

## **Contemporary Technologies for Medical Libraries: An innovative sustainable development technique for effective retrieval of Medical information**

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**Abstract-** This paper investigated contemporary technologies for effective retrieval of information in medical college libraries in Benue and Kwara States of Nigeria. The specific objectives are; identify contemporary technological resources, determine the extent contemporary technological resources were used for effective retrieval of information, and identify challenges associated with contemporary technologies for effective retrieval of medical information. Research questions are; what are the contemporary technological resources; what is the extent of contemporary technological resources for effective retrieval of information; what are the challenges of contemporary technologies for retrieval of information. The study adopted descriptive survey, with a population of 1035 comprising medical students from the two universities. The sample size is 207; a proportionate stratified random sampling technique was used to select 207 medical students at 20% stratum representing each medical college. The questionnaire titled “Contemporary technologies for effective retrieval of information in medical college libraries in Benue and Kwara States” were distributed, and 200 were returned valid for data analysis representing a return rate of 96%. The data collected were analysed using descriptive statistics of Mean and standard deviation. The findings show that, Medical Libraries under study to a high extent have one form of contemporary technological information resources or the other. Challenges in information retrieval are: inadequate supply of contemporary technologies to accommodate students and delay in payment of internet subscription. Recommendations are; provision of adequate number of contemporary technologies for easy accessibility, improvement on real time subscription that will enhance retrievals. Librarians should imbibe sustainable development techniques as well as indulge in accessing medical educational websites for effective medical information retrieval and a host of other contemporary health information resources.

**Keywords:** *Contemporary Technologies, Sustainable development and Medical libraries*

### **Introduction**

The era in perspective is 21<sup>st</sup> century which contemporary technologies is evolving in the dynamic environment and it has brought about changes in disseminating information services in Medical libraries. The availability of contemporary technological information resources with a standard Medical College library facility enables both competent medical College library staff and medical undergraduate students who are vast in use of contemporary technologies such as computer application to retrieve health related information needs. An effective retrieval of medical based information by medical librarians’ and its supportive staff require contemporary technological skills exponentially to carry out the task of retrieval of medical information as well as the undergraduate medical students. Application of contemporary technology enhances professionally organized information for easy access and retrieval.

Contemporary technologies are regarded as the advancement of technology with new additions and modification; for example, it is impossible for the people in this decade to live with a wireless telephone placed on the desk. Nevertheless a mobile phone, which can be taken with us anywhere, is the perfect example of the technology advancement or simply, the modern technology. Contemporary technology is relevant to medical library services and operations, it helps students to access resources without waste of time, it eliminates too many

students waiting to consult a particular book due to insufficiency of copies, rather due to technologies, many students can have access and retrieve e-books hence it is uploaded, it could accommodate a larger number of users at the same time irrespective of their location. Those contemporary technological tools refer to diverse information communication resources, which are used to communicate, create, disseminate, store and manage information in the Library. Most importantly, technologies offer unprecedented opportunities for access, and use of information resources effectively, since it could facilitate the expansion of scholarship by providing timely, distributed access to a variety of sources from a variety of locations.

However, technological obsolescence in hardware and software may pose problems of access to information and retrieval. Omekwu and Okeke (2007) declared that the idea of adopting multimedia technology in library user education came up due to the inability of conventional technologies to cope with the present demands for information hence the need for this study. Their opinion is that, the satisfaction of library users' is a quality function of information products(s) or resources received by the information system, as well as library facilities and services provided to access the information product. This implies that, to satisfy user's information need, medical libraries need to modify their facilities and services rendered to users. The electronic facilities such as; electronic cataloging, acquisition, inter-library loaning, OPAC, electronic circulation functions using the digital management software, Cloud computing, 3D printers and WAN/LAN. The computer technologies are; databases, library software, computer hard discs, flash drives, CD-ROM s, floppy discs, optical discs, and computer hardware. social media facilities include: Library Blogs, Media sharing, Podcasts and Wi-Fi. A state-of-the-Art Medical College Libraries with contemporary technology, enhances effective access and retrieval of information as well as digitized skills by both medical library staff and medical undergraduate students. It has vast search engines for access and retrieval of medical information.

### **Statement of the Problem**

A perturbing scenario where medical information accessibility is thwarted due to the inability of such special libraries performing maximally in disseminating core health information services to medical students who predominantly require effective access and retrieval of health information resources. The functionality of the technological variables in this era of globalization is fundamental to the knowledge acquisition of medical undergraduate. Medical College Libraries with virtual facilities that enables medical college library users to access the internet as well as websites for medical information resources have issues with inadequate technological know-how by the staff of medical college libraries BSU status (2015). It is against this background that the researcher wants to investigate available contemporary technologies for effective access and retrieval of information resources in medical colleges Library in these two states.

