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Impact of ICT on Information Retrieval System in Academic Libraries: The Experience of Federal University Gashua Library, Yobe State, Nigeria

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Abstract

This study was designed to determine the impact of information and communication technology (ICT) on information retrieval system in academic libraries. To achieve the purpose of this research, the study was guided by three (3) objectives, three (3) research questions and four (4) commendations. Survey research design was adopted for the study and data was gathered through the instrument of a questionnaire. Data collected were analyzed using descriptive statistics, frequency count and percentages. Information is considered an economic resource that improve national development and other resources such as education, security, politics, businesses, infrastructure and social amenities. This view stems from evidence that the possession, manipulation, and use of information and communication technology can increase the cost-effectiveness of many physical and cognitive processes. Therefore, the needs for latest ICT facilities such as computers, internet, intranet/extranet, local area network (LAN), printer, scanner, machines (photocopy, bindery and laminating), broadcasting technologies (radio, public address speaker and television), projector and telephony among others in academic libraries are necessity for information retrieval system and effective service delivery.

Keywords: Information retrieval system, Search engine, Database and Academic libraries

Introduction

Information and communication technology (ICT) is defined as a diverse set of technological tools and resources used to communicate, create, disseminate, store, manage information and promote human activities. These technologies include; computers, internet, printer, scanner, photocopy machine, binding machine, laminating machine, broadcasting technologies (radio, public address speaker and television), projector and telephony among others, and are widely used in today's education field most especially academic libraries. Saleem (2013) defines information and communication technology as the application of computers and other technologies to the acquisition, organization, storage, retrieval and dissemination of information. ICT has therefore changed the face of all fields of human endeavour. Khan (2016) opines that Information and Communication Technology (ICT) has transformed library services globally. Most current information are recorded in electronic format, ICT has also contributed immensely to the performance of librarians in the discharge of their duties such as in cataloguing and classification, reference services, circulation management, serials control and e-library.

Information is considered an economic resource that improve national development and other resources such as education, security, politics, businesses, infrastructure and social amenities. This view stems from evidence that the possession, manipulation, and use of information can increase the cost-effectiveness of many physical and cognitive processes. Fei (2011) observes that the major information source of leading Japanese scientists seem to be through personal acquaintance with colleagues and attendance at meetings through sharing of information on what other countries have done and how can they supersede. Rexwhite (2013) stresses that information is used in the context of user or studies need, to denote a physical entity or phenomenon, the channels of communication through which messages are transferred or the

factual data, document, transmitted orally. This information can be described as a response caused by an external stimulus that condition one's form of behaviour or the amount of impact received from exterior that modifies our state of knowledge.

Information retrieval (IR) is the science of searching for information in documents, searching for documents themselves, searching for metadata which describe documents, or searching within databases, whether relational stand-alone databases or hypertext networked databases such as the Internet or World Wide Web or intranets, for text, sound, images or data. Information retrieval is the process of searching some collection of documents, in order to identify those documents which deal with a particular subject. Any system that is designed to facilitate this literature searching may legitimately be called an information retrieval system. Jansen (2016) asserts that information retrieval deals with the production, representation, organization, storage, retrieval, use, or evaluation of information, along with the tools and techniques associated with these processes. Elmasri (2011) affirms that information retrieval is the process of retrieving documents from a collection in response to a query (or a search request) by a user. Many features of conventional text retrieval system are equally applicable to multimedia information retrieval, the specific nature of audio, image and video information have called for the development of many new tools and techniques for information retrieval. Modern information retrieval deals with storage, organization and access to text, as well as multimedia information resources. When using information retrieval systems, users often present search queries made of ad-hoc keywords to obtain a precise representation of user's information need, and the context of the information (Lotfi, 2013).

Search engine is a practical application of information retrieval to large scale document collections such as firefox, google chrome, bing, yahoo, ask.com, baidu, internet

archive, opera, yandex.ru and etcetera. Search engine is an information retrieval system designed to help find information stored on a computer system. With significant advances in computers and communications technologies, people today have interactive access to enormous amounts of user-generated distributed content on the Web. This has spurred the rapid growth in search engine technology, where search engines are trying to discover different kinds of real-time content found on the Web. Bachchhav (2016) stated the following requirements for online search system in information retrieval system:

Requirements for online search system:

i. Workstation or computer.

ii. Internet connection (dial up or broadband).

iii. Internet service provider such as VSNL.

iv. Search software.

v. Storage of information (in-house collection or databases).

