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**MULTIMEDIA RESOURCES AND LIBRARY UTILIZATION BY MEDICAL STUDENTS IN SELECTED NIGERIAN  
UNIVERSITIES**

By

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**ABSTRACT**

*This research examined multimedia resources and library utilization by medical students in selected Nigerian universities. 3 purposes of the study, 3 research questions and 3 research hypotheses were formulated for the research. The design for this research was descriptive survey research design. The area of the study consisted of selected federal universities in Nigeria to include university of Benin, University of Calabar, University of Nigeria Nsukka, University of Port Harcourt and University of Uyo. The population stood at 385 medical students who are registered with the libraries in the study area, while Krejcie and Morgan table for determining sample size was used to arrive at a sample of 196 for this research. A researcher- developed instruments titled "Multimedia Resources and Library Utilization Questionnaire" (MRLUQ) was used for data collection. Completed copies of the questionnaire were collected back by the researchers while Mean and standard deviation was used for answering the research questions and dependent t-test was used to test the null hypotheses at .05 level of significance. At the end of the research, it was discovered that text, audio and video resources have significant influence on medical student utilization of libraries in Nigerian universities but image resources do not have a significant influence on medical students' utilization of libraries.*

**KEYWORDS;** Multimedia resources, text resources, video resources, audio resources, image resource, medical students, Nigerian universities, utilization of libraries.

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**INTRODUCTION**

Beyond the immediate educational goal is the question of how to provide the 'best education' for the training of competent and independent practicing internists with the ability to care for patients in both in-patient and out-patient settings comprehensively. In order to accomplish this goal, an innovative skill is required by learners and instructors of medical science to meet their demands and expectations in teaching as leaning. This however highlights the important of library utilization in promoting access to Open Access Resources by identifying and discovering relevant scholarly web resources and getting these resources available to user community through a user-friendly information gateway.

As educational process functions in a world of books, the library becomes "the heart" of a university or an institute offering higher education. The entire academic and research process is fully dependent on library network. The library is a driver of knowledge and the gateway through which goals and objectives of the university are assured. Alemma (1994) views university library as an intellectual resource centre of the university established to play a supportive role of enhancing knowledge frontier of students, teaching and non-teaching staff of the university. To facilitate any educational programmes successfully, library proves the essential part in educational system. It serves as a key factor to accomplish the aims and objectives of the higher education. The importance of library has been demonstrated by the government as expressed in the National Policy on Education (NPE, 2004) that

every state Ministry needs to provide funds for the establishment of libraries in all her educational institutions and to train librarians and library assistants. As a resource, it occupies a central and primary place in any school system. It supports all functions of school teaching and provides service and guidance to its readers.

A civilized society is expected to have a literate and educated community fully aware of the value, importance and use of libraries. This is so because, wherever there is civilization, there must be books and wherever there are books, there are libraries. The library is, thus, a driving force capable of building a better society by its nature, variety, quality and extent of service. It is a support for all types of educational development of an individual. It enables every reader to access a wide range of reading material in order to broaden one's outlook, knowledge and ideas. The library according to (Farombi, 1998), opens the windows of the mind and enables the readers to solve their crucial problems in a reasonable manner. Library is saddled with the responsibilities of providing information resources and services and personal assistance to the users. Therefore, it could be derived from the above definitions that a library is an organization of records of human thought (Anyim, 2016). These records are in a physical form, i.e., human thoughts embodied in the form of useful manuscripts, books, periodicals, audio-visual records, microfilms, graphs, charts, etc. These are arranged, stored and preserved in a physical functional structure for effective utilization by the potential users in future.

Due to changes in technology and innovation which have revolutionized the way people learn, multimedia resources become the hope for effective utilization of library by university students. Multimedia resources as used in the context of this study is the combination of different (rich)-media contents - namely audio podcasts, audio-narrated slides, short video segments and full-video lecture capture to strengthened learners' understanding (Oparah, 2016). Multimedia refers to content that uses a combination of different content forms. This contrasts with media that use only rudimentary computer displays such as text-only or traditional forms of printed or hand produced material.

Multimedia includes a combination of text, audio, still images, animation, video, or interactivity content forms. In everyday life, multimedia is everything we hear or see, e.g. text in books, sound in music, and graphics in pictures. In computing multimedia is the presentation of information by a computer system using text, sound and graphics (Issa, 2009). By combining media and content, those interested in multimedia can take on and work with a variety of media forms to get their content. One example of multimedia would be combining a website with video, audio, or text images across Ramaiah (2012). Interactive Multimedia is the means to interface with these media typically with a computer keyboard, mouse, touch screen, on screen buttons, and text entry allowing a user to make decisions as to what takes place next (Rowley, 2016).

