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EMMANUEL CHIDIADI ONWUBIKO

ALEX EKWUEME FEDERAL UNIVERSITY NDUFU - ALIKE, IKWO,, onwubikoemma@yahoo.com

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An Appraisal of the availability and application of Wireless Fidelity Technology in Services of Academic libraries

Onwubiko Emmanuel Chidiadi. FCAI, FSASS, CLN
onwubikoemma@yahoo.com or emmabikos@gmail.com
+2348037237792

Abstract

There have been drastic changes in the way information is communicated based on the emergence on daily basis of new technology in the field of computing devices and networking which invariably has opened new opportunities for libraries and librarians towards enhancing their services and one of such new opportunities is the Wireless Fidelity technology also known as Wi-Fi. This study therefore is an appraisal of the availability and application of Wi-Fi technology in academic libraries. The study employed a descriptive survey design with a sampled population of 50 librarians derived from ten academic libraries in Southeast, Nigeria while it was guided by four research questions formulated in line with the research objectives. The main instrument used to gather data for this study is a 4-point Likert scale structured questionnaire that had items on availability, application/extent of utilization, benefits and factors that can enhance effective utilization of Wi-Fi technology in academic libraries. The data collected were analyzed using frequency and percentages. The outcome of this study brings to fore the shortfalls in the availability of Wi-Fi technology in most academic libraries in Southeast Nigeria and by extension Nigeria. The result further revealed that despite the fact that this device was not available in most academic libraries studied those that have, apply and utilize it to a high extent. The study also discovered that the librarians were not ignorant of the accrued benefits of the application and utilization of the device as they also agreed to factors that can enhance effective utilization of this device in academic libraries. It was based on the findings that they study recommended among other things that the National University Commission (NUC), National Board for Technical Education (NBTE) and Nation Commission for Colleges of Education (NCCE) as bodies responsible for accreditation of programs in universities, polytechnics and colleges of education respectively should as matter of need make the application and utilization of ICT which Wi-Fi technology is a part a must have for any academic

library as a basic yardstick for accreditation of any program or course and that government and other funding bodies should ensure that every academic library from inception is equipped with state-of-art facilities in tandem with the emerging technology with appropriate machinery kept in place for their management and maintenance for optimal functioning and utilization.

Keywords: Information and Communication Technology, Wireless fidelity technology, Academic library, Information delivery, Application, Utilization, Information users

Introduction

The desire of every academic library more so in developing countries in this era of exponential growth in information and information and communication technology (ICT) is to improve in her services with a view to satisfying the information needs of her teeming clientele. To this end, the major concern now lies with acquiring the necessary technological facilities for effective and efficient information delivery for research and education. This growing concern is precipitated by the urgency at which library users are in need of information which is not unconnected with information explosion as being experience today globally. This level of explosion of information which is so overwhelming has made it practically impossible for any single system, organization or library has what it takes in terms of pace to provide or meet all information needs of users. Be though as it may, the application of information and communication technology (ICT) to information generation/acquisition, processing, preservation and dissemination has stood out as the most influencing tool in information creation and handling in the world today in that it has created a sense of urgency and possibilities for development of new products which have revolutionalized information delivery processes thereby creating unlimited opportunities, faster and easier access to information by users.

In this context, information and communication technology refers to the use of hardware and software for information dissemination and conducting communication linked by a vast array of technological protocols (Qutab, Bhatti & Ullah, 2014). As expressed by Anie and Achugbue (2009), ICT covers internet service provision, information technology equipment and services, media and broadcasting, library and documentation centers, network based information services and other related communication activities. It is also evident that ICT embraces the process of information generation, processing, retrieval and dissemination and promotes faster information

handling from the point of generation through the telecommunication networks to the point of utilization. The obvious therefore, is that ICT is the pooling of computers and other related technologies to the processes of information generation, processing, storage, dissemination and the creation of enabling environment that facilitates the satisfaction of the information needs of users.

Indeed the application of ICT has brought tremendous relief to most libraries of the world in the area of information acquisition and user satisfaction considering over bloating user population and in the case of the academic library, increase in the students' enrollment and shrinking budgetary allocation which has led to reduction in book purchases and subscription to scholarly journals. ICT no doubt has improved the technical capabilities of institutions and individuals as information can be easily accessed from any part of the world by mere stroke of the button courtesy of the information super highway called the 'internet'. All said and done, the accessibility of information regardless of location, time and format remained the utmost contribution of ICT to libraries and has made librarians to remain relevant in the chain of information creation, management and dissemination.