Database is an organized collection of related information, stored in a format that enables efficient retrieval. Anyone who is undertaking or analysing research in sports medicine or any other field will inevitably use databases, with or without realizing it. The power of internet is only possible due to search engines, which are powered by massive databases containing information (in the form of key words) about millions of websites. Malik (2016) asserts that database can be defined as a collection of data that is saved on a computer system's hard drive. Databases allow any authorized user to access, enter and analyze data quickly and easily. It's a collection of queries, tables and views. The data stored in the databases are usually organized to model aspects that support processes that require information storage and retrieval. Rexwhite (2013) reported that database is a structured collection of records or data which is stored in a

computer so that a program can consult it to answer queries. The records retrieved in answer to queries become information that can be used to make decisions. The computer program used to manage and query a database is known as a Database Management System (DBMS). The central concept of a database is that of a collection of records, or pieces of knowledge.

Objectives of the study

The objectives of the study were to determine:

1. Availability of ICT resources and services
2. Impact of ICT on information retrieval system among library users
3. Challenges facing information retrieval system using ICT facilities

Research Questions

The study was guided by the following research questions:

1. What is the extent of availability of ICT resources and services
2. What are the impact of ICT on information retrieval system among library users
3. What are the Challenges facing information retrieval system using ICT facilities

Review of related Literature

An information retrieval system is designed to retrieve the documents or information required by the user community. It makes the right information available to the right user. Thus, information stored, collect and organize in one or more subject areas in order to provide it to the user as soon as he/she asked for the information. Maurya (2013) asserts that information retrieval process begins when a user enters a query into the system, query are formal statements of information needs. In information retrieval a query does not uniquely identify a single object in the collection. Instead several objects may match the query, perhaps with different degrees of relevancy. The concept of information retrieval presupposes that there are some documents or

records containing information that have been organised in an order suitable for easy retrieval. Agbele (2018) affirms that in information retrieval systems, users often present search queries made of ad-hoc keywords. It is then up to information retrieval systems (IRS) to obtain a precise representation of user's information need, and the context of the information. Emmanouilidis (2013) asserted that the IRS launches the query and shows the result set of documents. Jara (2013) reported that the user selects the results that considers relevant from the top *n* documents of the result set. Noh (2012) the IRS obtains information from the relevant documents, operates with the query and returns to relevance feedback in order to improve the retrieval performance. However, the effectiveness of relevance feedback is considered to be limited in real systems, basically because users are often reluctant to provide such information and this information is needed by the system in every search session, asking for a greater effort from the user than explicit feedback techniques in personalization. Jarvelin (2010) reported that user profile learning techniques do cause a much great impact on the overall performance of the retrieval system, as the mined preferences are intended to be part of the user profile during multiple sessions.

Impacts of ICT on information retrieval system in academic libraries:

a) Makes retrieval easier
b) Multiple access and retrieval at a time
c) Speed in locating information resources
d) Download as many as possible documents, unlike printed materials where users are allow to borrow two books at a time
e) Accuracy in dictating errors when searching and retrieving information
f) Storage of retrieved information on external drive

g) Automatic arrangement of information resources most especially in library databases

h) Reliability of access and retrieval system

i) Flexibility in downloading and retrieving of information resource

j) Save time of library users.

Methodology

Survey research design was adopted to carry out this quantitative study. The respondents of this study are library users both staff, researchers and students. A total of sixty (60) respondents were selected purposively for the study because of their consistency with the use of the university library. Administration of the instrument was conducted within a period of two (2) weeks to ensure that those respondents were reached and the instrument duly completed. Data collected from the questionnaire were analysed using frequency count and corresponding percentages.

Data Analysis and Interpretation

The entire 60 (100%) questionnaire administered to the respondents were returned and considered useable. Out of the 60 respondents 42 (70%) of the respondents were males and 18 (30%) respondents were females. It can be seen from table 1 that males respondents were more in number than the females.

Table 1: Distribution of users by gender

Sex of users	Frequency	Percentage
Male	42	70%
Female	18	30%
Total	60	100%

Table 1 shows that there were more males than the female's respondents which confirm the view that Federal University Gashua are dominated by the male students.

Table 2: Availability of ICT resources and services in Federal University Gashua library

Variables	Agree (percent)	Disagree (percent)	I don't know (percent)
The library provides internet service	22 (37 %)	36 (60 %)	2 (3%)
Library subscribe to electronic databases	19(32 %)	15(25 %)	26 (43%)
KOHA software services	17(28 %)	23(38 %)	20 (34%)
Library provides photocopying services	6(10 %)	41(68 %)	13(22%)
Email services is provided	16 (27 %)	39 (65%)	5(8%)
Library provides binding & printing services	25 (42%)	27 (45%)	8 (13 %)
Mobile phone services	47(79%)	11(18%)	2(3%)
E-reference services	6(10 %)	41(68 %)	13(22%)
Laminating and scanning services	5(8%)	48(80%)	7(12%)
Online public access catalogue (OPAC)	19(32 %)	15(25 %)	26 (43%)
Social network services	22 (37 %)	36 (60 %)	2 (3%)
Total	204(342%)	332(552%)	124(206%)

Table 2 presents availability of information and communication technology (ICT) resources and services in Federal University Gashua Library. The use of ICT depends on its availability. Therefore, table 2 indicates that out of the 60 respondents, 22 (37 %) respondents agreed that the library provides internet service, 36 (60 %) respondents disagreed, and while 2 (3%) respondents do not know about it. Also, 19(32 %) respondents indicated that the library subscribes to electronic databases, 15(25 %) respondents disagreed and 26 (43%) respondents do not know about it. Availability of KOHA software services was indicated by 17(28 %) respondents who agreed that KOHA software services are available in the library, 23(38 %) respondents who indicated disagreed that KOHA software services are available, and while 20 (34%)indicated no idea.

