April 2023

An Evaluation of the Effects of Virtual Library on the Academic Performance of Undergraduate Students in the Department of Medicine and Surgery, Benue State University, Makurdi, Nigeria

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Abstract: This paper investigates the effects of virtual library on the academic performance of undergraduate students in the Department of Medicine and Surgery, Benue State University, Makurdi. A case study design is used for the study. The population of the study comprises 392 undergraduate medical students of the department, and the sample size of 198 undergraduate medical students is used based on Taro Yamane's model. The instrument adopts for data collection is questionnaire. The data collected are analyzed using simple percentages and presented in tables. The findings of the study reveal that majority of the undergraduate medical students are not properly conversant with the facilities in the virtual library, the extent of their use of virtual library is very low because they are choked with series of lectures and clinical engagements, and the utilization of virtual library resources has position effects on their academic performance without any negative impact. In addition, the study finds out that the challenges hampering the effective use of virtual library by the medical undergraduate students are unstable power supply, poor or fluctuating internet connectivity, and lack of free space to consult the virtual library resources. Based on the findings, the study recommends that the administrators of the Department of Medicine and Surgery in collaboration with the College of Health Sciences should organize series of seminars to sensitize the undergraduate medical students on the importance of the facilities housed in the virtual library. Equally, there should be provision of adequate power supply, adequate and sufficient internet connectivity in the virtual library, and sufficient break time from lectures and clinical engagements should be allocated to encourage the effective use of virtual library.

Keywords: virtual library, level of awareness of virtual library, extent of utility of virtual library, effect of virtual library, undergraduate medical students.

1.0   INTRODUCTION

Libraries have long served central roles in the academic/learning environment. Libraries have physical aspects like space, equipment, storage media; intellectual aspects like collection of policies that determine what resources will be incorporated; organizational schemes that decide how the collection is accessed; and people who manage the physical and intellectual components and interact with users to solve information problems (Ida, 2016). Nevertheless, the traditional library setting has some setbacks such as the limitation of the library users to the available information resources in the library, and the restriction by the amount of time users can spend with a resource, since each must be returned to the library within a set period of time.

Due to the advent of technology, the concept of virtual library has emerged with vast advantages compare to the traditional library setting. By definition, a virtual library is a digital space that keeps and organizes virtual books and their associated documents. In fact, virtual library is the application of information technology (IT) to library services. The application of Information and Communication Technology (ICT) to library services has brought tremendous improvement in the academic performance of undergraduate students since the majority of the present day undergraduate students are computer literate (Baro, Onyenania and Oni, 2010; Ogunsola, 2011). It has been established that many students use virtual library for their academic workload which includes information to complete their assignments, test and research (Ossai, 2011).

The significance of virtual library is all encompassing, namely; it makes a wide varieties of contents accessible, it provides latest and updated materials, it allows readers to access materials on demand, it makes readers find resources instantly, it has no opening or closing hours, etc. Though virtual library is very important, it has some challenges which could limit its services, namely; poor ICT infrastructure development, inadequacies of government funding, lack of policies guiding the selection of electronic resources, poor ICT skills among librarians, intermittent power supply, limited access to internet services, poor and insufficient bandwidth, restriction by copyright law, and problem of selection of resources because of the increased number of resources (Grantham, 2007).

Closely associated with the use of virtual library in universities, is its effects on the undergraduate students' academic performance. The term "effect" is a state of affairs that is produced by a cause. That is, a change which is a result or consequence of an action or other cause. Something that inevitably follows an antecedent (such as a cause or agent) or something designed to produce a distinctive or desired impression is called effect (Di-Carlo, 2011). An effect is either positive or negative depending on the outcome. An undergraduate student is a student who is pursuing a degree at the first level of higher education (meaning the level after secondary school)   in a college or university (Akinrefon and Adejumo, 2012). Undergraduate students need virtual library because of the different learning opportunities it can support. In fact, virtual library provides undergraduate students with the convenience of learning at their own comfort. On the other hand, undergraduate medical students are the category of students in the college of medicine who are undergoing degree program for the award of medicine bachelor and bachelor of surgery (MBBS). Medical undergraduate students are housed in the department of medicine and surgery within the college of health sciences (Awunor, Abah, Akpoguma and Okhimamhe, 2016).

Academic performance is the measurement of student achievement across various academic subjects. It measures the level at which undergraduate medical students' educational outcome accomplished success as a result of learning. It measures the extent to which student learning has achieved educational goals. It is generally measured by examinations or tests and could be determined by comparing a student's score in a school test and/or scandalized test with the average score of other students at the same level (Denen, Uganneya and Akor, 2020). Undergraduate student's academic performance and graduation rates have been the area of interest for higher education institutions. Investigation of factors related to the academic performance of undergraduate students become a topic of growing interest in higher educational circle (Shahzadi and Ahmad, 2011). Scholars agree that students' academic achievement is a 'net result' of their cognitive and non-cognitive attributes as well as the sociocultural context in which the learning process takes place (Liem, 2019).