Meanwhile, video can be defined as a series of images or slides that are displayed on a television or computer screen one after the other (Madu, & Nwangwu, 2014). This creates the illusion of motion and interactivity that could engage the audience with the content. This combination is usually created by a display of a number of different frames per second where each frame contains a slight difference from the previous one. One of the main characteristics of a video is that it occupies large space. However, video can easily be transmitted live through a television broadcast, a videoconference or even on a mobile device (Onaolapo-Akinbode, 2012).

As earlier noted, the multimedia combines different elements of media to engage learners in instructional process. Apart from the text, multimedia requires the capabilities of images to provide visual representation of the message. These images include graphics and still images. Basically, an image is a critical component of multimedia that represents a replica, a physical or imaginary object. It is quite useful when the physical object is not available or inaccessible. Thus, a still image usually represents, protects, stores and displays a visual representation of a particular phenomenon or object that can be displayed on a computer screen, and this combines pixels with brightness and colour for effective representation.

As information technology (IT) progresses, academic libraries have placed a greater emphasis on electronic (multimedia) resources collections development. Users of academic libraries can get

direct access to electronic resources with uniformity and an assurance of fairness of access. In addition, students can get convinced benefits in accessing electronic resources such as, rapid browsing, comprehensive information coverage, sharing, print and downloading, retrieval speed, compound access, and more so (Pawar, 2016). In order to ensure effective navigation and exploitation of information resources in the library by the users without being stranded when librarians are not available for assistance, there is need to take cognizance of multimedia resources and library utilization by University of Uyo medical students.

## STATEMENT OF THE PROBLEM

The system of education has been changing rapidly in modern world. Due to the impact of tremendous advancement in computer and communication technologies, the perception, approaches and techniques of information assessment has also been altered gradually. Hence, according to the need of timely change, the entire system of education as well as academic libraries have to keep pace to fulfill the standards of quality education and achieve the projected goals. The modification in the academic world is considered essential to carry out further development of the country. With the advancement of digital technologies, the role of library and librarian in higher education has been widely expanded since a variety of challenges have emerged.

One of such ways the roles of the library has expanded is in the introduction and use of multimedia resources in the dissemination of information. The medical students who are very important library users carry out their studies by working on human body and understand how the body reacts to certain issues around it these students require information in practical analysis of human body and health. This information is contained in some information resources that can help the student understand their training. When these information resources are not in place in the libraries, there is a possibility that the students will not use the library. It is against this backdrop that this research wants to determine the influence of multimedia resources on medical student utilization of the library in selected Nigerian universities.

## PURPOSE OF THE STUDY

The general purpose of this study is to investigate on multimedia resources and Library utilization by medical students in selected Nigerian Universities. Specifically, the study seeks to:

- Determine the influence of text resources on Library utilization by medical students in selected Nigerian Universities.
- Determine the influence of audio resources on Library utilization by medical students in selected Nigerian Universities.
- Determine the influence of video resources on Library utilization by medical students in selected Nigerian Universities.
- Determine the influence of image resources on Library utilization by medical students in selected Nigerian Universities.

## RESEARCH QUESTIONS

The following questions were formulated to guide the conduct of this study:

- How does text resources influence library utilization by medical students in selected Nigerian Universities?
- How audio resources influence library utilization by medical students in selected Nigerian Universities?
- How video resources influence library utilization by medical students in selected Nigerian Universities?

- How image resources influence library utilization by medical students in selected Nigerian Universities?

## RESEARCH HYPOTHESES

The following null hypothesis was tested at 0.05 level of significance.

- **Ho<sub>1</sub>:** there is no significant influence of text resources on library utilization by medical students in selected Nigerian Universities.
- **Ho<sub>2</sub>:** there is no significant influence of audio resources on library utilization by medical students in selected Nigerian Universities.
- **Ho<sub>3</sub>:** there is no significant influence of video resources on library utilization by medical students in selected Nigerian Universities.
- **Ho<sub>4</sub>:** there is no significant influence of image resources on library utilization by medical students in selected Nigerian Universities.

## LITERATURE REVIEW

### THE CONCEPT OF MULTIMEDIA RESOURCES

The word multimedia combines two words “Multi” and “Media”. Multi means several or multiple while media is the channel for storing or transmitting information. Hence, multimedia is the combination of different forms of media including pictures, text, video, simulation and animation to convey information. For instance, PowerPoint could be combined with media resources like video, text and voice narration to produce an instructional medium called “Multimedia Presentation”. (Astleitner & Wiesner, 2014) defined multimedia as computer-based electronic system that affords users the opportunity to control, manipulate and integrate media elements like text, voiceover, video, infographics and animation to ensure effective delivery of information. It helps the user in providing information from different media on one platform thus enhancing networking and resource sharing. Multimedia can also be seen as educational software involving animations, sounds and text in CDs and DVDs.