### **Objectives of the Study**

The specific objectives are;

- i. identify contemporary technological resources in colleges of medicine, Benue State and Kwara State.
- ii. determine the extent contemporary technological resources were used for effective retrieval of information in colleges of medicine, Benue State and Kwara State and

- iii. identify challenges associated with contemporary technologies for effective retrieval of medical information in colleges of medicine Benue State and Kwara State.

### **Review of Related Literature**

The Medical College Library functions and supports the provision of information resources and services that facilitates the instructional, research, administrative and other community service programmes within the College which is cognitively operating the Colligate system where for; Medical College Library under the Collegiate System reveals that the headship should be one who has the qualification and rank as a Deputy Librarian. Medical College Library provides the following information services; Technical Services Division, Collection Development Unit, Readers and Circulation Services unit, Reference Services Unit, Serials Services unit and E-Library Services unit. It is hitherto a brief, in recognition of Medical College Libraries functional divisions, sections and units under the regulations of the Medical and Dental Council of Nigeria which is the regulatory body establishing Colleges of Health Sciences in Nigeria. In this perspective, Medical College Library information resources can be presented in soft copy such as CD-ROM, Databases, Internet Resources, Audio materials, Video materials, micro-forms, microfiches, computers, among others. Medical College Libraries provide physical or digital access to materials to its teaming medical students. Medical College Libraries have for long been facilitating access to resources in health, such as the famous MEDLINE, PubMed and PubMed Central databases from the National Library of Medicine in the United States (Anyoaku, 2014).

Contemporary Technologies are regarded as emerging technologies covering various cutting-edge developments in the convergence of technology, including information technology. Nwachukwu and Asiegbu (2014) explored the potentials of user education as an essential service of academic libraries in Nigeria in doing this; they tried to portray user education programs in libraries as tool for libraries in promotional drives, enhancing effective library use among clients. The first section of work tried to provide a succinct overview of the concept of user education in libraries. They recommend uniformity in a well-articulated scheme of work based on NUC Minimum Academic Standard, (MAS). The Library user education should remain full-fledged GST course in the University System, Provision of conducive accommodation illuminating and functional public address system for the teaching and orientation of students on the area of information literacy and information technology. This will further expose undergraduate students on how to use computerized libraries and Internet facilities, which are very vital in everyday living today. The study is related to the present study in areas of fundamental teaching of undergraduate students on how to access and use of the library for academic purpose and this is inclusive of medical students who needs to acquire a foundation of knowledge at the entrance of the university. In Shekarau, Adamu, Nongo & Sadiku, (2020) study, it recommended periodic training of medical practitioners on the technicality of library facilities through harmonized library instruction programs.

In the same vein, Zakari and Nongo (2016) asserted the need to strategies and initiate competitive intelligence systems as a vital tool or source for health information services by medical librarians due to the increasing information needs of the health care services. Considerably, application of competitive intelligence into the medical library services will enhance the driving innovation and creativity in library and information centers to keep pace with the fast changing knowledge society. The provision of easy access to health information on the internet or web have expectations of library users who expect same speed, breath and comprehensiveness in information services. Some special libraries for example, medical

libraries offer public access to a range of electronic equipment including public access computers, OPAC, photocopiers, biometric computers, and self-service checkouts units.

The emergence of contemporary technologies, spurred vast amounts of information in digital formats and more technologically talented users means that librarians and information managers are faced with the great challenge of dealing with this information revolution. The information and communication technology resources will include Internet access, computer networks which includes local area network (LAN) Metropolitan Area Network (MAN) and Wide Area Network (WAN) and other related services. The above assertion implies that information and communication technology resources are instructional resources, which are consulted in medical colleges' library for and medical information service delivery. There is no doubt that technology has had a lasting impact on libraries, with the help of innovation, re-imagination and vision, libraries are embracing contemporary technologies while creating dynamic community centers filled with life.

Contemporary Technology has changed the expectations of medical college library patrons; students and lecturers today expect to be able to find and access information from wherever they are. This is why so many medical college library systems across the country have increased both computers for use inside the library as well as mobile and online access to e-books, audio books, research databases and archives. There are appreciable contemporary technological resources for effective access and retrieval of information in this 21<sup>st</sup> era of information and communication technology, however, in spite of its perceived problems of technical know-how and capital intensive demand, it is expected that both medical librarians and medical undergraduate students are well acquainted with the following contemporary technologies to mention a few are; Internet, 3D printer, Software; Hinari, Medline, Pubmed, OPAC, Cochrane, E-Reader Pre-loader, CD-Roms, are used to access and retrieve relevant information, this aspect could enhance the need for library cooperation and consortium in the medical college libraries in the North Central (Okoye, 2005). A typical 3D printer functions as source for retrievals, 3D printing is a process in which material is joined or solidified under computer control to create a three-dimensional object, with material being added together, it is used in both rapid prototyping and additive printing of Anatomical and physiological features of the Human being. According to Moorefield-Lang (2014) 3D printing is the trend in contemporary technologies in medical college libraries enables students interact with their ideas and curiosity as physical printings are visualized and it intends to continue for years. The 3D Printer could be used to generate revenue for the college libraries due to its importance serving the need for references and researches.