The academic performance of undergraduate medical students could be enhanced by the provision of virtual library resources and services, and their level of utilization. The proper utilization of virtual library by undergraduate medical students is capable of determining their academic performance in terms of good grades and promotion during medical examinations. Since the level of awareness of virtual libraries by undergraduate medical students is very low, its effects on their academic performance is minimal (Baro, Endouware and Ubogu, 2011). An awareness has to do with the state of being aware or knowledge and understanding that something exists. The level of awareness of virtual library affects the extent at which virtual library's resources are being put into use. The level of awareness and utilization of virtual library resources can be heightened by proper sensitization campaign and the provision of enabling environment for virtual library to strive.

The effects of virtual library for the enhancement of academic performance of undergraduate medical students in the Department of Medicine and Surgery in Benue State University, Makurdi could be limited, possibly due to poor awareness on the availability of virtual library for academic performance, and the challenges associated with its use. The poor knowledge of the medical field among undergraduate medical students could be traced to the lack of effective use of virtual library since virtual library contains adequate and updated medical information that may not be accessible in their lecture notes or physical library due to the dynamic nature of medical courses. To this end, this paper seeks to appraise the effects of virtual library on the academic performance of undergraduate medical students in the Department of Medicine and Surgery, College of Health Sciences, Benue State University, Makurdi.

1.1 Objectives

The aim of the paper is to investigate the effects of virtual library on the academic performance of undergraduate medical students in the Department of Medicine and Surgery, College of Health Sciences, Benue State University, Makurdi. The aim is achieved through the following specific objectives, which are to:

i. assess the level of awareness of the undergraduate medical students on the availability of virtual library in the department for their academic performance,
ii. find out the extent of the use of virtual library by the undergraduate medical students to boost their academic performance.
iii. evaluate the effects of virtual library on the academic performance of undergraduate medical students in the department.
iv. identify the challenges associated with the use of virtual library by the undergraduate medical students in the department.
v. suggest ways to encourage the use of virtual library to enhance the academic performance of undergraduate medical students.

1.2 Research Questions

Based on the above-stated objectives, the study seeks to find answers to the following research questions:

i. What is the level of awareness of the undergraduate medical students on the availability of virtual library in the department?
ii. To what extent do the undergraduate medical students use virtual library to boost their academic performance?
iii. What are the effects of virtual library on academic performance of undergraduate medical students in the department?
iv. What are the challenges associated with the use of virtual library in the department

2.0   REVIEW OF RELATED LITERATURE
2.1   Conceptual Framework
2.1.1   Medical Undergraduate Students

Medical undergraduate students are students in the Department of Medicine and Surgery who are undergoing degree program for the award of Medicine Bachelor and Bachelor of Surgery (MBBS). The Department of Medicine and Surgery is a unit of the Medical College which is saddled with the responsibility of training the undergraduate medical students towards the award of the degree of medicine bachelor and bachelor of surgery.

Medical courses are highly competitive, and hence tens of thousands of elite secondary school graduates compete for limited places in medical college. There is no doubt that most of those admitted to medical colleges are students who have proven their ability and willingness to adapt to the study of medicine and overcome the challenges of successive exams and long study hours (Kaliyadan, Thalamkandathil, Parupalli, Amin, Balaha and Ali, 2015). Studies have indicated that successful medical undergraduate students in medical colleges can define their learning styles and use them in a way that makes them adapt to different circumstances, manage their time effectively, learn from multiple sources, invest in technology with high efficiency, and contribute to the education of their peers (Abdulrahman, Khalaf, Abbas and Alanazi, 2021). Being a medical undergraduate student is certainly a daily challenge. Regardless of the passion of the medical undergraduate students for medicine, their lives can be stressful and overwhelming at times, due to the hard work and long hours split between studying and training rounds at the hospital.

2.1.2   Academic Performance

Academic performance is the measurement of student achievement across various academic subjects. Teachers and education officials typically measure achievement using classroom performance, graduation rates and results from standardized tests. The academic performance of undergraduate students is generally determined by the provision of the virtual library resources and services, and the level of utilization of the conventional libraries. Academic performance of undergraduate students can be low or high depending on the perception of the use of these services. Academic performance is a key feature in education; it is considered to be the center around which the whole education system revolves (Abaidoo, 2018). Academic performance is among the several components of academic success. Many factors, including socioeconomic status, student temperament and motivation, peers, and parental support influence the undergraduate students' academic performance (Masud, Mufarrih, Qureshi, Khan, Khan and Khan, 2019).