As ICT is celebrated in this century one astonishing thing is they way new phenomena are emerging almost on yearly basis in this area and their applications are indications that we are at the threshold of ICT development. To this end, advances in technology are drastically changing the way information is communicated. As they emerge almost on daily basis new technology in the field of computing devices and networking, librarians are opened to new opportunities towards enhancing their services and one of such new opportunities is the wireless technology which wireless fidelity technology also known as Wi-Fi is a part. As has been observed the last several years, wireless technologies have progressed and achieved success in various fields like healthcare, education, manufacturing among others. All the same, wireless technology has been around libraries for some years now but it seems that only the libraries in developed nations have actually realized to the fullest its benefits for information services and library management activities. As has been noted good number of libraries including academic libraries in western countries are using this technology. Stating the obvious, wireless technology has noticed to be very fast, reliable and highly flexible with major benefit of immediate access to digital resources which enables users to simply and easily connect a wide range of computing and

telecommunications devices without the need to buy, carry, or connect cables. It uses a variety of devices such as laptop and notebook computers, tablets, personal digital assistants (PDAs), email-only devices, handheld computers, etc. Wireless networks contribute flexible and instantaneous access to digital information. It eliminates the direct cost of physical networking and reduces the indirect cost of network administration. Wireless LANs offer new solutions for providing cost-effective access to digital information. In other words, wireless technology allows users to access the Internet without the constraints of cables, data lines, phone jacks, or even walls. Wireless data-translation protocols allow disparate devices to use the information from all sources effectively.. While wireless fidelity technology (Wi-Fi) which is defined as the wireless technology used to connect computers, tablets, smartphones and other devices to the internet and the radio signal sent from a wireless router to a nearby device, which translates the signal into data you can see and use as well as transmitting a radio signal back to the router, which connects to the internet by wire or cable (Verizon 2020) in the past years has become the most popular and dominant networking technology.

Going by the nature of the device, it is no doubt a veritable tool for libraries and librarians for effective and efficient delivery of services for information users as it is argued to be a convenient way for adding value to the services being offered to teeming users of academic libraries in developing countries in general and Nigeria in particular. This is based on the assertion that on daily basis, we utilize Wi-Fi; one can connect to the internet using Wi-Fi from any Wi-Fi-enabled device. Wi-Fi enables us to communicate wirelessly, including streaming and casting audio and video to any device, When using Wi-Fi to share files, data, and other items between two or more computers or mobile phones, data transmission speeds are also quite fast, A Wi-Fi printer's capacity to print any document is another significant feature, Wi-Fi can also be utilized as a HOTSPOT, giving a localized area wireless Internet access, Consumers of Wi-Fi-enabled devices can access the primary network connection via Hotspot while the main network connection is operational, providing them with temporary internet connectivity and Wi-Fi adapters use the owner's network connection to broadcast radio waves and create a hotspot (Khanna, 2022). Furthermore, Wireless Fidelity (Wi-Fi) broadband network technology has made tremendous impact in the growth of broadband wireless networks. There exist today

several Wi-Fi access points that allow employees, partners and customers to access corporate data from almost anywhere and anytime

.It is after due consideration of the general benefits of utilizing wireless fidelity technology that it was concluded that librarians and libraries are best for it thus the need to examine the availability and application of this device by academic libraries in Southeastern Nigeria.

1.2 Statement of the Problem

As information and communication technology is celebrated in this century one astonishing thing is the way new phenomena are emerging almost on daily basis in this area and their applications are indications that we are at the threshold of ICT development. To this end, there have been drastic changes in the way information is communicated based on the emergence on daily basis of this new technology in the field of computing devices and networking which invariably has opened new opportunities for librarians towards enhancing their services and one of such new opportunities is the wireless fidelity technology also known as Wi-Fi.

Evidence has shown that libraries of develop countries of the world are actually cashing on this new technology to effectively and efficiently provide information services to their users. In developing countries like Nigeria despite the popularity and accrued benefits of this device, it seems that the application and usability in academic libraries remain on the platonic as little or nothing is heard of its availability let alone its utilization. This worrisome state is further harkened when one considers the fact that there is little or no literature in this regard in this part of the globe; a situation that calls for closing of the gap in this aspect of body of knowledge.

It is after thorough examination of the above situations that the desire to carry out a study became imperative as to establishing the availability of this device in academic libraries and where it is available, at what extent is it being applied by the academic libraries in their services. To achieve this goal, selected academic libraries in Southeastern Nigeria are being used as testing ground.

1.3. Research Objective

This study specifically examined the availability and application of wireless fidelity (Wi-Fi) technology in academic libraries in Southeastern Nigeria. Other objectives include:

- i. To ascertain the availability of wireless fidelity in academic libraries;
- ii. Establish the extent of utilization of wireless fidelity technology where they are available,
- iii. To determine the benefits of the application and utilization of Wi-Fi technology in academic libraries,
- iv. To identify factors that can enhance effective utilization of wireless fidelity in academic libraries.

1.4. Research Questions

The study was guided by the following research questions:

- i. How available is wireless fidelity technology in the library;
- ii. To what extent is wireless fidelity utilized in the library
- iii. What are the benefits of the application and utilization of Wi-Fi technology in academic libraries?
- iv. Are there factors that can enhance effective utilization of wireless fidelity in academic libraries?

