed by 48(33.8%) whose years of experience fall in-between 11-15, then those with 1-5 years of experience are 12(8.5%) while those with 16-20 years of experience constitute the minority, represented by 8(5.6%). Going by the respondents' years of experience, this finding indicated that the majority of respondents have a moderate years of experience in service and that could be sufficient enough for them to use big data analytics in their respective libraries.

Objective 1.: To achieve objective 1, this research used six items to measure the librarians' level of awareness of the big data analytics use in academic libraries. The results obtained based on the respondents' responses are presented in Table 3 below.

Table 3: The level of Librarians' Awareness of Big Data Analytics Use in Academic Libraries

Code	Statement	SA	A	N	DA	SD	Mean	St. Dev
AWS1	I know what big data analytics is all about	60	61	19	0	2	4.25	0.79
AWS2	Am aware that other sister libraries are using big data analytics	46	74	21	0	1	4.15	0.71
AWS3	I am aware that big data analytics can be used to analyse academic libraries' data	41	73	22	4	2	4.04	0.82
AWS4	I have a good understanding of how big data analytics can be implemented in academic libraries	39	82	19	1	1	4.11	0.70
AWS5	I am aware that big data analytics is used to improve decisions in any organizations	41	85	6	7	3	4.08	0.85
AWS6	I am aware that big data can facilitate more effective information management in an academic library	52	59	28	2	1	4.12	0.82

From Table 3 Findings revealed that the majority of respondents represented

by 61agreed that they know what big data analytics is all about; followed by 60 who strongly agreed that they know what big data analytics is all about. While 19 are neutral and 2strongly disagreed that they know what big data analytics is all about. Regarding the librarians' awareness of the use of big data analytics by other sister libraries, 74 agreed, 46 strongly agreed, 21are undecided and 1strongly disagreed that they are aware of other sister libraries are using the big data analytics. Furthermore, 41and 73respondents agreed and strongly agreed respectively that they are aware that big data analytics can be used to analyse academic libraries' data. Although, 22remained neutral regarding the awareness of using big data analytics on academic libraries' data, but 4and 2disagreed and strongly disagreed respectively that they are aware that big data analytics can be used to analyse academic libraries' data. Based on this analysis, it is deduced that the majority of respondents are aware that big data analytics can be used to analyse academic libraries' data.

Objective 2.: To achieve this objective, six items were used and measured the objective in which the results obtained indicated that the librarians' perception toward using big data analytics in academic library services is high. The results are presented in Table 3 below.

Table 3.: Librarians' Perception Toward using Big Data Analytics in Academic Libraries

Code	Statement	SA	A	N	DA	SD	Mean	St. Dev
PER1	I perceive that using big data analytics in academic libraries requires high technical knowledge of analytics	74	46	12	0	10	4.23	1.09
PER2	I possess the requisite skills needed for the use and maintenance of big data analytics in an academic library	61	64	8	2	7	4.19	0.97
PER3	I perceive that the implementation of big data analytics is not beyond the financial status of many Libraries	53	62	27	0	0	4.18	0.73
PER4	I perceive that the use of big data analytics in our libraries will make certain tasks easy	31	67	36	5	3	3.83	0.88
PER5	I perceive that implementation of big data in academic libraries will provide a guide to monitor in-out of information	97	26	0	13	6	4.37	1.14
PER6	I perceive that all the needed information related to the daily activities of academic libraries will be gotten by using big data analytics	86	24	0	25	7	4.11	1.32

From Table 3 above, it is revealed that 74and 46of respondents strongly agreed and agreed respectively that they perceive using big data analytics in academic libraries requires high technical knowledge of analytics, but 10strongly disagreed and 12remained neutral with the statement. Moreover, 61and 64strongly agreed and disagreed respectively that they possess the requisite skills needed for the use and maintenance of big data analytics in an academic library. Contrarily to that, 2and 7respondents disagreed and strongly disagreed respectively that they possess the requisite skills needed for the use and maintenance of big data analytics in an academic library. Though 8have not commented on that statement. While 53and 62strongly agreed and agreed respectively that the implementation of big data analytics is not beyond the financial status of many libraries, 27remained quiet about the statement. Besides that, respondents were asked whether the use of big data analytics in libraries will make certain tasks easy, 31and 67agreed and strongly agreed respectively that the