In addition, the academic performance of undergraduate students is the measure of the level at which the undergraduate students' educational output accomplished success as the result of learning. It measures the extent to which student's learning has achieved the educational goals. It is generally measured by examinations or tests and could be determined by comparing a student's score in a school test and/or scandalized test with the average score of other students of the same level. This can be noticed through careful evaluation of general performance of students in their academic programs (Denen, Uganneya and Akor, 2020).

Undergraduate medical students experience serious stress during their academic years. This stress is related to financial issues, health problems, social issues, and academic difficulties. Mehfooz and Haider (2017) stated that a strong relationship exists between stress and academic performance of undergraduate medical students, and also alleged that female undergraduate medical students showed higher level of stress than their male counterparts before and after

examinations. It is important that the undergraduate medical students should be educated to manage stress effectively otherwise it can adversely influence their health and academic performance. The academic performance of undergraduate medical students can be boosted if they utilized virtual library for their studies.

2.1.3 Concept of Virtual Library

Libraries have been able to transform their operations due to the advancement in technology. The library ecosystem has been greatly transformed by digitalization in such a way that, library materials have been made readily available to undergraduate students to positively influence their academic performance. With the recent development in ICT, electronic information sources could be regarded as one of the most powerful tools ever invented in human history (Olaewe and Mutahir, 2015).

According to Adeniran and Unuigboje (2018), most academic libraries have moved from the conventional way of information handling and delivery to more sophisticated methods where access is more enhanced. As a result, virtual libraries have become increasingly important in the learning environment. Virtual libraries play important role in providing access to a wide range of information resources across the globe. Beyond what the traditional libraries can offer, virtual libraries break the barrier of time and location to facilitate sharing of scholarly information for academic excellence, a feat which was practically impossible in the past. The introduction of virtual library provides opportunities for information users to access information across the globe without restriction. The role of virtual library in mediating between the individual information needs of the members of the academic community and the vast amount of globally available content were presented in (Adeniran, 2014; Okebukola, 2002; Rahman, 2002).

The virtual library project has the capability of resolving the problems of the physical library like few current books, journals, and other reading resources, staff shortages, deterioration of facilities, inadequate equipment and even library buildings (Fabunmi, 2009). In this period of information explosion, there is the need for university libraries in Nigeria to use appropriate technology to access the world's information in order to enable universities carry out their traditional functions of teaching, research, and public service effectively and efficiently.

2.2 Level of Awareness of Undergraduate Medical Students for Virtual Library

Awareness is a state of having knowledge about something. When knowledge about something is missing and there is a need for it, then certain measures can be put in place to encourage the relevant audience to acquire the knowledge. For undergraduate medical students to have knowledge of the availability of virtual library, an awareness has to exist. Ali (2005) defined awareness of electronic library resources as the degree of user's knowledge of the availability of the service and the extent of their use of them. Anaraki and Babalhavaeji (2013) pointed out that awareness should not only be limited to library users but should also include the library staff so that they can pass on the knowledge to the library users. In the context of this study, the knowledge that is needed is the knowledge of the awareness of virtual library resources by the undergraduate medical students of the Department of Medicine and Surgery, College of Health Sciences, Benue State University.

A number of studies, including a study conducted by Callinan (2005) at University College Dublin in Ireland, has revealed that library users may fail to utilize the electronic library resources available to them due to lack of awareness of the existence of the resources. In this way, awareness is the first step before utilization: without awareness, utilization will not be realized. Also, a study conducted by Osinulu (2020) in Olabisi Onabanjo University, Nigeria, revealed that majority of the medical students were not aware of available online library resources. It also revealed low

frequent usage of the online library resources for academic purposes. Baro, Endouware and Ubogu (2011) stipulated that the awareness and the use of online information resources by medical students at Delta State University, Nigeria are very much related. Hence, awareness is necessary before utilization. It is, therefore, critical that the library establishes measures to inform users of the availability of virtual library resources. In recap, undergraduate medical students will benefit immensely from virtual library with regards to their academic performance if they are aware of its existence, which will lead to their utilization of its resources.

2.3 Extent of the Use of Virtual Library by Undergraduate Medical Students

The phrase "extent of use" refers to a period of time that is devoted to something in a determined way because of its important. Mwirigi (2012) defined the usage of virtual library resources as searching, browsing, examining, and visiting an e-resource and/or service by a user. The extent of use of virtual library resources is critical in the current era, as the amount of information available online is increasing daily, with some information sources only being available in electronic format. There are several factors that affect the extent of use of electronic library resources, including lack of promotion of the availability of e-resources, competing e-services offered, technical infrastructure, user authentication as well as training and support for information retrieval (Pullinger, 1999).