Multimedia can be defined as the use of a computer or other electronic devices to present and combine text, graphics, audio, and video with links and tools that let the user navigate, interact, create, and communicate (Igwe, 2015). In recent times, the use of multimedia in teaching and learning has become more extensively advocated among scholars and policymakers. Multimedia technologies include CD-ROMs, CD-I (compact disc interactive), DVI (digital video interactive), and rewritable compact discs as well as slides and video demonstrations (Ramaiah, 2016). Vocabulary.com dictionary defined multimedia as simply transmission that combines media of communication (text, graphics and sound etc.). Multimedia resources provide opportunities for students to learn from and about each other even when they do not have the opportunity to learn with students from other health professions (Bent & Brink, 2013). Multimedia is used in multimedia conferencing, video, mail, office management, business applications, modeling, simulation, teaching and training, entertainment, publishing, high speed networking and health care etc.

According to (Marshall, 2011), multimedia has to do with the integration of diverse media elements like text, graphics, charts, images, simulation, animation, voice narration and other media through capabilities of computer. In this format, every type of information can be processed, stored, and transmitted in digital form. According to (Manda, 2006) it is possible to record, play, and utilize multimedia to display, interact with or access information content through an information processing device, such as a computer or any other electronic device(s).

Multimedia resources are designed to be used in knowledge institutions to aid and enhance learning and knowledge transfer, data storage and retrieval (Bertot, 2000). The power of multimedia technology application in library services lies in the fact that it is multi-sensory, stimulating the many senses of the audience. It is interactive, enabling the end users of the application to control the content

and flow of information. It can also help meet information preferences of the users scholarly, scientifically, vocationally, artistically, recreationally etc. Most academic libraries deliver information services to customers through conventional print-based media (Bovik, 2014). It is important to stress that because of the dynamics of growth of knowledge and information, university libraries are expected to provide both manual and automated/online information services in order to meet the ever-growing needs of their students.

The traditional library consists of information resources in printed form. Its task has been to collect, process, and store and disseminate information for the purpose of reading, teaching and consultation. The information, largely in print form, has been the most widely accepted format for information resources and retrieval to satisfy the needs of library users, (Ramaiah, 2016). Today this is being complemented by electronic or digital resources that meet the needs of researchers and information seekers. Thus, at a time of ever-increasing demand for information, libraries must keep abreast of developments in information technology and advanced communication to enable them provide services that today's society both expects and needs. (Minishi-Majanja, 2007) posited that libraries that cling to traditional service models in an era of new information technology, rising costs and flat budgets cannot thrive.

Multimedia is the field concerned with the computer-controlled integration of text, graphics, drawings, still and moving images (Video), animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally. The power of multimedia technology application in library services lies in the fact that it is multi-sensory, stimulating the many senses of the users (Surjono, 2015). It is interactive, enabling the end users of the application to control the content and flow of information. It can also help meet information preferences of the users scholarly, scientifically, vocationally, artistically, recreationally etc.

It has been observed that an ever-increasing amount of information – covering educational and recreational interests as well as information needs – is being produced in a wide range of multimedia technologies and electronic formats. Application of multimedia technology in libraries attract students and other users who at present see it as an out-of-date educational service that provides “just books”. (Aina, 2012). According to the author the rich variety of multimedia expressions in society should be reflected in the services offered to it users by the libraries. The traditional information service options seem to be no longer acceptable to a larger majority of library users (IFLA, 2004). (Reddi & Mishra, 2013) observed that presently there is a strong demand for newer forms of services such as multimedia based which has now become a vital part of our cultural heritage. Libraries have throughout the history ensured a democratic, independent and free access to the knowledge and intellectual value represented by conventional books. It is evident that this principle is also valid for multimedia information (Patel, 2013). Thus availability of multimedia information through data networks may also open completely new ways for university libraries to obtain information for their students (Bhardwaj, et al 2019).

## **ELEMENTS OF MULTIMEDIA RESOURCES**

Libraries have embraced multimedia applications to transform their spaces into dynamic hubs of knowledge and exploration. Multimedia, with its diverse range of formats and interactive elements, offers numerous ways to enhance the library experience for patrons of all ages. Because they serve such a diverse range of people, libraries maintain collections that can span the spectrum of human knowledge and opinions (Bagui, 2019). Collections include printed materials such as reference sets, paperback novels, biographies, children's and young adult literature, histories, newspapers, and magazines. They usually also contain photographs, maps, art reproductions, sound recordings, and video recordings (Madu & Nwangwu, 2014)

According Multimedia displays and exhibits are another way libraries can captivate their visitors. By integrating text, images, videos, and interactive elements, libraries can create visually

stunning and informative displays on various topics. Multimedia exhibits provide a multisensory experience, encouraging users to delve deeper into subjects that pique their interest and fostering a love for learning. (Mayer's, 2011) suggests that students "learn best when interacting actively with course material" As such, drawing attention to the capacity for multimedia to be paused, replayed and reflected upon and to provide a powerful tool for learning, this study take into consideration, four elements of multimedia resources which exert influence on library utilization by students.