Furthermore, 6(10 %) respondents indicated agreed that the library provides photocopying services, 41(68 %) respondents disagreed, while 13(22%) respondents do not know. In the same vein, availability of email services was indicated by 16 (27 %) respondents, 39 (65%) respondents disagreed, and while 5 (8%) respondents ticked I do not know. At the

same time, 25 (42%) respondents agreed with the availability of binding and printing services, 27 (45%) respondents indicated disagreed, while 8 (13 %) respondents do not know about it. Similar, table 2 indicated that 47(79%) respondents agreed that the library provides mobile phone services, 11(18%) respondents disagreed, while 2(3%) respondents do not know about it. Also 6(10 %) respondents agreed that e-reference service is provided, 41(68 %) respondents disagreed, while 13(22%) respondents do not know about it. More so, 5(8%) respondents agreed that the library provides laminating and scanning services, 48(80%) respondents disagreed, while 7(12%) respondents do not know about it. At the same time, 19(32 %) respondents agreed that the library offers online public access catalogue (OPAC), 15(25 %) respondents disagreed, while 26 (43%) respondents do not know about it. Finally, 22 (37 %) respondents indicated agreed that the library provides social network services, 36 (60 %) respondents disagreed, while 2 (3%) respondents do not know about it.

The analysis above therefore revealed that there are limited ICT resources and services in Federal University Gashua Library. This is evident by the majority of the respondent's responses as shown on table 2.

Table 3: Impacts of ICT on information retrieval system among library users

Options	SA		A		D		SD	
	F	P	F	P	F	P	F	P
Makes retrieval easier	24	40%	12	20%	21	35%	3	5%
Provide speedy and easy access to information	27	45%	19	32%	8	13%	6	10%
Makes retrieval difficulty	5	8%	11	18%	31	52%	13	22%
Provides remote access to users	29	48%	18	30%	10	17%	3	5%
Waste time of users	6	10%	7	12%	25	42%	22	37%
Provides access to unlimited information from different sources	42	70%	16	27%	2	3%	0	0%
Multiple login at a time	26	43%	22	37%	8	13%	4	7%
Fast printing of information	31	52%	23	38%	6	10%	0	0%
Ease identification using author, title & etc	19	32%	11	18%	21	35%	9	15%
Multiple access to the same information at a time	26	43%	21	35%	10	17%	3	5%
Total	235	391%	160	267%	142	237%	63	106%

Key: SA =Strongly Agree, A =Agree, D =Disagree, SD =Strongly Disagree

Table 3 presents the impacts of ICT on information retrieval system among library users in Federal University Gashua. The digital information retrieval system depends largely on ICT facilities. Therefore, table 3 indicates that out of the 60 respondents, 24 (40 %) respondents strongly agreed that ICT makes retrieval easier, 12 (20 %) respondents agreed, 21 (35 %) respondents disagreed, and while 3 (5%) respondents strongly disagreed. Also, 27(45%) respondents indicated strongly that ICT provide speedy and easy access to information, 19(32%) respondents agreed, 18(13%) respondents disagreed and 6 (10%) respondents strongly disagreed. ICT makes retrieval difficult was indicated by 5(8 %) respondents who strongly agreed that ICT makes retrieval difficult in the library, 11(18 %) respondents who indicated agreed that ICT makes retrieval difficult, 31(52%) respondents disagreed and 13 (22%) respondents strongly disagreed. Furthermore, ICT provides remote access to users was indicated by 29(48 %) respondents who strongly agreed that ICT provides remote access to users in the library, 18(30