2.0. Literature review

2.1. Conceptual overview of Wireless Fidelity Technology

Wireless fidelity (Wi-Fi) which is credited to Vic Hayes, the leader of the IEEE Committee that established the 802.11 specifications in 1997 is a combination of the phrases wireless and fidelity with wireless denoting the absence of cables or wires for signal transmission and fidelity denoting long-term support. It is defined as a data technology that allows consumers to connect to high-speed internet without the use of cables. In other words, it is a wireless technology used to connect computers, tablets, smartphones and other devices to the internet. Wi-Fi is the radio signal sent from a wireless router to a nearby device, which translates the signal into data you can see and use. The device transmits a radio signal back to the router, which connects to the internet by wire or cable. While a Wi-Fi network is simply an internet connection that's shared

with multiple devices in a home or business via a wireless router. The router is connected directly to your internet modem and acts as a hub to broadcast the internet signal to all your Wi-Fi enabled devices. This gives one, flexibility to stay connected to the internet as long as one is within the network coverage area (Verizon, 2020). The above definition is not different from that of 123helpme.com (2016) which defines it as the wireless technology that allows internet connection to be broadcasted through radio waves. In other words, Wireless networks use high-frequency electromagnetic waves, either infrared (IR) or radio frequency (RF) to transmit information from one point to another without relying on any physical connections. RF is expected to be of more practical use in library networking than IR, because it is not limited by line-of sight transmission; radio waves travel through wall and windows. Data and voice traffic is superimposed or modulated, onto the radio waves or carriers, and extracted at the receiving end. Multiple radio carriers can exist in the same space at the same time without interfering with each other by transmitting at different frequencies. There are a large number of different technologies that can be used in wireless library network applications. Following are some of the technologies for wireless networking. Wi-Fi technology is further seen as another name for combination of different protocols that use the Institute of Electrical Electronic Engineers (IEEE) standard called 'IEEE 802.11b' or '802.11g' with the 802.11b version being replaced by 802.11g standard which is faster and capable of 54Mbps communication at the 2.4 GHz band (IEEE, 2007; 123helpme.com, 2016).

To Krishnamurthy and Rajashekara (2011) Wi-Fi is a generic term that refers to the IEEE 802.11 communication standard for Wireless Local Area Network (WLAN) which they maintain is an alternative to wired technology which was earlier used for networking while presently various light and wave emitting technology are in use (Wi-Fi Alliance, 2014). As explained, Wi-Fi uses radio waves to transmit data from your wireless router to your Wi-Fi enabled devices like your TV, Smartphone, tablet and computer explaining in that the establishment of a Wireless Local Area Network is made possible because of wireless fidelity. Wireless fidelity, like other wireless technologies, works by transferring signals between devices using radio signals at specific frequencies. Wi-Fi uses the 2.4 GHz and 5 GHz frequency bands. (Khanna, 2022). A Wireless Local Area Network (WLAN) on its own is a flexible data communication system implemented as an extension to, or as an alternative for, a wired LAN. It uses a high speed, radio-frequency

(RF) network access technology to transmit data. It links computers to each other or to networks for shared access and Internet based information. The Institute of Electrical and Electronic Engineers (IEEE) established the 802.11b standard for wireless networks, and the Wireless Compatibility Ethernet Alliance (WECA), assures that Wireless LAN products are interoperable from manufacturer to manufacturer (Bhartiya, 2001).

2.2. Theoretical and Empirical Framework

It is noted that Wi-Fi technology have a wide range of uses which if applied in libraries services will be of great benefit, including in all areas where computers or digital media are used. Among the uses as highlighted include: one can connect to the internet using Wi-Fi from any Wi-Fi-enabled device; Wi-Fi enables one to communicate wirelessly, including streaming and casting audio and video to any device, when using Wi-Fi to share files, data, and other items between two or more computers or mobile phones, data transmission speeds are also quite fast, a Wi-Fi printer's capacity to print any document is another significant feature, Wi-Fi can also be utilized as a HOTSPOT, giving a localized area wireless Internet access, consumers of Wi-Fi-enabled devices can access the primary network connection via Hotspot while the main network connection is operational, providing them with temporary internet connectivity, Wi-Fi adapters use the owner's network connection to broadcast radio waves and create a hotspot, Wi-Fi or WLAN technology can also be used to establish a Point-to-Point network and this method can connect two places that are difficult to reach by wire, such as two corporate office buildings (Wi-Fi Alliance, 2014).

Writing on the advantages of Wi-Fi technology application and usage, Khanna (2022) reveals that the installation does not require complicated wiring and has a diverse network connection; It is accessible from anywhere inside the Wi-Fi range, Regulatory permission is not necessary for independent users, Furthermore, Wi-Fi Extenders allow you to expand your network, Setup is simple and quick, Only the service set identifier (SSID) and password must be set up, Wi-Fi networks encrypt radio signals using WPA encryption as part of their security procedures, It is also less expensive and Another function it provides is hotspots and Roaming is also possible. In their own contribution on the advantages Nwabueze and Akaneme (2009) stated that Wi-Fi

allows LANS to be deployed without cabling for client's devices, typically reducing the costs of network deployment and expansion. Spaces where cables cannot be run, such as outdoor areas and historical buildings, can host wireless LANS.