Awareness and accessibility do not necessarily transform to extent of use, but they are means to extent of use. To ensure the extent of use of electronic library resources, academic libraries have to put various measures into place. Obasuyi and Usifoh (2013) noted that the extent of use of virtual library services is heavily influenced by the users' awareness and relevance of the service. Bassey and Odu (2015) noted that undergraduate students are more comfortable to use electronic library resources for their studies and assignments because of ease of access to the electronic library resources. On the contrary, a study conducted by Parande, Tapare and Borle (2017) on the utilization of library services by undergraduate medical students in a medical college in Western Maharashtra, India, revealed that majority of undergraduate medical students were not satisfied with the IT facilities of library because of lack of befitting facilities for virtual library. From this, we know that the extent of the use of virtual library is directly proportional to the availability of befitting virtual library infrastructures.

A study conducted by Sadaf, Siddique and Shahzad (2022) on the extent of use of digital resources by medical students in Lahore revealed that majority of the medical students (160 out of 272) used e-resources for their academic work. The result of research showed that more than half of the medical students used the internet- resources rather than print resources. This study is similar to the present study but it did not emphasized on the effects of virtual library on the academic performance of undergraduate medical students.

The study by Alabdulwahhab, Kazmi, Sami, Almujel, Alanazi, Alanazi, *et al.* (2021) on the use of online resources by undergraduate medical students at College of Medicine, Majmaah University in Kingdom of Saudi Arabia revealed that male students consult online resources for studying more than their females counterparts, and students with the highest GPA scores used to online educational resources. A significant proportion of the undergraduate medical students at College of Medicine, Majmaah University used online educational resources for learning. The study shares similarity with the present study but it is limited to online resources without reference to the virtual library context. The extent of the use of virtual library resources will lead to positive effects on the academic performance of undergraduate medical students.

2.4   Effects of Virtual Library on Undergraduate Medical Students' Academic Performance

Virtual library has proven to be effective in determining undergraduate medical students' academic performance. Virtual library has both positive and negative effects although almost all studies dwelled on the positive effects of virtual library. Ivwighreghweta and Igere (2014) investigated the effects of internet on the academic performance of students in some selected tertiary institutions in Nigeria, and found out that majority of the undergraduate students used the internet in order to retrieve relevant academic materials. It was asserted the use of internet enhanced the academic performance of the students. We observe that the study in (Ivwighreghweta and Igere, 2014) and the present study focused on the effects of e-libraries on the academic performance of students, however, the present study places more emphasize on virtual library and its effects on the academic performance of undergraduate medical students.

A study conducted by Denen, Uganneya and Akor (2020) on an assessment of library internet services on students' academic performance in universities in Benue State, Nigeria, revealed that effective use of library internet services helps the students to accomplished their assignments with ease, and it promotes good academic grades.

Alabdulwahhab, Kazmi, Sami, Almujel, Alanazi, Alanazi, et al. (2021) noted that undergraduate medical students that used virtual library stand the chance to attain very good GPA scores, and are sure to graduate in record time. Sadaf, Siddique and Shahzad (2022) noted that undergraduate medical students highly depend on virtual library for their assignments and preparation for medical examinations because it provides latest and up-to-date information resources suitable for the dynamic nature of the medical profession. Virtual library can negatively affects the undergraduate medical students' performance through distractions due to online adverts and video poop ups, which could lead to addict to films with consequence effects on their academic performance. In the context of this study, the researcher is concerned with how virtual library resources positively or negatively effects the academic performance of undergraduate medical students in the Department of Medicine and Surgery in Benue State University, Makurdi. Albeit, the effects of virtual library on the academic performance of undergraduate medical students can be hampered by some challenges.

2.5   Challenges Associated with the Use of Virtual Library Resources by Undergraduate Medical Students

Several studies as seen so far showed that virtual libraries are very resourceful with a significant effects on the academic performance of undergraduate medical students. However, a number of barriers hinder some medical undergraduate students from fully harnessing the resources of virtual library. It is important to note that, although the barriers may be similar in some cases, more challenges are observed in developing countries than in developed countries, mainly due to the unavailability or shortage of technologies needed to access e-resources.

Although technologies have increased the availability of information, it is not all countries or universities that are able to access the ICTs that are needed for one to access virtual information. Technology has resulted in what is termed the digital divide, which refers to the gap between countries that can access and use ICTs and those that cannot access and use these technologies because of their poor economies (Watson, 2000). The notable barriers recorded in literature range from lack of awareness, poor information, and digital literacy skills, negative attitude of students towards the use of virtual library, lack/poor internet connectivity, poor ICT Infrastructures, information overload, license restrictions on the internet amongst many others.

High cost of establishment of virtual library is a problem. Virtual libraries are very expensive to install. It is expected that funding should be provided to acquire an effective virtual library facilities. Funding can be provided by government, non-government organizations, private or public enterprises (Gbaje, 2007).