use of big data analytics in libraries makes certain tasks easy. Contrarily to that 5 and 3 disagreed and strongly disagreed respectively. However, 36have not commented as to whether the use of big data analytics in libraries will make certain tasks easy or not. In the same vein, 97and 26have strongly agreed and agreed respectively that implementation of big data in academic libraries will provide a guide to monitor in-out of information. On the contrary, 13and 6disagreed and strongly disagreed respectively. Similarly, when respondents were asked whether all the needed information related to the daily activities of academic libraries will be gotten by using big data analytics? 86and 24strongly agreed and agreed respectively with the statement awhile 25and 7disagreed and strongly disagreed respectively. From the general stands of this analysis, it is deduced that librarians have a good perception toward using big data analytics in academic library services.

Objective 3: To achieve this objective, six items were used to measure it and the results obtained indicated that the extent to which librarians use big data analytics in their libraries is low as presented in Table 4 below.

Table 4.: The extent to Which Librarians Use Big Data Analytics in Academic Libraries

Code	Statement	SA	A	N	DA	SD	Mean	St. Dev
USE 1	I frequently use big data analytics in our library	8	15	0	57	62	4.06	1.17
USE 2	I partially use big data analytics in our library	68	50	0	16	8	4.08	1.19
USE 3	I occasionally use big data analytics in our library	65	33	0	37	7	3.78	1.38
USE 4	I don't use big data analytics in our libraries	1	0	11	98	32	4.13	0.56
USE 5	I only use one type of big data analytics tool in our library	40 03	66	0	24	12	3.85	1.09
USE 6	I use more than one type of big data analytics tool in our library	15	30	3	71	23	3.59	1.11

Regarding the frequent use of big data analytics by librarians as can be seen in table 4 above, 8and 15respondents respectively strongly agreed and agreed that they frequently use big data analytics, while 57and 62respectively disagreed and strongly disagreed with that statement. Similarly, 68and 50respondents strongly

agreed and agreed respectively that they partially use big data analytics in their libraries, while 16 and 8disagreed and strongly disagreed with the statement. Moreover, respondents who strongly agreed that they occasionally use big data analytics are 65,followed by those who agreed represented by 33,then those who disagreed and strongly disagreed are 37and 7respectively. Similarly, respondents who don't use big data analytics in their libraries is 1, 11are neutral while 98and 32disagreed and strongly disagreed respectively that they don't use big data analytics in their libraries. Correspondingly, responses regarding the use of only one type of big data analytics tool in the libraries, 66and 40respondents agreed and strongly agreed respectively with the statement. Contrarily to that 24and 12disagreed and strongly agreed respectively with the statement. Again, 30and 15respondents agreed and strongly agreed respectively that they use more than one type of big data analytics tool in their libraries. 71and 23disagreed and strongly disagreed respectively that they use more than one type of big data analytics tool in their libraries while 3of them remained neutral. Generally, this analysis revealed that the rate of use of big data analytics by librarians is low.

Objective 4.: To achieve this objective, six items were used to measure it, in which the results obtained indicated that the challenges that are associated with the use of big data analytics in academic libraries are enormous. The results are presented in Table 5 below.

Table 5: Challenges Associated with the Use of Big Data Analytics in Academic Libraries

Code	Statement	SA	A	N	DA	SD	Mean	St.Dev
CHL1	The cost of deploying and maintaining big data analytics tools is too much	56	51	2	25	8	3.86	1.27
CHL2	Inadequate skills and expertise can restrict a lot of librarians from using big data analytics in academic libraries	35	65	0	29	13	3.77	1.11
CHL3	An unreliable power supply can disrupt the use of big data analytics in academic libraries	35	57	0	23	27	3.35	1.30
CHL4	Inadequate staff training opportunities can negatively affect the optimum utilization of big data analytics in academic libraries	37	51	0	28	26	3.33	1.33
CHL5	Lack of good data protection policies can hinder the smooth use of big data analytics in academic libraries	48	49	0	39	6	2.88	1.27
CHL6	Poor maintenance culture of ICT facilities can affect the use of big data analytics in academic libraries	46	44	0	37	15	3.00	1.34