## **Methodology**

The field study was carried out in 2019. It adopted a descriptive survey, with a population of 1035 comprising medical students from the two universities under study. The sample size is 207; a proportionate stratified random sampling technique was used to select 207 medical students at 20% stratum representing each medical college. The questionnaire titled "Contemporary technologies for effective retrieval of information in medical college libraries in Benue and Kwara States" were distributed, and 200 were returned valid for data analysis representing a return rate of 96%. The data collected were analysed using descriptive statistics of Mean and standard deviation.

## Findings and Discussion

Table 1 Available Contemporary Technologies

	BSU	UNIILORIN	A	ANU	NA	D	
1	Cloud computing	*	√	1(90%)	0(0%)	1(40%)	A
2	Online Databases	√	√	5(100%)	0(0%)	0(0%)	A
3	Library software	√	√	5(100%)	0(0%)	0(0%)	A
4	Computer Hard Disks Drive	√	√	5(100%)	0(0%)	0(0%)	A
5	Flash Drives	√	√	5(100%)	0(0%)	0(0%)	A
6	CD ROMS	√	√	5(100%)	0(0%)	0(0%)	A
7	Floppy Discs	X	X	0(0%)	4(80%)	1(20%)	ANU
8	WAN	√	√	5(100%)	0(0%)	0(0%)	A
9	Computers	√	√	5(100%)	0(0%)	0(0%)	A
10	WEB Subscription	√	√	5(100%)	0(0%)	0(0%)	A
11	LAN	√	√	5(100%)	0(0%)	0(0%)	A
12	3D Printers	*	*	0(0%)	0(0%)	5(100%)	NA
13	Blogs	√	*	3(60%)	0(0%)	2(40%)	A
14	Free Wi-Fi	√	√	4(80%)	0(0%)	1(20%)	A
15	Skype	*	*	1(20%)	1(20%)	3(60%)	NA
16	Pod-casts	*	*	1(20%)	1(20%)	4(80%)	NA
17	Media sharing	√	*	1(20%)	1(20%)	3(60%)	NA
18	Library thing	√	√	3(60%)	0(0%)	2(40%)	A
19	Google	√	√	4(80%)	0(0%)	1(20%)	A
20	CCTV	*	√	1(20%)	1(20%)	3(60%)	NA
21	Microfilming	√	*	1(20%)	1(20%)	3(60%)	NA
22	Online library loan service	*	*	1(20%)	1(20%)	3(60%)	NA
23	Micro printing	√	√	3(60%)	0(0%)	2(40%)	A
24	Library management system	√	*	2(40%)	0(0%)	3(60%)	NA
25	Electronic Res mgt sys	√	*	1(60%)	0(0%)	2(40%)	A
	A	19(76%)	15(60%)				
	ANU	0(0%)	1(4%)				
	NA	6(24%)	9(36%)				
	D	A	A				

KEYS: BSU=BEUNUE STATE, UNIILORIN=UNIVERSITY OF ILORIN A= AVAIALBLE, ANU= AVAILABLE BUT NOT UTILIZED NA=NOT AVAILABLE, D =DECISION, √= AVAILABLE, X = AVAILABLE BUT NOT UTILIZED, \*= NOT AVAILABLE

Table 1 shows the availability of contemporary technological resources at the medical college libraries in the two states. Result shows that, out of the twenty-five resources listed in the study, six (6) and nine (9) were found not to be available in Benue and Kwara college of health science libraries respectively. It also shows an availability of (19)76% and (15)60% respectively. This finding tallies with Ugwoke (2011)), whose result showed various types of contemporary technological information resources is available in the university libraries in Nigeria. The findings also tallies with Nwafor (2013) whose study on health information resources and utilization for effective health-care delivery by doctors in teaching hospitals in South Eastern Nigeria. The study was to ascertain the health information resources available to respondents and how they were utilized.