Problem of classification and catalogue of published works is a challenge associated with virtual libraries. The virtual library had problems getting researchers and lecturers to publish their works according to international standard. There is the need for authors, researchers, or academics to acquire the International Standard Serial Number (ISSN) and the International Standard Book Number (ISBN), to enable for better organization of published works (Nok, 2006). Most academic libraries find it almost difficult to make payment for monthly subscriptions for internet. Without using the internet, availability of virtual library would be impossible for the undergraduate medical students.

Operation of the virtual library requires a lot of skills and training from the users, and many of the undergraduate medical students are not skilled to use virtual library. Most undergraduate students find it difficult to use virtual library due to non-availability of computers, or internet networks (Ivwighreghweta and Igere, 2014).Copyright issue is associated with virtual library. Virtual library does not control piracy of intellectual works or duplication of another individual's research, journals or articles, which may be carried out by the users (Ayele, 2022). Virtual library lacks privacy. Virtual library does not ensure protection of published works, like the online journals, articles, books and resource materials (Nwosu and Obiano, 2021). This is because virtual library can be easily accessible, and its contents can be scanned or printed from a computer. Virtual libraries cannot operate effectively without constant electricity supply. Nigeria has poor service of power generation (Gbaje, 2007). This does not make the use of virtual library fully operational, and thus denied the undergraduate medical students access to virtual library services. The enumerated challenges needed to be remedied to enable undergraduate medical students to access virtual library resources for their studies.

2.6 Measures to Encourage the Use of Virtual Library Resources by Undergraduate Medical Students

Owing to challenges confronting the use of virtual library by undergraduate medical students, some measures have been suggested to encourage its uses. The term "measure" has to do with the way forward to mitigate challenges confronting something. For Nigerian university libraries to overcome the problems limiting the effective utilization of virtual library by undergraduate medical students, there is the need for the provision of funds and technical skills especially in computer education.

Building of centers to promote virtual library services is necessary to encourage the use of virtual library by undergraduate medical students. There is need for proper establishment of centers to promote the use of virtual library within the university environment. This will improve undergraduate students' ability to access the virtual library to carry out researches, projects or assignments. Academic libraries should also have instalments of virtual library services to upgrade for wider storage of intellectual materials and resources (Nok, 2006).

Affordable internet services should be provided for easier access of virtual library. There is need to make internet service providers, make their network affordable and more convenient for users within the university setting (Obaseki, Maidabino and Makama, 2012). Once there is affordable access of internet, undergraduate medical students can reach resources of virtual libraries operating locally or even globally. Better funding to enable for more virtual libraries and for the equipment of the existing virtual libraries should be encouraged. The university's domain

needs more access to virtual library, which should have more locations. Construction and equipping a virtual library is very expensive, so there is need for other sources of funding apart from Government participation, to build more virtual libraries in Nigeria universities (Gbaje, 2007).

Proper legal regulations for virtual library use should be expedite. Government must make up better policies to ensure better use of the virtual library in Nigeria universities. Legislation such as the Copy right Act of Nigeria may not be enough to stop individuals from duplicating other people's work (Adeniran, 2014). For undergraduate medical students and other library users to access virtual library services, there must be accurate knowledge of how to use electronic devices like the computer. When undergraduate medical students are sensitized and trained, they will acquire necessary skills, to retrieve information and other intellectual resource materials from the virtual library. The university libraries should organize workshops, seminars and conferences to train librarians on the use of virtual library (Ya'u, 2003).

2.7 Summary of Literature Review

The review of literature revealed that some related works on virtual library with respect to the role of virtual library in the learning environment, the challenges of successful implementation of virtual libraries in academic libraries in Nigeria, and the relevance of virtual library to the undergraduate medical students' academic performance have been carried out in literature. Though many of the related studies on virtual library were carried out with regards to the academic performance of undergraduate students, none discuss its level of awareness and extent of use among the undergraduate medical students in the Department of Medicine and Surgery, Benue State University, Makurdi.

Owing to this research gap, this study is set to appraise the level of awareness and the extent of use of virtual library resources among the undergraduate medical students in the Department of Medicine and Surgery, College of Health Sciences, Benue State University, Makurdi, to ascertain how to improve the capacity and utilization of virtual library in the department for better academic performance.

3.0 RESEARCH METHOD

3.1 Research Design and Area of Study

The research design that is used for this study is the case study approach. A case study approach singles out individuals, group of individuals, institutions or community for analysis (Adikwu, Aduloju and Emaikwu, 2013). This design is suitable because it provides an effective way of collecting data or information from an appropriate number of sources.

The area of the study is the Department of Medicine and Surgery, College of Health Sciences, Benue State University, Makurdi. The Benue State University is located along Gboko Road in Makurdi, the Benue State capital in North-Central Zone of Nigeria. The College of Health Sciences was established in the 2003/2004 academic session with Medicine and Surgery as the only undergraduate course. Presently, other allied undergraduate courses like Nursing, Anatomy, and Physiology have been introduced in the College.