As revealed, Wi-Fi is widely available in more than 250,000 public hotspots and tens of millions of homes, corporate and university campuses worldwide. Wi-Fi Protected Access (WPA and WPA2) is not easily cracked if strong passwords are used and WPA2 encryption has no known weakness. New protocols for Quality of Service make Wi-Fi more suitable for latency sensitive applications. Furthermore, as of 2007, wireless network adapters are built into most modern laptops. The prices of chipsets for Wi-Fi continue to drop, making it an economical networking option included in ever more devices. Wi-Fi has become widespread in corporate infrastructures, which also helps with the deployment of Real Time Location Systems (RFID) technology that can ride on Wi-Fi and different competitive brands of access points and client network interfaces are Inter-operable at a basic level of service noting that products designated as 'Wi-Fi Certified' are backwards interoperable. Wi-Fi is a global set of standards. Unlike mobile telephones, any standard Wi-Fi device will work anywhere in the world it added (RFID Radio, n.d).

As explained by Mohamed (2004), wireless networks contribute flexible and instantaneous access to digital information. It eliminates the direct cost of physical networking and reduces the indirect cost of network administration. Wireless LANs offer new solutions for providing cost-effective access to digital information. Wireless technology allows users to access the Internet without the constraints of cables, data lines, phone jacks, or even walls. Wireless data-translation protocols allow disparate devices to use the information from all sources effectively. The above fact was corroborated by Mohamed and Bavakutty (2001), who posit that Wireless networking helps users to access digital information without connecting physically and system administrators can set up or extend networks without installing wires. Mobility is the most attractive feature of wireless networking. It is more flexible than wired networking. It provides all the functionality of wired networking, without the physical constraints of the wire.

The above benefits of Wi-Fi in libraries were further harkened by Mohamed (2004) who revealed that wireless networking can be used to access the library network, library resources

and Internet without plug in by wires and cables. Wireless networking will allow users with devices like laptops, notebooks, simputers, PDAs, tablet PCs, etc. to move freely in the library while remaining connected to the library network. Wireless networking is an excellent solution for libraries with historic buildings or older buildings where the installation of wired networking is either impossible or very expensive. Libraries can be saved from the constant wiring and rewiring by installing wireless networks. Libraries can get lot of space by wireless networking. Installation of wireless network is very easy because there are no wires. Wireless network components can be set up anywhere in the library. Wireless networking makes it easy to move computers and other devices without the need to reconfigure the network. Other benefits of Wireless Networking in Libraries added Mohamed and Bavakutty (2001) include:

- ❖ A library wireless network provides access to multiple computers, databases, the Internet and library OPAC throughout the library or outside the library.
- ❖ It provides faster access to information for library users, resulting in better service and improved user satisfaction, location independent access for network administrators for easier on-site-trouble-shooting and support.
- ❖ Using laptop computers library users can access electronic media and also be physically near whatever printed material they want.
- ❖ Sharing of peripherals, files, multimedia resources and databases are easier.
- ❖ Improved database access.
- ❖ Simplified network configuration.
- ❖ Wireless networking permits quick connectivity to the network.
- ❖ Wireless networking is an excellent solution for libraries with historic buildings or older buildings, which make the installation of wired networking either impossible or very expensive.

In another development, Insight Media Internet (2007) in a survey carried out revealed that 25% of libraries in the UK have implemented the use of Wi-Fi technology in the delivery of their services. Krishnamurthy and Rajashekara (2011) did report that the use of wireless fidelity at Indian Statistical Institute (ISI) at Bengaluru has been active since 2004. They explained that the institute started with a stage by stage WLAN implementation and by 2009, the WLAN has covered not only the library but almost all the buildings on campus including the students'

hostel. In Nigeria, Chigbu and Dim (2012) noted that the deployment of wireless internet services in the University of Nigeria, Nsukka did set the stage for the utilization of the global information superhighway by faculty and staff.

On the other hand, Okon (2011) reported a low patronage of internet resources in the libraries of the universities of Uyo, Calabar as well as that of Rivers State University of Science Technology, Port Harcourt, Nigeria and this he attributed to poor internet infrastructure on campus. While, the library of Akanu Ibiam Federal Polytechnic, Afikpo, Ebonyi State, Nigeria made Wi-Fi available to users and through it attracts and meets their needs through the configuration of a Wi-Fi hotspot which increased their access to information in a faster and cheaper ways (Attama & Asoronye, 2016)

To better meet growing patron demand for online information and services as reveal by ALA (2022) in her final report of Libraries Connect Communities: Public Library Funding and Technology Access Study 2011-2012 public libraries continue to expand free public access to the Internet via wireless connections as vast majority of libraries (70 percent) reportedly increased use of their wireless networks in 2009-2010. Nationwide, 82 percent of public libraries offer this service and some states including the District of Columbia report universal Wi-Fi access in their public libraries.