## RELEVANCE OF MULTIMEDIA RESOURCES

Libraries have embraced multimedia applications to transform their spaces into dynamic hubs of knowledge and exploration. Multimedia, with its diverse range of formats and interactive capabilities, offers numerous ways to enhance the library experience for patrons of all ages. Let's delve into some key ways multimedia can be applied in libraries (Adeniyi, 2016).

One significant application of multimedia in libraries is creating and curating digital collections. Libraries can offer a vast array of eBooks, audiobooks, digital images, videos, and music, providing users with convenient access to a wealth of multimedia resources. Digital collections expand the reach and availability of materials, allowing users to explore and engage with content beyond the limitations of physical items (Uhegbu, 2012). According to (Mohler, 2011), libraries can also leverage multimedia to offer online databases and platforms. These platforms provide access to scholarly journals, educational videos, streaming media services, and interactive learning modules. By incorporating multimedia resources into their databases, libraries become valuable gateways to a wide range of information and research opportunities.

Furthermore, (Issa, 2009) added that libraries can use multimedia to preserve and share cultural heritage through digital archives. By digitizing historical documents, photographs, and recordings, libraries can make them accessible to a wider audience. These multimedia archives ensure the preservation of valuable artifacts while allowing users to immerse themselves in the past and explore different facets of history. (Nwalo & Nwokocha, 2012) added that multimedia can also enhance the learning experience in libraries. Interactive multimedia presentations and workshops can be organized to teach various skills and topics. From video editing to graphic design, these sessions equip library patrons with practical knowledge and empower them to create their own multimedia content. Such initiatives foster digital literacy and creativity among library users, encouraging them to become active contributors to the ever-expanding digital landscape (Anyim, 2017).

Virtual reality (VR) and augmented reality (AR) experiences offer an exciting dimension to library services. Libraries can set up VR stations where users can explore virtual environments and historical reconstructions or even visit famous landmarks worldwide. AR applications can overlay digital content onto real-world objects, enabling users to interact with multimedia elements in a tangible way. These immersive experiences offer unique educational opportunities and engage users on a whole new level (Saunders & Hutt, 2015). The author added that multimedia displays and exhibits are another way libraries can captivate their visitors. By integrating text, images, videos, and interactive elements, libraries can create visually stunning and informative displays on various topics. Multimedia exhibits provide a multisensory experience, encouraging users to delve deeper into subjects that pique their interest and fostering a love for learning.

Collaborative multimedia projects according to (Sayood, 2012) can be initiated within library spaces, encouraging patrons to work together and create multimedia content. Whether it's producing podcasts, videos, or digital artwork, these projects foster a sense of community and creativity while promoting collaboration and the exchange of ideas. Libraries play a pivotal role in promoting digital and media literacy. By offering workshops, tutorials, and resources, libraries can empower users to critically evaluate multimedia sources, navigate online platforms responsibly, and become discerning consumers of information in the digital realm. (Madu & Nwangwu, 2014), also found that multimedia offers an abundance of opportunities for libraries to enhance their offerings and engage with their patrons. From digital collections and online databases to virtual reality experiences and multimedia

exhibits, libraries can harness the power of multimedia to create dynamic and interactive spaces that cater to their users' diverse needs and interests. By embracing multimedia applications, libraries continue to evolve and remain vital pillars of knowledge and exploration in the digital age.

## **TEXT RESOURCES AND LIBRARY UTILIZATION**

Text consists of letters, words, sentences and paragraphs. Apart from letters, text also includes numbers, punctuation, symbols, and special characters. For most applications text is needed for giving instruction on how to use them e.g manuals. For instance, in designing graphical user interface (GUI) applications, including menus that include short meaningful words, symbols, help menu, thesauruses, hyperlinks in Web pages and error reporting text are needed Just as words are powerful, texts are equally powerful and must be carefully chosen so that they can convey the intended message. This is the reason why experts in multimedia are expected to appropriately select the words that convey the real idea of the content. According to (Vaughan, 2014) and (Li & Drew, 2004) this is done in addition to other properties of text such as size, color and effects to grab the reader's attention.

For instance, text in multimedia systems can express specific information, or it can act as reinforcement for information contained in other media items. This is a common practice in applications with accessibility requirements (Oshinaike & Adekunmisi, 2011). For example, when Web pages include image elements, they can also include a short amount of text for the user's browser to include as an alternative, in case the digital image item is not available. (Vasanthi, 2015) established that the audio is a powerful media component that touches the emotions and senses of humans and even animals. In all human activities, the use of sound has been considered as critical component of multimedia used for information and instructional purposes. Multimedia resources can hardly communicate effectively without sound or voiceover. Audio files and streams play a major role in some multimedia systems. Audio formats include MP3, WMA, Wave, MIDI and RealAudio. When developers include audio within a website, they will generally use a compressed format to minimize on download times. Web services can also stream audio, so that users can begin playback before the entire file is downloaded.