3.2 Population of the Study

The population of the study comprised of 392 students of the Department of Medicine and Surgery, College of Health Sciences, Benue State University, Makurdi (Examination Office, Department of Medicine and Surgery, 2022). The breakdown of the population are; 86 students (100 Level), 89 students (200 Level), 90 students (300 Level), 29 students (400 Level), 57 students (500 Level), and 41 students (600 Level), respectively.

3.5   Sample and Sampling Technique
        The sample size for the study was determined to be 198 undergraduate students of the Department of Medicine and Surgery, Benue State University, Makurdi by using the Taro Yamane's sampling technique (Yamane, 1967).

3.6   Instrument for Data Collection
        The instrument for data collection is questionnaire. The questionnaire is divided into four sections, namely; Section A, Section B, Section C, and Section D. Section A focuses on the level of awareness of virtual library resources among the undergraduate medical students, Section B is on the extent of the use of virtual library resources among the undergraduate medical students, Section C dwells on the challenges associated with the use of virtual library resources by undergraduate medical students, and Section D focuses on the measures to encourage the use of virtual library by undergraduate medical students.

3.7   Method of Data Collection and Method of Data Analysis
        The researcher administered the questionnaire to 198 undergraduate students of the Department of Medicine and Surgery, Benue State University, Makurdi. The researcher guided the respondents to react appropriately to the instrument. The questionnaire was filled accordingly and returned after completion. The researcher used descriptive statistical method to analyze the data that were collected. The descriptive statistical method was used to generate frequencies and percentages, which are presented in tables, bar and pie charts.

4.0   DATA PRESENTATION AND ANALYSIS
4.1   Response Rate and Responses from Research Questions

A total of 198 questionnaires were distributed to the students in the Department of Medicine and Surgery, Benue State University, Makurdi. All the questionnaires were correctly filled and returned.

        Research Question 1: What is the level of awareness of the undergraduate medical students on the availability of virtual library in the department?
Research Question 1 was presented in 5 items, and the answers are showcased in Table 1.
Table 1: Level of Awareness on the Availability of Virtual Library
KEYS: Strongly Agree (**SA**), Agree (**A**), Disagree (**D**), Strongly Disagree (**SD**)

S/N	Level of awareness on the availability of virtual library	SA	%	A	%	D	%	SD	%
1	I am aware of the availability of virtual library in the University.	95	48	63	31.8	22	11.1	18	9.1
2	I know the location of virtual library in the University.	68	34.3	51	25.8	49	24.7	30	15.2
3	I know the facilities in the virtual library.	39	19.7	50	25.3	78	39.4	31	15.7
4	I know the services offered by the virtual library.	34	17.2	78	39.4	65	32.8	21	10.6
5	I know virtual library can provide good sources of information to complete assignments and to prepare for examinations.	105	53	73	36.9	16	8.1	4	2

        Table 1 shows the frequency and percentage distributions on the level of awareness on the availability of virtual library by the undergraduate medical students in the Department of Medicine

and Surgery, Benue State University, Makurdi (DMSBSUM). From Table 1, majority of the respondents indicated strongly agree and agree on the items in the table with the exception of items 3 and 4, where 78 (39.4%) respondents indicated disagree and agree on the items. This shows that the undergraduate medical students are aware of the availability of virtual library in the institution, however, they do not know how equipped is the virtual library.

Research Question 2: To what extent do the undergraduate medical students use virtual library to boost their academic performance?

Research Question 2 was presented in 5 items, and the answers are showcased in Table 2.

Table 2: Extent of Use of Virtual Library

KEYS: Very High Extent (**VHE**), High Extent (**HE**), Low Extent (**LE**), Very Low Extent (**VLE**)

S/N	Extent of the use of virtual library	VHE	%	HE	%	LE	%	VLE	%
1	I use virtual library resources before every lecture to enhance comprehension during lectures.	11	5.6	23	11.6	42	12.2	122	61.6
2	I use virtual library to complete assignments.	18	9.1	33	16.7	52	26.3	95	48
3	I use virtual library resources to prepare for examinations.	20	10.1	27	13.6	48	24.2	103	52
4	I use virtual library to access online videos needed for clinical engagements.	25	12.6	40	20.2	41	20.7	92	46.5
5	I use virtual library because it contains adequate and up-to-date information necessary for my academic performance.	32	16.2	38	19.2	44	22.2	84	42.4

Table 2 shows the frequency and percentage distributions on the extent of use of virtual library by the undergraduate medical students in DMSBSUM. From Table 1, majority of the respondents indicated very low extent of utilization of virtual library on the items in the table without any exception. In fact, 122 respondents (61.6%) show very low extent on item 1, 95 respondents (48%) show very low extent on item 2, 103 respondents (52%) show very low extent on item 3, 92 respondents (46.5%) show very low extent on item 4, and 84 respondents (42.4%) show very low extent on item 5. These show that the extent of the use of virtual library by the undergraduate medical students is very low.