Table 2: Mean ratings of students' extent of effective retrieval of information

ITEM STATEMENT ON	KWARA		BSU		R	D
	Mean	SD	Mean	SD		
1 Scanning, uploading and downloading. (through the process of digitization)	2.77	.97	2.78	.96	1 <sup>st</sup>	HE
2 Using CD-ROMs, DVDs, flash drives, computer databases and OPAC among others to deliver information for a specified period of time.	2.55	1.12	2.60	1.11	4 <sup>th</sup>	HE
3 Multiple output download of relevant data for medical students	2.35	.94	2.38	.94	6 <sup>th</sup>	LE
4 Microfilming and micro printing resources to condense bulky serial materials.	2.36	.85	2.37	.85	2 <sup>nd</sup>	LE
5 Scholarly Publishing Services to medical students.	2.33	.91	2.36	.91	8 <sup>th</sup>	LE
6 Retrieval of Cloud computing from databases.	2.32	.89	2.33	.90	7 <sup>th</sup>	LE
7 Using cloud computing for remote databases in creation, storing and retrieval of digital information.	2.29	.88	2.32	.89	3 <sup>rd</sup>	LE

8	3D printers usage	2.28	1.00	2.32	1.00	5 <sup>th</sup>	LE
9	Access to open repository services	2.31	.88	2.32	.88	9 <sup>th</sup>	LE
Cluster Mean		2.38	.94	2.40	.94		LE

Table 2 reveals the respondents ranked 1<sup>st</sup> agrees that, to a high extent retrieval of information in medical college libraries, applied the use of Scanning using digitization process to retrieve relevant data by medical students ( $\bar{X}$ =2.78), Microfilming and micro printing resources to condense bulky serial materials ( $\bar{X}$ =2.37), Scholarly Publishing Services to medical students ( $\bar{X}$ =2.36), Retrieval of Cloud computing from databases ( $\bar{X}$ =2.33), Using cloud computing for remote databases in creation, storing and retrieval of digital information( $\bar{X}$ =2.32), Access to open repository services ( $\bar{X}$ =2.32) among others. The findings of the study revealed that scanning, uploading and downloading which is to a high extent through the process of digitization, using CD-ROMs, DVDs, flash drives, computer databases and OPAC are used for retrieval of information in medical college libraries.

**Table 3: mean ratings of challenges of effective retrieval of information**

ITEM STATEMENT ON CHALLENGES OF RETRIEVAL		Mean	Std. Deviation	R	D
1	Lack of enabling structure to collaborate with staff	3.00	.83	1 <sup>st</sup>	A
2	Rigid policy in the use of the virtual library	2.97	.81	2 <sup>nd</sup>	A
3	Poor internet connectivity	2.97	.81	2 <sup>nd</sup>	A
4	Inadequate supply of contemporary technologies for use	2.94	.86	4 <sup>th</sup>	A
5	Inadequate structures	2.93	.84	4 <sup>th</sup>	A
6	Inadequate web-based access to knowledge	2.88	.88	6 <sup>th</sup>	A
7	Delay in subscription	2.86	.80	7 <sup>th</sup>	A
8	Non functional hardware	2.86	.87	7 <sup>th</sup>	A
9	Complexity nature of contemporary technological resources	2.80	.81	9 <sup>th</sup>	A
10	Attitude of the staff towards unwillingness to share knowledge on use of contemporary technology.	2.79	.88	10 <sup>th</sup>	A
11	Inadequate social media connectivity	2.79	.86	10 <sup>th</sup>	A
12	Inadequate knowledge of contemporary technology by medical students.	2.78	.92	12 <sup>th</sup>	A
13	Inadequate power supply to the library	2.78	.95	12 <sup>th</sup>	A
Cluster Mean		2.87	.67		A

The data presented in Table 3 revealed that, the mean ratings of the responses of the respondents on the thirteen (13) identified challenges associated with the use of contemporary technologies for retrieval of information in medical college libraries in Benue and Kwara States had mean values ranging from 3.00 to 2.78 which are all above the cut-off point of 2.50 on a 4 point rating scale. The above findings indicated respondents agreed that Lack of enabling structure to collaborate with staff ( $\bar{X}$ =3.00), Rigid policy in the use of the virtual library ( $\bar{X}$ =2.97), Poor internet connectivity ( $\bar{X}$ =2.97), Inadequate supply of contemporary technologies for use ( $\bar{X}$ =2.94), Inadequate structures ( $\bar{X}$ =2.93), inadequate web-based access to knowledge ( $\bar{X}$ =2.88), delay in subscription ( $\bar{X}$ =2.86), Non functional hardware ( $\bar{X}$ =2.86), Complexity nature of contemporary technological resources( $\bar{X}$ =2.80), attitude of the staff towards unwillingness to share knowledge on use of contemporary technology ( $\bar{X}$ =2.79), inadequate social media connectivity ( $\bar{X}$ =2.79) and inadequate knowledge of contemporary technology by medical students ( $\bar{X}$ =2.78) and inadequate power supply to the library ( $\bar{X}$ =2.78), were challenges associated with the application of contemporary technologies' retrieval of information in medical college libraries. Also, the overall mean showed that Lack of enabling structure to collaborate with staff (mean=3.00) is ranked highest, while inadequate social media connectivity (mean= 2.78) is ranked lowest as regards to Challenges associated with the use of contemporary technologies to retrieve information in the two States medical college libraries.