Text is seen as probably one of the most frequently combined mediums in the colorful world of multimedia. It started as a written message to be sent across to readers and has been one of the key forms of communication in the world for ages. As multimedia resources in library utilization, it is usually combined with photographs and video presentations to augment these other forms of communication and give a detailed description of them. According to (Douglas, 2016), students, despite the arrival of computers interactive technologies, in their class, textbooks are preferred more by the students than e-books for learning and this preference does not change because of knowledge of the center. Okon et al (2023) noted that text is one way web resources and other media can be presented and it is the most common and most accessible of all media presentation.

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## **AUDIO RESOURCES AND LIBRARY UTILIZATION**

Audio is a powerful media component that touches the emotions and senses of humans and even animals. In all human activities, the use of sound has been considered as critical component of multimedia used for information and instructional purposes (Mayer, 2018). Multimedia resources can hardly communicate effectively without sound or voiceover. For a instance, a computer game, videoconferencing or an instructional video without sound or voiceover. These media cannot be used effectively by the users without the audio component (Bagui, 1998).

Generally, sound is generated as a result of differences in pressure that produce waves which can be move in different directions. In most cases, the interest usually lies in the use of sound in multimedia, where is it used, how to generate it and how users or developers can integrate sound in a multimedia project (Pohlmann, 2016). With the advancement in computers and internet technologies, many computer applications and Web pages can now be integrated with digital sound to function as alerts in case of errors or warnings as the case may be. In this case, the audio component is stored on the computer in form of digital data which can be a digital musical instrument (MIDI) and it can also be digitized from an existing recording (Li, & Drew, 2014).

In simplest terms, the process of digitizing an existing medium involves the conversion of a sound from the continuous form (analog) into digital format (discrete form). By this process, a sample of the audio will be taken at a given time interval and stored as an 8-bit or 16-bit sample of data. The sampling of digital multimedia is usually done at three common frequencies i.e. 11.025 kHz, 22.05kHz and 44.1kHz (Sayood, 2012). This will then be stored in form of mono or stereo sound either on a computer memory or CD. The audio files can exist in different formats including MIDI, MP3 Audio, WAV audio, Windows Media, and MPEG audio stream. These formats can easily be played on different platforms, they only require the installation of a media player that is capable of recognizing such formats work effectively. One of the main strengths of a digitized sound is that it allows editing with the use of digital audio editors. Tools like Audacity, Adobe Audition and Apple Quick Time Player are some of the editors that can be used to edit the audio content (Ramaiah, 2016). Audio resources also go very well with some social media site, hence Okon et al (2023b) noted that when library resources are linked with multimedia which can be also connected to social media, it creates an interesting outlook that would be able to aid medical students to use the library resources and also share their ideas, knowledge and medical information to vast array of persons around them.

## VIDEO RESOURCES AND LIBRARY UTILIZATION

Video can be defined as a series of images or slides that are displayed on a television or computer screen one after the other. This creates the illusion of motion and interactivity that could engage the audience with the content. This combination is usually created by a display of a number of different frames per second where each frame contains a slight difference from the previous one. One of the main characteristics of a video is that it occupies large space. However, video can easily be transmitted live through a television broadcast, a videoconference or even on a mobile device (Bovik, 2014; Sayood, 2012).

According to Boyle (2017), there are different types of videos based on their purpose:

- **Video as a text replacement:** A video can serve as a text replacement if an instructor records a video in addition to the explanations that follows a paragraph of text or lecture presentations. This kind of video makes learning more interactive and allows users to process the content at their pace.
- **Narration:** This is when the entire content of learning material is produced as a video. This may be tedious and seemingly uninteresting since interactivity is not emphasized.
- **Scenario:** Here, actors are used to demonstrate certain situations and recorded as a video. This is mainly used to represent certain activities in various courses.
- **Simulation:** This kind of video involves users which makes it more suitable for an interactive online learning. Here, learners learn in a practical way. The process involved in creating a simulation is quite challenging, however, the output has many advantages over other multimedia resources. One of the main attributes of the simulation is the interactive interface or environment in which users can learn about an event in a more realistic way (Boyle, 2017). Simulation can be useful when a particular event might be too risky to be brought into classroom environment, for instance, territorialism in lion kingdom.



- **Demonstration:** This is another type of video that can be used to explain procedures involved in an event. This video can be used to demonstrate step by step guidelines to follow in executing a particular task. In teaching-learning process, demonstration video can be quite useful to explain different concepts that involve specific guidelines and procedure. For instance, a teacher can demonstrate in a video, how to install a particular software on a computer. Teaching this kind of concept requires more than listing the steps in text format. The teacher or an online tutor should be able to demonstrate the steps involved through visual demonstration, this can be done through screen casting. Okon, opined that video resources without a good internet cannot actually work well, so in addition to the video resources a good internet service is required.