Regarding the challenges associated with the use of big data analytics, as can be seen in Table 5 a great proportion of respondents strongly agreed and agreed that cost of deployment, inadequate skills, the unreliability of power supply, inadequate staff training opportunities, lack of good data protection policies and poor maintenance culture negatively affected the use of big data analytics in libraries. Contrarily to that, a small proportion of respondents disagree and strongly disagreed that those itemized challenges do not negatively affect the use of big data analytics in libraries. Based on this analysis, it is therefore concluded that using big data analytics in academic libraries is to some extent associated with challenges which need to be addressed.

Discussion of Findings

The findings of this research revealed that the level of librarians' awareness of big data analytics is high, which implied that the librarians from the selected university libraries know big data analytics so much and its uses in delivering library services. This is not surprising as Kayode et al. (2020) stated that Nigerian librarians use new technologies while discharging their duties Ahmad et al. (2019) acknowledged that the level of big data analytics awareness among librarians in Pakistan is high. Though the present results contradicted that of Kairigo (2019) who reported that the librarians' awareness of big data analytics is low. Similarly, these research findings revealed that the perception of librarians in the selected university libraries is good and above average, which implied that the librarians believed that using big data analytics in libraries will offer so many benefits and ease the process of managing information. This finding could be very true considering the fact that the majority of librarians are aware of big data analytics and have been using it to some extent. Kayode et al. (2020) stated that Nigerian librarians have a good perception of novel technologies and use it to the maximum level. Likewise, Hussain and Shahid (2022) reported that librarians of Islamabad, Pakistan have a good perception of big data analytics. However, findings of Esomonu et al., (2020) revealed up to now there is poor perception toward using big data analytics by some users of the big data analytics especially in some parts of Nigeria.

Moreover, this research results regarding the extent to which librarians use big data analytics in their libraries revealed a high level of usage by the librarian of the selected university libraries. This indicated that the librarians utilized one or more big data analytics applications in managing information in the libraries. This finding corroborated that of Faten et al. (2020) who also found that the level of big data analytics use by librarians is high and that they use it to a maximum level. Likewise finding of Tella (2021) revealed that librarians use big data analytics in

processing and managing library information. Correspondingly, this research revealed that despite the opportunities that big data analytics offers, it is also associated with some challenges that include but are not limited to staff inadequate technical know-how, irregular power supply, insufficient staff training opportunities, deficiencies in data protection policies and poor maintenance culture. These challenges and many more hinder the full utilization of big data analytics to some extent in many academic libraries in Nigeria. This finding supported that of Tella (2021) who reported that the adoption of novel technologies in Nigerian libraries is always associated with challenges that slow its adoption process. However, he justifies that some strategic efforts are underway toward curtailing such challenges in Nigeria.

Conclusion

This research has examined the librarian's awareness and use of big data analytics in academic libraries of some selected universities in Northeast Nigeria. The results revealed that the majority of librarians have an appreciable level of awareness of big data analytics, and they use it to some extent in managing library information for better performance and efficient service delivery. Equally the results indicated that majority of respondents have a good perception of the use of big data analytics, however, some challenges have limited its full implementation in the libraries. Therefore, with the use of novel technology such as big data analytics, it is concluded that all sorts of information coming and going out of the libraries will be fully managed, hence improving the efficiency at which a better service will be delivered. It is hoped that the challenges associated with big data usage in libraries will soon be overcome in order to facilitate its full adoption in all the libraries in Nigeria, Africa and the rest of countries of the world.

Recommendations

Based on the outcome of this research, it is recommended that more training opportunities should be given to librarians periodically in order to enhance their capacity in using big data. Equally, librarians should try to maximally utilise big data analytics and accrue the benefits derived from it to justify its purpose of use. Necessary strategies should be put in place to address the challenges related to the use of big data analytics for improved information management in all libraries. Other types of libraries such as special, public and private libraries should be investigated in future research in order to have their view regarding the use of big data analytics in their libraries.

libraries.

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