%) respondents who indicated agreed that ICT provides remote access to users, 10(17%) respondents disagreed and while 3 (5%) respondents strongly disagreed. At the same time, ICT waste time of users was indicated by 6(10%) respondents who strongly agreed that ICT waste time of users in the library, 7(12 %) respondents who indicated agreed that ICT waste time of users, 25(42%) respondents disagreed and while 22 (37%) respondents strongly disagreed. Table 2 indicated that ICT provides access to unlimited information from different sources was indicated by 42(70%) respondents who strongly agreed that ICT provides access to unlimited information from different sources in the library, 16(27%) respondents who indicated agreed that ICT provides access to unlimited information from different sources, 2(3%) respondents disagreed. Also 26(43%) respondents strongly agreed that ICT provides multiple login at a time in the library, 22(37%) respondents who indicated agreed that ICT provides multiple login at a time, 8(13%) respondents disagreed and while 4(7%) respondents strongly disagreed. More so, 31(52%) respondents strongly agreed that ICT provides fast printing of information in the library, 23(38%) respondents who indicated agreed that ICT provides fast printing of information, 6(10%) respondents disagreed. At the same time, 19(32%) respondents strongly agreed that ICT provides ease identification using author, title and etcetera in the library, 11(18%) respondents who indicated agreed that ICT provides ease identification using author, title and etcetera, 21(35%) respondents disagreed and while 9(15%) respondents strongly disagreed. Finally, 26(43%) respondents strongly agreed that ICT provides multiple access to the same information at a time in the library, 21(35%) respondents who indicated agreed that ICT provides multiple access to the same information at a time, 10(17%) respondents disagreed and while 3(5%) respondents strongly disagreed.

The analysis above therefore revealed that there are limited ICT resources and services in Federal University Gashua Library. This is evident by the majority of the respondent's responses as shown on table 3.

Table 4: Challenges facing information retrieval system using ICT facilities

Options	SA		A		D		SD	
	F	P	F	P	F	P	F	P
Lack of orientation on the use of ICT for information retrieval system	32	53%	21	35%	5	8%	2	4%
Limited equipment (computers, scanners and printers)	38	63%	18	30%	3	5%	1	2%
Slow network/bandwidth	15	25%	25	42%	2	3%	18	30%
Epileptic power supply	36	60%	21	35%	3	5%	0	0%
Limited working hours (8am-6pm)	43	72%	17	28%	0	0%	0	0%
Staff attitude to users	7	12%	2	3%	19	32%	32	53%
Lack of conducive environment	38	63%	18	30%	3	5%	1	2%
Total	234	389%	139	232%	23	38%	24	41%

Key: SA =Strongly Agree, A =Agree, D =Disagree, SD =Strongly Disagree

Table 4 presents the challenges facing information retrieval system using ICT facilities in Federal University Gashua (FUGA) Library. Table 4 indicates that out of the 60 respondents, 32 (53%) respondents strongly agreed that lack of orientation on the use of ICT for information retrieval system is one of their challenges, 21 (35%) respondents agreed, 5 (8 %) respondents disagreed, and while 2 (4%) respondents strongly disagreed. 38 (63%) respondents strongly agreed that limited equipment (computers, scanners and printers) is another challenges that confront them whenever they are into retrieval system, 18 (30%) respondents agreed, 3 (5 %) respondents disagreed, and while 1 (2%) respondents strongly disagreed. 15 (25%) respondents strongly agreed that slow network/bandwidth is another challenges facing information retrieval system, 25 (42%) respondents agreed, 2 (3 %) respondents disagreed, and while 18 (30%) respondents strongly disagreed. 36 (60%) respondents strongly agreed that epileptic power supply is also another challenges facing information retrieval system, 21 (35%) respondents

agreed, 3 (5%) respondents disagreed. 43 (72%) respondents strongly agreed that limited working hours (8am-6pm) is another challenges facing information retrieval system, 17 (28%) respondents agreed. 7 (12%) respondents strongly agreed that staff attitude to users is another challenges hindering adequate retrieval of information in the library under study, 2 (3%) respondents agreed, 19 (32%) respondents disagreed, and while 32 (53%) respondents strongly disagreed. 38 (63%) respondents strongly agreed that lack of conducive environment is also another challenges of information retrieval system in the library under study, 18 (30%) respondents agreed, 3 (5%) respondents disagreed, and while 1 (2%) respondents strongly disagreed.

Conclusion and Recommendations

Based on this study, information and communication technology (ICT) has positive impacts on information retrieval system in academic libraries. An information retrieval system is designed to retrieve the documents or information required by the user community. It makes the right information available to the right user and all these can be achievable through information and communication technologies; These technologies include; computers, internet, intranet/extranet, local area network (LAN), printer, scanner, machines (photocopy, bindery and laminating), broadcasting technologies (radio, public address speaker and television), projector and telephony among others, and is widely used in today's education field most especially academic libraries.

Based on the findings, the following recommendations were made by the researcher:

1. The university management should support the library financially to enable them acquire all the necessary ICT facilities needed for information retrieval system.
2. There should be regular training of library users on information retrieval skills

3. The evaluation units of the university library in collaboration with library management and ICT/e-library division should develop performance metrics to evaluate both the services of the library and the performance of the librarians. This will enable the library management evaluate and measure the effect and impact of staff and users ICT literacy.
4. The library working hours should be increase and shifting allowances should also be paid to staff in order to motivate their efforts.

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