## **Implications of the Study**

The findings of the study revealed that downloading through the process of digitization; Using CD-ROMs, DVDs, flash drives, computer databases and OPAC are contemporary technologies used at high extent for retrieving information resources in medical college libraries while majority of the undergraduate medical students are not highly competent in the use of contemporary technologies for retrieving information resources. The implication of this is that the technologies are not being put to its ultimate use. The findings revealed that majority of the medical undergraduates are not highly competent. This therefore implies that the rate at which they access and retrieve information will be minimal. The numerous challenges associated with contemporary technologies for retrieval of information in medical college libraries in Benue and Kwara States implies ample hindrances for retrieval of health inclined information.

## **Recommendations**

The following were recommended;

- I. There should be provision of adequate number of contemporary technologies for easy retrieval of information.
- II. Provision of alternative power supply to medical college libraries to enhance internet radius coverage for medical students and staff accessibility and utilization of the internet.
- III. University Management should improve on timely subscription to enhance bandwidth and internet connections and
- IV. Orientation programs on the use of new technologies for information retrieval should be conducted and made compulsory for new entrants into the medical colleges by way of inclusion of such in the medical students curriculum.

## **Limitations of the Study**

The study was constrained by a number of factors, prominent between which is National Strike and the lengthy instrument, which took a long time to complete, have contributed to non-validity of some of the questionnaire administered. Major limitation is a delay the process of administration of this research questionnaire, as the respondents were not readily available.

## **Conclusion**

The inevitable conclusion is that the medical librarians should endeavour to track, explore medical websites with facets of useful medical resources and repackage health information from the databases, e-books library collections in appropriate formats and make those readily accessible to medical students. Attitudinal shifts from negativism to positivism to in using available contemporary technologies been an innovation for effective retrieval of information in medical college libraries, provides gateway to ample health education thereby fostering sustainability in medical libraries information resources services, thus medical library have to deliver need based innovative user services to improve user satisfaction and to gain user appreciation along with employer recognition of innovative intervention of skills acquisition using ICT resources to embrace service delivery.

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### **Review of Related Literature**

The Medical College Library functions and supports the provision of information resources and services that facilitates the instructional, research, administrative and other community service programmes within the College which is cognitively operating the Colligate system where for; Medical College Library under the Collegiate System reveals that the headship should be one who has the qualification and rank as a Deputy Librarian. Medical College Library provides the following information services; Technical Services Division, Collection Development Unit, Readers and Circulation Services unit, Reference Services Unit, Serials Services unit and E-Library Services unit. It is hitherto a brief, in recognition of Medical College Libraries functional divisions, sections and units under the regulations of the Medical and Dental Council of Nigeria which is the regulatory body establishing Colleges of Health Sciences in Nigeria. In this perspective, Medical College Library information resources can be presented in soft copy such as CD-ROM, Databases, Internet Resources, Audio materials, Video materials, micro-forms, microfiches, computers, among others. Medical College Libraries provide physical or digital access to materials to its teaming medical students. Medical College Libraries have for long been facilitating access to resources in health, such as the famous MEDLINE, PubMed and PubMed Central databases from the National Library of Medicine in the United States (Anyoaku, 2014).

Contemporary Technologies are regarded as emerging technologies covering various cutting-edge developments in the convergence of technology, including information technology. Nwachukwu and Asiegbu (2014) explored the potentials of user education as an essential service of academic libraries in Nigeria in doing this; they tried to portray user education programs in libraries as tool for libraries in promotional drives, enhancing effective library use among clients. The first section of work tried to provide a succinct overview of the concept of user education in libraries. They recommend uniformity in a well-articulated scheme of work based on NUC Minimum Academic Standard, (MAS). The Library user education should remain full-fledged GST course in the University System, Provision of conducive accommodation illuminating and functional public address system for the teaching and orientation of students on the area of information literacy and information technology. This will further expose undergraduate students on how to use computerized libraries and Internet facilities, which are very vital in everyday living today. The study is related to the present study in areas of fundamental teaching of undergraduate students on how to access and use of the library for academic purpose and this is inclusive of medical students who needs to acquire a foundation of knowledge at the entrance of the university. In Shekarau, Adamu, Nongo & Sadiku, (2020) study, it recommended periodic training of medical practitioners on the technicality of library facilities through harmonized library instruction programs.