## IMAGE RESOURCES AND LIBRARY UTILIZATION

Apart from the text, multimedia requires the capabilities of images to provide visual representation of the message. These images include graphics and still images. Basically, an image is a critical component of multimedia that represents a replica a physical or imaginary object. It is quite useful when the physical object is not available or inaccessible (Li & Drew, 2014). Thus, a still image usually represents, protects, stores and displays a visual representation of a particular phenomenon or object that can be displayed on a computer screen, and this combines pixels with brightness and colour for effective representation (Bent & Brink, 2013). In essence, an image can be defined as a collection of dots and representations with colours. These representations and dots, which could be black and white or coloured, are usually combined with colours to produce an entire image that conveys information and message (Haddad & Araxler, 2016).

Digital images can be represented on a sheet of paper and in other form, it can be stored on a computer after being captured using a digital camera. It is worthy of note that image editing software also has the capabilities that allow users to draw these images directly, which can be saved for use anytime, anywhere (Minishi-Majanja, 2007). It is also important to mention that images can be stored and distributed in various standard formats such as the 8-bit GIF format (Graphics Interchange Format) and JPEG format (Joint Photographic Experts Group), which is considered the most commonly used formats in Web browsers (Heinich, 2018). These two standard formats (image compression formats) are platform independent and popular due to the small file size that is mostly suitable for exchange over slow network channels. However, other less common formats are used in multimedia such as BMP, PICT, PNG, and TIFF. According to (Gonzales & Woods, 2012), digital images are divided into two types: Bitmap images and Vector images.

- **Bitmap images:** These images are usually representations of a two dimensional matrix of pixels. In each of these pixels is a different representation (pixel depth), which basically depends on the type of the image.
- **Binary Images:** This is also called 1-bit monochrome images. In these kinds of images, a single bit and a value (either 0 or 1) represented with white and black or coloured display is present in each pixel. Due to their small sizes and low display quality, these types of images are largely used for illustrations and simple representations. An example of binary image is the image with 600 x 800 dimension which has a file size of 60KB. What can be visibly observed is the poor quality and contrast of the image as it is represented in only black and white colours.
- **Gray-Level Images:** A gray-level, or 8-bit image is a type of image with each pixel having a value range between 0-255 basically made of gray colours or shades. The combination is such that 0-value pixel is generally black while the other part consisting of 200-valued pixel is a bright colour or sometimes close to white. It could be observed in a gray level image that there is now a significant improvement in the visual quality of the image as compared to the binary image. In other words, the image has improved viewing quality and better contrast display.

- **8-Bit Colour Images:** This implies that they are either black and white or grey mixed with black colour. However, the 8-Bit colour image has a combination of colours. In this case, each pixel is usually represented by 8-bit value with colours ranging from 0 to 255. There are three basic colours combined to form this type of image. These colours include red, green, and blue mostly referred to as RGB colour space. However, what can be seen as the main difference between this image and the gray-level image is that the pixel value is not a colour. It is rather an address to an index of colours, which is usually stored in the machine that displays the image. This index of colours is referred to as a look-up table (LUT), which basically comprises all the colours that in an image.
- **24-Bit Colour Images:** This is another type of images that can easily be used for representation and instruction. It is a rich colour image that can convey meaning with clarity and precision. In this type of image, each pixel is stored as three bytes of colour and resulting to combinations of colours (16,777,216). The image is usually represented as three-dimensional arrays combining the three main colours. These colours are red, green and blue. With this arrangement, one array represents each colour and this combination is mostly referred to as RGB images.
- **Vector Images:** This type of image is usually made up of one or more objects that are defined and stored as mathematical equations and not by pixels as we have in other images. The mathematical equations that are used to represent vector image indicate a reference point of a line, including direction and endpoint. It is similar to drawing a rectangle on a page (Figure 4 shows a rectangle and a colour-filled circle). These shapes have main characteristics like colour, fill and outline and all these attributes can easily be edited without affecting the nature of the object itself. Apparently, these objects can be manipulated and easily resized, or moved and they are basically animated images. Okon, and Okwu (2016) also noted that the availability and accessibility of these pictures which are automated resources can facilitate the progression of medical students in accessing and understanding medical activities because by seeing they can understand what it all entails. What can be considered as the main advantage of these images is mainly the small file size. The small size of the vector images makes them easy to store on computer's memory, and display quickly on computer monitors anytime, anywhere.