Library of Congress (n.d.) did realize the all importance of wireless access thus declared that users are invited to explore the Library's vast online resources using their own wireless-enabled device. She went on to highlight that Free Wi-Fi is available in Library of Congress public research areas, Thomas Jefferson building exhibition spaces and selected areas serving special clientele which include; Congressional reading rooms, the Kluge Center and various meeting rooms. Writing on the public library's role to bridge the digital divide and create strong economies, communities WhoFi (2022) revealed that Libraries have always played a critical role in giving citizens access to information and that intellectual freedom is a core concept and value of public libraries. In the age of information, libraries play a critical role in the community by providing access to online information it added. On the effective use of Wi-Fi in an academic library, Attama and Asoronye (2016) were of the view that librarians must be conversant with

the modus operandi as to be well informed to tutor the users on how to connect to the device and to ensure that all users operate in line with the internet and security policies

3.0. Methodology

The study adopted a descriptive research survey which is a type of research design that aims to obtain information and systematically describe a phenomenon, situation, or population with a sampled population of 50 academic librarians randomly selected from six federal universities, two colleges of education and two polytechnics in Southeast, Nigeria (see table 1 under data presentation and analysis). The sample distribution was 5 from each academic library. Through the simple random sampling techniques of balloting, each librarian was given equal opportunity of being selected.

The major instrument used in collecting data for this study was a 31-item modified Likert Scale structured questionnaire constructed by the researcher to ascertain the availability, application and extent of utilization of Wi-Fi technologies in these libraries as well as factors that can enhance effective utilization of the device by users. The questionnaires were electronically sent with adequate instructions to the librarians. While the data collected were statistically analyzed using frequency and percentile in line with the research questions which were in tune with the objectives of the study.

4.0. Presentation and Analysis of Data

All data presented in this section were analyzed using frequency and percentages in the order of the research questions.

Table 1: Availability of Wi-Fi technology in academic libraries

Institution	Available	Not available
Abia State University	*	X
Alex Ekwueme federal university, Ikwo	*	X
Enugu State University of Science and Technology	*	X
Imo State University	*	X
Nnamdi Azikiwe University	X	*
University of Nigeria	X	*

Akanu Ibiam Federal Polytechnic Unwana, Afikpo	X	*
Institute of Management and Technology, Enugu	*	X
Federal college of Education, Eha-Amufu, Enugu State	*	X
Alvan Ikoku Federal College of Education, Owerri	X	*

Of all the 10 academic libraries sampled as shown in table 1 above, only 4 or 40% can boast of the availability and application of Wireless Fidelity (Wi-Fi) technology in the provision of services to their patron. Out of this 4, 2 were university libraries while the other 2 were of the college of education and polytechnic libraries respectively. The data revealed that 60% (6 academic libraries) of the libraries from which the sampled population was derived do not apply Wi-Fi technology in their services because of its unavailability.

Table 2: Components and infrastructural facilities of Wi-Fi technology available in the library

Items	A		NA	
	F	%	F	%
Wireless Access Point	20	40	30	60
Network Switch	20	40	30	60
Secure Router	20	40	30	60
Wireless LAN bridge	5	10	45	90
Broadband Internet Connection	20	40	30	60
Wireless Authentication and Billing Gateway	10	20	40	80