In the same vein, Zakari and Nongo (2016) asserted the need to strategies and initiate competitive intelligence systems as a vital tool or source for health information services by medical librarians due to the increasing information needs of the health care services. Considerably, application of competitive intelligence into the medical library services will enhance the driving innovation and creativity in library and information centers to keep pace with the fast changing knowledge society. The provision of easy access to health information on the internet or web have expectations of library users who expect same speed, breath and comprehensiveness in information services. Some special libraries for example, medical

libraries offer public access to a range of electronic equipment including public access computers, OPAC, photocopiers, biometric computers, and self-service checkouts units.

The emergence of contemporary technologies, spurred vast amounts of information in digital formats and more technologically talented users means that librarians and information managers are faced with the great challenge of dealing with this information revolution. The information and communication technology resources will include Internet access, computer networks which includes local area network (LAN) Metropolitan Area Network (MAN) and Wide Area Network (WAN) and other related services. The above assertion implies that information and communication technology resources are instructional resources, which are consulted in medical colleges' library for and medical information service delivery. There is no doubt that technology has had a lasting impact on libraries, with the help of innovation, re-imagination and vision, libraries are embracing contemporary technologies while creating dynamic community centers filled with life.

Contemporary Technology has changed the expectations of medical college library patrons; students and lecturers today expect to be able to find and access information from wherever they are. This is why so many medical college library systems across the country have increased both computers for use inside the library as well as mobile and online access to e-books, audio books, research databases and archives. There are appreciable contemporary technological resources for effective access and retrieval of information in this 21<sup>st</sup> era of information and communication technology, however, in spite of its perceived problems of technical know-how and capital intensive demand, it is expected that both medical librarians and medical undergraduate students are well acquainted with the following contemporary technologies to mention a few are; Internet, 3D printer, Software; Hinari, Medline, Pubmed, OPAC, Cochrane, E-Reader Pre-loader, CD-Roms, are used to access and retrieve relevant information, this aspect could enhance the need for library cooperation and consortium in the medical college libraries in the North Central (Okoye, 2005). A typical 3D printer functions as source for retrievals, 3D printing is a process in which material is joined or solidified under computer control to create a three-dimensional object, with material being added together, it is used in both rapid prototyping and additive printing of Anatomical and physiological features of the Human being. According to Moorefield-Lang (2014) 3D printing is the trend in contemporary technologies in medical college libraries enables students interact with their ideas and curiosity as physical printings are visualized and it intends to continue for years. The 3D Printer could be used to generate revenue for the college libraries due to its importance serving the need for references and researches.

## **Methodology**

The field study was carried out in 2019. It adopted a descriptive survey, with a population of 1035 comprising medical students from the two universities under study. The sample size is 207; a proportionate stratified random sampling technique was used to select 207 medical students at 20% stratum representing each medical college. The questionnaire titled "Contemporary technologies for effective retrieval of information in medical college libraries in Benue and Kwara States" were distributed, and 200 were returned valid for data analysis representing a return rate of 96%. The data collected were analysed using descriptive statistics of Mean and standard deviation.

## Findings and Discussion

Table 1 Available Contemporary Technologies

	BSU	UNIILORIN	A	ANU	NA	D	
1	Cloud computing	*	√	1(90%)	0(0%)	1(40%)	A
2	Online Databases	√	√	5(100%)	0(0%)	0(0%)	A
3	Library software	√	√	5(100%)	0(0%)	0(0%)	A
4	Computer Hard Disks Drive	√	√	5(100%)	0(0%)	0(0%)	A
5	Flash Drives	√	√	5(100%)	0(0%)	0(0%)	A
6	CD ROMS	√	√	5(100%)	0(0%)	0(0%)	A
7	Floppy Discs	X	X	0(0%)	4(80%)	1(20%)	ANU
8	WAN	√	√	5(100%)	0(0%)	0(0%)	A
9	Computers	√	√	5(100%)	0(0%)	0(0%)	A
10	WEB Subscription	√	√	5(100%)	0(0%)	0(0%)	A
11	LAN	√	√	5(100%)	0(0%)	0(0%)	A
12	3D Printers	*	*	0(0%)	0(0%)	5(100%)	NA
13	Blogs	√	*	3(60%)	0(0%)	2(40%)	A
14	Free Wi-Fi	√	√	4(80%)	0(0%)	1(20%)	A
15	Skype	*	*	1(20%)	1(20%)	3(60%)	NA
16	Pod-casts	*	*	1(20%)	1(20%)	4(80%)	NA
17	Media sharing	√	*	1(20%)	1(20%)	3(60%)	NA
18	Library thing	√	√	3(60%)	0(0%)	2(40%)	A
19	Google	√	√	4(80%)	0(0%)	1(20%)	A
20	CCTV	*	√	1(20%)	1(20%)	3(60%)	NA
21	Microfilming	√	*	1(20%)	1(20%)	3(60%)	NA
22	Online library loan service	*	*	1(20%)	1(20%)	3(60%)	NA
23	Micro printing	√	√	3(60%)	0(0%)	2(40%)	A
24	Library management system	√	*	2(40%)	0(0%)	3(60%)	NA
25	Electronic Res mgt sys	√	*	1(60%)	0(0%)	2(40%)	A
	A	19(76%)	15(60%)				
	ANU	0(0%)	1(4%)				
	NA	6(24%)	9(36%)				
	D	A	A				