## DESIGN OF THE STUDY

The design for this research was descriptive survey research design. The area of the study consisted of selected federal universities in Nigeria to include university of Benin, University of Calabar, University of Nigeria Nsukka, University of Port Harcourt and University of Uyo. The population stood at 385 medical students who are registered with the libraries in the study area, while Krejcie and Morgan table for determining sample size was used to arrive at a sample of 196 for this research. A researcher-developed instruments titled "Multimedia Resources and Library Utilization Questionnaire" (MRLUQ) was used for data collection. The researchers through the aid of research assistance administered the questionnaire personally to the respondents who in turn filled the questions and returned same to the research assistants. Completed copies of the questionnaire were collected back by the researchers while Mean and standard deviation was used for answering the research questions and dependent t-test was used to test the null hypotheses at .05 level of significance.

## RESULTS AND FINDINGS

Answering of Research questions

### Research Question One

How does text resources influence library utilization by medical students in selected Nigerian Universities?

**Table 1: Mean and Standard Deviation Scores of Respondents on Influence of Text Resources on Library Utilization**

S/N	The following Text Resources are available and influence utilization of lib.	$\bar{X}$	SD	Remark
1	Textbooks and e-books	13.3	2.71	Agree
2	Academic e-journals	13.3	1.71	Agree
3	e-Medical publications	13.2	2.78	Agree
4	e-Reference materials	12.9	0.95	Agree
5	Internet site and special collections	12.5	1.08	Agree
	<b>Grand Mean</b>	<b>31.8</b>	<b>3.67</b>	

n= 196

The result presented in Table 1 reveals the responses on the influence of text resources on library utilization of medical students in selected Nigerian universities. As observed, the mean response on all the five items implies that the respondents agreed that the five items influence library utilization of medical students in the selected Nigerian Universities.

### Research Question Two

How does audio resources influence library utilization by medical students in selected Nigerian Universities?

**Table 2: Mean and Standard Deviation Scores of Respondents on Influence Audio Resources on Library Utilization**

S/N	The following Audio Resources are available and influence utilization of lib.	$\bar{X}$	SD	Remark
1.	Multimedia player	13.70	1.07	Agree
2.	Recorder and player	13.62	1.12	Agree
3.	Headset for audio listening	13.86	0.95	Agree
4.	Loudspeakers	13.78	1.06	Agree
5.	Audio media devices	13.82	0.96	Agree
	<b>Grand Mean</b>	<b>31.76</b>	<b>7.03</b>	

n= 196

The result presented in Table 2 reveals the responses on the influence of audio resources and library utilization. As observed above, the mean responses on all the five items implies that the respondents used in the study agreed that the five items influence library utilization. It can therefore be inferred from the grand mean of items related to audio resources that the audio resources influence library utilization by medical students.

### Research Question Three

How does video resources influence library utilization by medical students in selected Nigerian Universities?

**Table 3: Mean and Standard Deviation Scores of Respondents on Influence of Video Resources on Library Utilization**

S/N	The following Video Resources are available and influence utilization of lib.	$\bar{X}$	SD	Remark
1.	Overhead projectors showing medical clips	13.76	2.89	Agree
2.	Live medical video streaming	13.72	1.85	Agree
3.	Interactive smart board and classroom	13.74	3.87	Agree
4.	Video slides	13.82	1.99	Agree
5.	Filmstrips	13.70	2.76	Agree
	<b>Grand Mean</b>	<b>31.75</b>	<b>7.78</b>	

n= 196

The result presented in Table 3 reveals the responses on the influence of video resources on library utilization. As noted above, the mean responses on all the five items implies that the respondents used in the study agreed that the five items influence library utilization. It can therefore be inferred from the grand mean of items related to video resources (31.75) that the extent of influence of library utilization by University of Uyo medical students is very low.

#### Research Question Four

How does image resources influence library utilization by medical students in selected Nigerian Universities?

**Table 4: Mean and Standard Deviation Scores of Respondents on Influence of image Resources on Library Utilization**

S/N	The following Image Resources are available and influence utilization of lib.	$\bar{X}$	SD	Remark
1.	Graphics and Still images	13.76	1.02	Agree
2.	Posters	13.56	1.18	Agree
3.	Vector images	9.50	1.02	disagree
4.	Maps and globes	8.58	1.04	disagree
5.	Gray level images	9.62	1.03	disagree
	<b>Grand Mean</b>	<b>17.60</b>	<b>1.13</b>	

n = 196

The result presented in Table 4 reveals the responses on the influence of image resources on library utilization of medical students in selected Nigerian Universities. As depicted in Table 4, the mean response on all the five items implies that the respondents used in the study accepted that the 2 items influence library utilization of medical students in selected Nigerian Universities while 3 items do not. It can therefore be inferred from the grand mean of items related to image resources (17.60) that the extent of influence on library utilization of medical students in selected Nigerian Universities is not high.

#### TESTING OF HYPOTHESES

##### Hypotheses One

There is no significant influence of text resources on library utilization by medical students in selected Nigerian Universities.