**Key: A=Available, NA=Not available

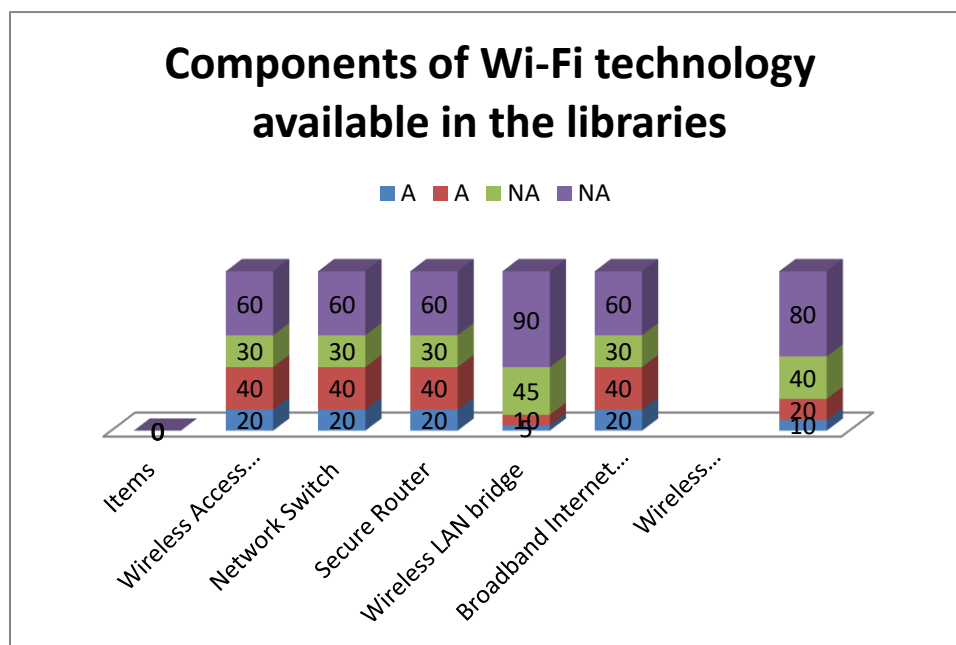


Figure 1: Components and facilities of Wi-Fi technology used in the libraries

The data in both table 2 and figure 1 above did show that of the 50 respondents only 20 representing 40% of the respondents indicated the availability of wireless access point, network switch, secure router and broadband internet connection in their libraries while 10 respondents or 20% indicated the availability of wireless authentication and billing gateway and 5 respondents or 10% indicated that wireless LAN Bridge was available in their library. The data further revealed that 60% or 30 librarians standing for 6 academic libraries had no Wi-Fi technology in use in their libraries, 80% does not have wireless authentication and billing gateway and 90% does not have wireless LAN Bridge.

Table3 : Extent to which Wi-Fi technology is utilized in service delivery in the library

Items	VHE		HE		LE		VLE	
	F	%	F	%	F	%	F	%
Used to access library Online Public Access Catalog (OPAC) in any corner of the library	20	40	*	*	*	*	30	60
The library uses Wi-Fi equipped laptops for computer literacy training as part of the library program of library instruction	20	40	*	*	25	50	5	10
Users surf the web-OPAC and the internet in any corner of the library thereby saving library seat	20	40	*	*	30	60	*	*
Wi-Fi is utilized as a HOTSPOT, giving a localized area wireless Internet access.	15	30	5	10	*	*	45	90
APs software is used in the creation and provision of consistent security policies across the network	20	40	*	*	*	*	30	60
With APs software IT staff manage the entire system from one central location	20	40	*	*	*	*	30	60
Registration of library users	*	*	10	20	*	*	40	80
The printer is used to print any document	*	*	*	*	10	20	40	80

**Key: VHE=Very High Extent, HE=High Extent, LE=Low Extent, VLE=Very Low Extent

The data in table 3 above were also obtained from 50 respondents or 100% of the population sample which represents the ten academic libraries while only four indicated the availability and by extension that they utilize Wi-Fi technology in their operations. As revealed by the data collected, the four libraries to a very high extent utilize Wi-Fi technology as it is used by patrons to access library Online Public Access Catalog (OPAC) in any corner of the library; the library

uses Wi-Fi equipped laptops for computer literacy training as part of the library program of library instruction, users surf the web-OPAC and the internet in any corner of the library thereby saving library seat, APs software is used in the creation and provision of consistent security policies across the network and with APs software IT staff manage the entire system from one central location ‘On the other hand, only 29 respondents or 40% of the entire respondents indicated that their library (four academic libraries) utilize to a very high extent ‘Wi-Fi as a HOTSPOT, giving a localized area wireless Internet access, while 10 respondents or 20% indicated that their libraries to a very high extent utilize the device to register users. Whereas, the use of the printer to print all documents was of low or very low extent as all the respondents indicated same.

Table 4: benefits of application and utilization of Wi-Fi technology in academic libraries,

Items	SA		A		DA		SDA	
	F	%	F	%	F	%	F	%
Wi-Fi offers tremendous speed to users	15	30	10	20	8	16	7	14
Users can access library Online Public Access Catalog (OPAC) in any corner of the library	50	100	*	*	*	*	*	*
Users can also surf the web-OPAC and the internet in any corner of the library thereby saving library seat	30	60	12	24	5	10	3	6
The library can use Wi-Fi equipped laptops for computer literacy training as part of the library program of library instruction	18	36	22	44	7	14	3	6
With Wi-Fi, users can bring to the library their own wireless-equipped devices to access the entire range of full-text database under free Wi-Fi internet access	50	100	*	*	*	*	*	*
With the APs software anticipated yearly maintenance of Wi-Fi is on low cost	18	36	11	2	7	14	4	8
Users have free internet access	30	60	5	10	12	24	3	6
It allows for cloud computing as the OPAC is used by many users using their own devices	50	100	*	*	*	*	*	*
APs software allows IT staff to manage the entire system from one central location	20	40	10	20	10	20	10	20
Wi-Fi can also be utilized as a HOTSPOT, giving a localized area wireless Internet access.	50	100	*	*	*	*	*	*

Registration of library users	*	*	12	24	20	40	18	36
APs software enables the creation and provision of consistent security policies across the network	35	70	15	30	*	*	*	*
installation does not require complicated wiring and has a diverse network connection	50	100	*	*	*	*	*	*
The printer is used to print any document	20	40	15	30	5	10	10	20