KEYS: BSU=BEUNUE STATE, UNIILORIN=UNIVERSITY OF ILORIN A= AVAIALBLE, ANU= AVAILABLE BUT NOT UTILIZED NA=NOT AVAILABLE, D =DECISION, √= AVAILABLE, X = AVAILABLE BUT NOT UTILIZED, \*= NOT AVAILABLE

Table 1 shows the availability of contemporary technological resources at the medical college libraries in the two states. Result shows that, out of the twenty-five resources listed in the study, six (6) and nine (9) were found not to be available in Benue and Kwara college of health science libraries respectively. It also shows an availability of (19)76% and (15)60% respectively. This finding tallies with Ugwoke (2011)), whose result showed various types of contemporary technological information resources is available in the university libraries in Nigeria. The findings also tallies with Nwafor (2013) whose study on health information resources and utilization for effective health-care delivery by doctors in teaching hospitals in South Eastern Nigeria. The study was to ascertain the health information resources available to respondents and how they were utilized.

Table 2: Mean ratings of students' extent of effective retrieval of information

ITEM STATEMENT ON	KWARA		BSU		R	D
	Mean	SD	Mean	SD		
1 Scanning, uploading and downloading. (through the process of digitization)	2.77	.97	2.78	.96	1 <sup>st</sup>	HE
2 Using CD-ROMs, DVDs, flash drives, computer databases and OPAC among others to deliver information for a specified period of time.	2.55	1.12	2.60	1.11	4 <sup>th</sup>	HE
3 Multiple output download of relevant data for medical students	2.35	.94	2.38	.94	6 <sup>th</sup>	LE
4 Microfilming and micro printing resources to condense bulky serial materials.	2.36	.85	2.37	.85	2 <sup>nd</sup>	LE
5 Scholarly Publishing Services to medical students.	2.33	.91	2.36	.91	8 <sup>th</sup>	LE
6 Retrieval of Cloud computing from databases.	2.32	.89	2.33	.90	7 <sup>th</sup>	LE
7 Using cloud computing for remote databases in creation, storing and retrieval of digital information.	2.29	.88	2.32	.89	3 <sup>rd</sup>	LE

8	3D printers usage	2.28	1.00	2.32	1.00	5 <sup>th</sup>	LE
9	Access to open repository services	2.31	.88	2.32	.88	9 <sup>th</sup>	LE
Cluster Mean		2.38	.94	2.40	.94		LE

Table 2 reveals the respondents ranked 1<sup>st</sup> agrees that, to a high extent retrieval of information in medical college libraries, applied the use of Scanning using digitization process to retrieve relevant data by medical students ( $\bar{X}$ =2.78), Microfilming and micro printing resources to condense bulky serial materials ( $\bar{X}$ =2.37), Scholarly Publishing Services to medical students ( $\bar{X}$ =2.36), Retrieval of Cloud computing from databases ( $\bar{X}$ =2.33), Using cloud computing for remote databases in creation, storing and retrieval of digital information( $\bar{X}$ =2.32), Access to open repository services ( $\bar{X}$ =2.32) among others. The findings of the study revealed that scanning, uploading and downloading which is to a high extent through the process of digitization, using CD-ROMs, DVDs, flash drives, computer databases and OPAC are used for retrieval of information in medical college libraries.