Research Question 3: What are the effects of virtual library on academic performance of undergraduate medical students in the department?

Research Question 3 was presented in 5 items, and the answers are showcased in Table 3.

Table 3: Effects of Virtual Library on Academic Performance
KEYS: Strongly Agree (**SA**), Agree (**A**), Disagree (**D**), Strongly Disagree (**SD**)

S/N	Effects of virtual library on academic performance	SA	%	A	%	D	%	SD	%
1	It enhances my understanding during lectures, and thus improves my academic performance.	47	23.7	81	40.9	45	22.7	25	12.6
2	It helps me to access educational materials to complete assignments, and thus improves my academic performance.	51	25.8	75	37.9	46	23.2	26	13.1
3	It assists me to adequately prepare for examinations, and thus improves my academic performance.	34	17.2	83	41.9	50	25.3	31	15.7
4	It helps me to access online videos which promotes my performance during clinical engagements.	42	21.2	72	36.4	57	28.8	27	13.6
5	It sometimes distracts my attention due to online adverts and video poop-ups, and thus negatively affects my academic performance.	52	26.3	62	31.3	56	28.3	28	14.1

Table 3 shows the frequency and percentage distributions on the effects of virtual library on academic performance of undergraduate medical students in DMSBSUM. From Table 3, majority of the respondents agree to the positive effects of virtual library on their academic performance on each of the items in the table. In the breakdown, 81 respondents (40.9%) agree on item 1, 75 respondents (37.9%) agree on item 2, 83 respondents (41.9%) agree on item 3, 72 respondents (46.5%) agree on item 4, and 62 respondents (42.4%) agree on item 5. These show that the extent of the use of virtual library by the undergraduate medical students is very low. The information shows that virtual library positively effects the academic performance of the undergraduate medical students, however, their extent of use is very low.

Research Question 4: What are the challenges associated with the use of virtual library in the department?

Research Question 4 was presented in 5 items, and the answers are showcased in Table 4.

Table 4: Challenges Associated with the Use of Virtual Library

KEYS: Strongly Agree (**SA**), Agree (**A**), Disagree (**D**), Strongly Disagree (**SD**)

S/N	Challenges associated with the use of virtual library	SA	%	A	%	D	%	SD	%
1	I am unaware of virtual library's potentials for academic performance.	36	18.2	55	27.8	54	27.3	53	26.8
2	I am not encouraged to use virtual library because it is poorly equipped and congested.	30	15.2	60	30.3	73	36.9	35	17.7
3	I am discouraged from using virtual library because of unstable power supply.	40	20.2	81	40.9	60	30.3	17	8.6
4	I am not encouraged to use virtual library because of poor or fluctuating internet connectivity.	44	22.2	70	35.4	65	32.8	19	9.6
5	I am discouraged from using virtual library because I am mostly choked with series of lectures and clinical engagements.	62	31.3	69	34.8	47	23.7	20	10.1

Table 4 shows the frequency and percentage distributions on the challenges associated with the use of virtual library by the undergraduate medical students in DMSBSUM. From Table 4, the respondents do not clearly show the challenges associated with the use of virtual library because difference between those that agree and disagree is marginal. In fact, there is disparity among the respondents on the challenges associated with their use of virtual library except on item 5, where 69 respondents (34.8%) agree and 62 respondents (31.3%) strongly agree that series of lectures and clinical engagements discouraged their use of virtual library. From this, one can infer that series of lectures and clinical engagements are challenges associated with the use of virtual library by undergraduate medical students.

Research Question 5: What are the measures to encourage the use of virtual library for the academic performance of undergraduate medical students in the department?

Research Question 5 was presented in 5 items, and the answers are showcased in Table 5.

Table 5: Measures to Encourage the Use of Virtual Library
KEYS: Strongly Agree (**SA**), Agree (**A**), Disagree (**D**), Strongly Disagree (**SD**)

S/N	Measures to encourage the use of virtual library	SA	%	A	%	D	%	SD	%
1	There should be provision of funds to equip the existing virtual library and to build more virtual libraries.	133	67.2	63	31.8	1	0.5	1	0.5
2	There should be sensitization on the availability of virtual library, how to use it, and its potentials for academic performance.	155	78.3	43	21.7	0	0	0	0
3	There should be provision of adequate power supply in the virtual library.	150	75.8	48	24.2	0	0	0	0
4	There should be provision of adequate and sufficient internet connectivity in the virtual library.	158	79.8	37	18.7	2	1	1	0.5
5	There should be allocation of sufficient break from lectures and clinical engagements to access virtual library resources.	114	57.6	70	35.4	9	4.5	5	2.5

Table 5 shows the frequency and percentage distributions on the measures to encourage the use of virtual library by the undergraduate medical students in DMSBSUM. Though the respondents disagree on the challenges confronting the use of virtual library, vast majority of them strongly agree to the measures that would encourage the use of virtual library. 133 respondents (67.2%) strongly agree on item 1, 155 respondents (78.3%) strongly agree on item 2, 150 respondents (75.8%) strongly agree on item 3, 158 respondents (79.8%) strongly agree on item 4, and 114 respondents (57.6%) strongly agree on item 5, respectively.