**Key: SA=Strongly Agree, A=Agree, DA=disagree, SDA=Strongly Disagree

Table 4 above contained data collected in respect of the benefits accrued in using Wi-Fi technology in libraries. As revealed the entire librarian respondents which signify 100% strongly agree that by using Wi-Fi technology in the library, users can access library Online Public Access Catalog (OPAC) in any corner of the library; users can bring to the library their own wireless-equipped devices to access the entire range of full-text database under free Wi-Fi internet access, it allows for cloud computing as the OPAC is used by many users using their own devices and installation does not require complicated wiring and has a diverse network connection as well as that Wi-Fi can also be utilized as a HOTSPOT, giving a localized area wireless Internet access. . Other benefits as indicated include that APs software enables the creation and provision of consistent security policies across the network with 70% or 35 respondents in strongly agree and 15 or 30% in agree. 60% of the respondent strongly agree or agree that APs software allows IT staff to manage the entire system from one central location while the remaining 40% or 20 respondents disagree or strongly disagree. Furthermore 40 respondents or 80% strongly agree or agree that the library can use Wi-Fi equipped laptops for computer literacy training as part of the library program of library instruction whereas, 42 respondents representing 84% strongly agree or agree that users can also surf the web-OPAC and the internet in any corner of the library thereby saving library seat and 70% or 35 respondents agree that it allows users free internet access among others.

Table 5: Factors that can enhance effective utilization of Wi-Fi technology in academic libraries

Item	SA		A		DA		SDA	
	F	%	F	%	F	%	F	%
There is of necessity a working understanding of what library patrons need to know to connect to the library hotspot	37	74	13	26	*	*	*	*
Users should abide by the library acceptable internet use policy	45	90	5	10	*	*	*	*

Users should keep to the Wi-Fi network and public Wi-Fi hotspots security policy.	44	88	6	12	*	*	*	*
The library network should be made so exclusive for registered patrons	50	100	*	*	*	*	*	*

The data in table 5 above is in view of a situation in which there is application of Wi-Fi technology in an academic library. To this end, the data above showed that all the 50 librarians who formed the respondents representing 100% strongly agree or agree that there is of necessity a working understanding of what library patrons need to know to connect to the library hotspot; users should abide by the library acceptable internet use policy, users should keep to the Wi-Fi network and public Wi-Fi hotspots security policy and that the library network should be made so exclusive for registered patrons as factors that can enhance effective utilization of Wi-Fi technology in academic libraries.

5.0. Discussion of Results

The finding of this study in the first instance reveals that academic libraries in Nigeria are not cashing on the accrued benefits of the use of Wi-Fi technology in library services as noticed in libraries of developed nations. The result shows that of the 10 academic libraries sampled only 4 have the device representing 40% and the same percentage also indicated the availability of wireless access point, network switch, secure router and broadband internet connection in their libraries while 10 respondents or 20% indicated the availability of wireless authentication and billing gateway and 5 respondents or 10% indicated that wireless LAN Bridge was available in their library. The data further revealed that 60% or 30 librarians standing for 6 academic libraries had no Wi-Fi technology in use in their libraries, 80% does not have wireless authentication and billing gateway and 90% does not have wireless LAN Bridge (see tables 1, 2 & figure 1). This result is indeed contrary to the state of things in India where according to Krishnamurthy and Rajashekara (2011), the use of wireless fidelity (WLAN) has covered not only the library but almost all the buildings on campus including the students' hostels.

The outcome of this study going by the data collected and analyzed showed that it was four out of the ten academic libraries studied make use of Wi-Fi technology. As revealed by the data collected, the four libraries to a very high extent utilize Wi-Fi technology as it is being used by patrons to access library Online Public Access Catalog (OPAC) in any corner of the library; the

library uses Wi-Fi equipped laptops for computer literacy training as part of the library program of library instruction, users surf the web-OPAC and the internet in any corner of the library thereby saving library seat, APs software is used in the creation and provision of consistent security policies across the network and With APs software IT staff manage the entire system from one central location 'On the other hand, only 29 respondents or 40% of the entire respondents indicated that their library (four academic libraries) utilize to a very high extent 'Wi-Fi as a HOTSPOT, giving a localized area wireless Internet access, while 10 respondents or 20% indicated that their libraries to a very high extent utilize the device to register users. The outcome of this study as microcosm-Southeast academic libraries is a true reflection of the macrocosm called Nigerian academic libraries. The assertion is that going by the extent of utilization of the device by the four academic libraries where it was availability one can deduce that Wi-Fi technology is to a very high extent utilized by academic libraries and that the indication of a very low extent of utilization was an expression of non-availability (see table 1 and 3). This result affirms Mohamed (2004) assertion that Wireless networking can be used to access the library network, library resources and Internet without plug in by wires and cables. Wireless networking will allow users with devices like laptops, notebooks, simputers, PDAs, tablet PCs, etc. to move freely in the library while remaining connected to the library network. In the area of the number of academic library utilizing Wi-Fi technology, the finding of this study fell short of what is obtainable in developed nations like the US where ALA (2022), in their study discovered that libraries continue to expand free public access to the Internet via wireless connections as vast majority of libraries (70 percent) reportedly increased use of their wireless networks in 2009-2010. If that was the state twelve years ago one can imagine what the state is like now.