**Table 3: mean ratings of challenges of effective retrieval of information**

ITEM STATEMENT ON CHALLENGES OF RETRIEVAL		Mean	Std. Deviation	R	D
1	Lack of enabling structure to collaborate with staff	3.00	.83	1 <sup>st</sup>	A
2	Rigid policy in the use of the virtual library	2.97	.81	2 <sup>nd</sup>	A
3	Poor internet connectivity	2.97	.81	2 <sup>nd</sup>	A
4	Inadequate supply of contemporary technologies for use	2.94	.86	4 <sup>th</sup>	A
5	Inadequate structures	2.93	.84	4 <sup>th</sup>	A
6	Inadequate web-based access to knowledge	2.88	.88	6 <sup>th</sup>	A
7	Delay in subscription	2.86	.80	7 <sup>th</sup>	A
8	Non functional hardware	2.86	.87	7 <sup>th</sup>	A
9	Complexity nature of contemporary technological resources	2.80	.81	9 <sup>th</sup>	A
10	Attitude of the staff towards unwillingness to share knowledge on use of contemporary technology.	2.79	.88	10 <sup>th</sup>	A
11	Inadequate social media connectivity	2.79	.86	10 <sup>th</sup>	A
12	Inadequate knowledge of contemporary technology by medical students.	2.78	.92	12 <sup>th</sup>	A
13	Inadequate power supply to the library	2.78	.95	12 <sup>th</sup>	A
Cluster Mean		2.87	.67		A

The data presented in Table 3 revealed that, the mean ratings of the responses of the respondents on the thirteen (13) identified challenges associated with the use of contemporary technologies for retrieval of information in medical college libraries in Benue and Kwara States had mean values ranging from 3.00 to 2.78 which are all above the cut-off point of 2.50 on a 4 point rating scale. The above findings indicated respondents agreed that Lack of enabling structure to collaborate with staff ( $\bar{X}$ =3.00), Rigid policy in the use of the virtual library ( $\bar{X}$ =2.97), Poor internet connectivity ( $\bar{X}$ =2.97), Inadequate supply of contemporary technologies for use ( $\bar{X}$ =2.94), Inadequate structures ( $\bar{X}$ =2.93), inadequate web-based access to knowledge ( $\bar{X}$ =2.88), delay in subscription ( $\bar{X}$ =2.86), Non functional hardware ( $\bar{X}$ =2.86), Complexity nature of contemporary technological resources( $\bar{X}$ =2.80), attitude of the staff towards unwillingness to share knowledge on use of contemporary technology ( $\bar{X}$ =2.79), inadequate social media connectivity ( $\bar{X}$ =2.79) and inadequate knowledge of contemporary technology by medical students ( $\bar{X}$ =2.78) and inadequate power supply to the library ( $\bar{X}$ =2.78), were challenges associated with the application of contemporary technologies' retrieval of information in medical college libraries. Also, the overall mean showed that Lack of enabling structure to collaborate with staff (mean=3.00) is ranked highest, while inadequate social media connectivity (mean= 2.78) is ranked lowest as regards to Challenges associated with the use of contemporary technologies to retrieve information in the two States medical college libraries.

## **Implications of the Study**

The findings of the study revealed that downloading through the process of digitization; Using CD-ROMs, DVDs, flash drives, computer databases and OPAC are contemporary technologies used at high extent for retrieving information resources in medical college libraries while majority of the undergraduate medical students are not highly competent in the use of contemporary technologies for retrieving information resources. The implication of this is that the technologies are not being put to its ultimate use. The findings revealed that majority of the medical undergraduates are not highly competent. This therefore implies that the rate at which they access and retrieve information will be minimal. The numerous challenges associated with contemporary technologies for retrieval of information in medical college libraries in Benue and Kwara States implies ample hindrances for retrieval of health inclined information.

## **Recommendations**

The following were recommended;

- I. There should be provision of adequate number of contemporary technologies for easy retrieval of information.
- II. Provision of alternative power supply to medical college libraries to enhance internet radius coverage for medical students and staff accessibility and utilization of the internet.
- III. University Management should improve on timely subscription to enhance bandwidth and internet connections and
- IV. Orientation programs on the use of new technologies for information retrieval should be conducted and made compulsory for new entrants into the medical colleges by way of inclusion of such in the medical students curriculum.

## **Limitations of the Study**

The study was constrained by a number of factors, prominent between which is National Strike and the lengthy instrument, which took a long time to complete, have contributed to non-validity of some of the questionnaire administered. Major limitation is a delay the process of administration of this research questionnaire, as the respondents were not readily available.

## **Conclusion**

The inevitable conclusion is that the medical librarians should endeavour to track, explore medical websites with facets of useful medical resources and repackage health information from the databases, e-books library collections in appropriate formats and make those readily accessible to medical students. Attitudinal shifts from negativism to positivism to in using available contemporary technologies been an innovation for effective retrieval of information in medical college libraries, provides gateway to ample health education thereby fostering sustainability in medical libraries information resources services, thus medical library have to deliver need based innovative user services to improve user satisfaction and to gain user appreciation along with employer recognition of innovative intervention of skills acquisition using ICT resources to embrace service delivery.

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