4.2   Discussion of Findings

From the data analyzed, we made the following findings as follows:

Research Question 1 sought to know the level of awareness on the availability of virtual library by the undergraduate medical students in the Department of Medicine and Surgery, Benue State University, Makurdi (DMSBSUM). The finding reveals that the undergraduate medical students are not properly conversant with the facilities in the virtual library, which is in consonant with the study carried out by Callinan (2005) at University College Dublin in Ireland, which revealed that library users may fail to utilize the electronic library resources available to them due to lack of awareness of the existence of the resources.

Research Question 2 sought to appraise the extent of use of virtual library by the undergraduate medical students in DMSBSUM. The finding reveals that the undergraduate medical students do not consult virtual library before every lecture to enhance comprehension during lectures. Equally, they do not use the resources of virtual library to prepare for their examinations. In fact, the extent of use of virtual library to the items under Research Question 2 is very low in agreement with Obasuyi and Usifoh (2013), which stated that the extent of use of virtual library services is heavily influenced by the users' awareness and relevance of the service.

Research Question 3 sought to examine the effects of virtual library on the academic performance of the undergraduate medical students in DMSBSUM. The finding reveals that virtual library has positive effects on the academic performance of the undergraduate medical students, which agrees with the study by Ivwighreghweta and Igere (2014) which asserted that the use of internet resource materials enhanced the academic performance of students. In addition, the finding does not in any justifies that, the very low extent of the use of virtual library the undergraduate medical students is caused by its negative impact on their academic performance.

Research Question 4 sought to know the challenges associated with the use of virtual library by the undergraduate medical students in DMSBSUM. The finding reveals that the challenges hampering the effective use of virtual library by the students are unstable power supply, poor or fluctuating internet connectivity, and lack of free space to consult the virtual library resources. These agree with the works by Nok (2006), Gbaje (2007), Fasanu (2013), and Olaewe and Mutahir (2015) that virtual library will have issues to operate effectively without good internet networks, and constant electricity supply. The only different challenge pinpointed by this study with regards to the use of virtual library is the issue of choked lecture time table and busy clinical engagements.

Research Question 5 sought to know the measures to encourage the use of virtual library by the undergraduate medical students in DMSBSUM. The finding reveals that the administrators of the Department of Medicine and Surgery in collaboration with the College of Health Sciences should organize series of seminars to sensitize the undergraduate medical students on the importance of the facilities housed in the virtual library. Equally, there should be provision of adequate power supply, adequate and sufficient internet connectivity in the virtual library, and sufficient break time from lectures and clinical engagements should be allocated to encourage the effective use of virtual library. Some of the measures discovered by this study are akin to the measures stated by Denen, Uganneya and Akor (2020), and Nwosu and Obiano (2021), but the measure for the allocation of sufficient break time from lectures and clinical engagements to encourage the effective use of virtual library is novel to the best of our knowledge.

5.0   CONCLUSION

Based on the analysis and discussion of the findings, it is certain that the undergraduate medical students are not properly conversant with the facilities in the virtual library, which made their extent of use of virtual library resources is very low. Also, the very low extent of the use of virtual library by the undergraduate medical students can be attributed to their being choked with series of lectures and clinical engagements.

In addition, the utilization of virtual library resources has no negative effects on the academic performance of the undergraduate medical students. Succinctly, unstable power supply, poor or fluctuating internet connectivity, and lack of free space to consult the virtual library resources are the challenges militating against the effective use of virtual library by undergraduate medical students.

Based on the conclusion, the followings suggestions and recommendation are made:

i.   The administrators of the Department of Medicine and Surgery in collaboration with the College of Health Sciences should organize series of seminars to sensitize the undergraduate medical students on the importance of the facilities housed in the virtual library.

ii. There should be provision of adequate power supply to encourage the utilization of virtual library resources by the undergraduate medical students.

iii.   Adequate and sufficient internet connectivity should be installed within the vicinity where the virtual library is situated to enhance access to virtual library resources.

iv.   The examination officer of the department in collaboration with the college examination officer and provost should ensure sufficient break time from lectures and clinical engagements be allocated to boost the effective use of virtual library.

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