The study further discovered that the respondents as librarians were not ignorant of the benefits of the application and utilization of Wi-Fi technology in academic libraries in Nigeria. As revealed in table 4, the entire librarian respondents strongly agree that by using Wi-Fi technology in the library, users can access library Online Public Access Catalog (OPAC) in any corner of the library; with Wi-Fi, users can bring to the library their own wireless-equipped devices to access the entire range of full-text database under free Wi-Fi internet access, it allows for cloud computing as the OPAC is used by many users using their own devices and that installation does not require complicated wiring as it has a diverse network connection as well as that Wi-Fi can

also be utilized as a HOTSPOT, giving a localized area wireless Internet access. . They also agree that with APs software the library can create and provide consistent security policies across the network and also allow IT staff to manage the entire system from one central location among other benefits. This finding is in consonance with Khanna (2022) revelation that the installation does not require complicated wiring and has a diverse network connection and It is accessible from anywhere inside the Wi-Fi range. This was also the opinion of Nwabueze and Akaneme (2009) who stated that Wi-Fi allows LANS to be deployed without cabling for client's devices, typically reducing the costs of network deployment and expansion. Spaces where cables cannot be run, such as outdoor areas and historical buildings, can host wireless LANS. This outcome is also an affirmation of Mohamed (2004) assertion that wireless networking can be used to access the library network, library resources and Internet without plug in by wires and cables. Wireless networking will allow users with devices like laptops, notebooks, simputers, PDAs, tablet PCs, etc. to move freely in the library while remaining connected to the library network.

On factors that can enhance effective utilization of Wi-Fi technology in academic libraries in Nigeria, the result indicates (see table 5) that the librarians strongly agree that it is of necessity for the librarians to have a working understanding of what library patrons need to know to connect to the library hotspot; that users should abide by the library acceptable internet use policies as well as keep to the Wi-Fi network and public Wi-Fi hotspots security policy and that the library network should be made so exclusive for registered patrons. This finding did not run short of the opinion of Attama and Asoronye (2016) who posit that for effective use of the Wi-Fi in libraries, librarians must be conversant with the modus operandi as to be well guided to tutor the users on how to connect to the device and to ensure that all users operate in line with the internet and security policies

5.1. Conclusion and Recommendations

In line with the outcome of this study, the deduction is that Wireless Fidelity (Wi-Fi) is one out of the many technologies that are the off-shoot of ICT that can be effectively applied in academic libraries for sustainable service delivery with a view to satisfying the information needs of both students and faculty. It has this comparative advantage of providing access to remote users who do not have internet access. It was further discovered that the major challenge facing academic

libraries when it comes to the issue of Wi-Fi technology is not the extent of utilization rather it is that of non-availability as the librarians were not ignorant of the benefits when applied in library services but as discovered most do not have it provided in their libraries. It is in the light of the above that the under listed recommendations are made:

- It is on record that some heads of academic libraries conspire with head of academic institutions to misappropriate fund meant for library development. This ugly situation should be frowned at and checked by government through the appointment of morally sound men and women of integrity whose duty is to monitor and ensure that funds released for library development are employed for the actual purpose and any erring head made to face the music as demanded by law. This step has become imperative as it has been discovered that most academic libraries without Wi-Fi technology was not due to non provision of funds but as a result of misappropriation and embezzlement of fund by those at the helm of affairs.
- The act of appointing head of academic libraries on the basis of political affiliation or who you know should be fought head-on by the professional bodies such as Library Associations and Librarians Registration Councils. This is based on the premise that appointed head of academic libraries see such positions as a way of enriching themselves within their five year tenure rather than ensuring the development of such libraries and promotion of academic excellence.
- The National University Commission (NUC), National Board for Technical Education (NBTE) and Nation Commission for Colleges of Education (NCCE) as bodies responsible for accreditation of programs in universities, polytechnics and colleges of education respectively should as matter of need make the application and utilization of ICT which Wi-Fi technology is a part a must have for any academic library as a basic yardstick for accreditation of any program or course. The act of assessing any academic library during accreditation by mere collection development based on the volumes of books and journals in their collection should be jettisoned in an era of information explosion and ICT being the end thing for effective and sustainable library services. The needful is that these regulatory bodies should ensure that any academic library without this prerequisite should be denied accreditation as such

action will serve as a wakeup call for all academic librarians and management to sit-up to their responsibilities.

- Librarians Registration Councils and Library Associations should start acting as a watchdogs as to ensuring that any academic librarian appointed works in line with the professional ethics and towards the promotion of the profession while erring ones should be sanctioned as obtained in other professional bodies like Bar associations and Medical Associations.
- On the part of the government and other funding bodies, every academic library from inception should be equipped with state-of-art facilities in tandem with the emerging technology with appropriate machinery kept in place for their management and maintenance for optimal functioning and utilization.

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