**Table 5: t-test Analysis of Influence of Text Resources on Library Utilization by Medical Students**

Variable	N	$\bar{x}$	SD	Df	P-val	t-crit	Decision
Text Resources	196	13.08	3.67	195	2.66	2.01	Ho <sub>1</sub> Rejected
Library Utilization		2.82	.822				

Significant at .05

Result of data analysis in table 5 shows that the P-value of 2.66 is higher than the critical t-value of 2.01 at .05 level of significant with 195 degree of freedom, hence, the null hypothesis is rejected. This however implies that there is a significant influence of text resources on library utilization by medical students in selected Nigerian Universities.

**Hypotheses Two**

There is no significant influence of audio resources on library utilization by Medical students in selected Nigerian Universities

**Table 6: t-test Analysis of Influence of Audio Resources on Library Utilization by Medical Students**

Variable	N	$\bar{x}$	SD	Df	P-val	t-crit	Decision
Audio Resources	196	13.76	7.03	195	3.34	2.01	Ho <sub>2</sub> Rejected
Library Utilization		2.82	.822				

Significant at .05

The result of data analysis in table 6, shows that the P-value of 3.34 is greater than the critical t-value of 2.01 at .05 level of significant with 195 degree of freedom, hence, the null hypotheses is rejected. This implies that there is a significant influence of audio resources on library utilization by medical students in selected Nigerian universities.

**Hypotheses Three**

There is no significant influence of video resources on library utilization by medical students in selected Nigerian Universities.

**Table 7: t-test Analysis of Influence of Audio Resources on Library Utilization by Medical Students**

Variable	N	$\bar{x}$	SD	Df	P-val	t-crit	Decision
Audio Resources	196	13.75	7.78	195	2.35	2.01	Ho <sub>3</sub> rejected
Library Utilization		2.82	.822				

Significant at .05

In testing hypotheses three, Table 7 shows that the P-value of 2.35 is greater than the critical t-value of 2.01 at .05 level of significant with 195 degree of freedom, hence, the null hypotheses is rejected. This however implies that there is a significant influence of video resources on library utilization by medical students in selected Nigerian Universities.

**Hypotheses Four**

There is no significant influence of image resources on library utilization by medical students in selected Nigerian Universities.

**Table 8: t-test Analysis of Influence of Image Resources on Library Utilization by Medical Students**

Variable	N	$\bar{x}$	SD	Df	P-val	t-crit	Decision
Image Resources	196	17.60	1.13	195	1.92	2.01	Ho <sub>4</sub> accepted
Library Utilization		2.82	.822				

Significant at .05

In testing hypotheses four, Table 8 shows that the P-value of 1.92 is lower than the critical t-value of 2.01 at .05 level of significant with 195 degree of freedom. Hence, the null hypothesis is upheld. This implies that there is no significant influence of image resources on library utilization by medical students in selected Nigerian Universities.

### FINDINGS OF THE STUDY

- There is a significant influence of text resources on library utilization by medical students in selected Nigerian universities.
- There is a significant influence of audio resources on library utilization by medical students in selected Nigerian Universities.
- There is a significant influence of video resources on library utilization by medical students in selected Nigerian Universities.
- There is no significant influence of image resources on library utilization by medical students in selected Nigerian Universities.

### DISCUSSION OF FINDINGS

The findings of the research are discussed based on the specific objectives of the study.

- **The Influence of Text Resources on Library Utilization by Medical Students in Selected Nigerian Universities**

Findings of the study on the influence of text resources on library utilization revealed that the extent of influence of text resources on library utilization of medical students in selected Nigerian Universities is high. Testing of the corresponding null hypothesis also revealed that there is a significant influence of text resources on library utilization by medical students. The implication of this finding is that text is one of the most frequently combined mediums in the colorful world of multimedia. The findings of this study Aligns with the findings of Ramaiah, (2016) that library information largely presented in print form, has been the most widely accepted format for information resources and retrieval to satisfy the needs of library users. Text a multimedia resources in library utilization, it is usually combined with photographs and video presentations to augment these other forms of communication and give a detailed description of them. Multimedia with the use of text appropriately select the words that convey the real idea of the content (Vaughan, 2004)

- **The Influence of Audio Resources and Library Utilization by Medical Students in selected Nigerian Universities**

Findings of the study on the influence of audio resources on library utilization and testing of the corresponding null hypothesis revealed that there is a significant influence of audio resources on library utilization medical students in selected Nigerian Universities. The influence could be attributed to the fact that there are audio signal translated devices medical library. The findings of this study is supported by Mayer (2018) that in all human activities, the use of sound has been considered as critical component of multimedia used for information and instructional purposes. The author added that multimedia resources can hardly communicate effectively without sound or voiceover, for instance, a

computer game, videoconferencing or an instructional video without sound or voiceover. These media cannot be used effectively by the users without the audio component (Bagui, 2019).

- **The Influence of Video Resources on Library Utilization by Medical Students in selected Nigerian Universities**

Findings of the study revealed that the extent of influence of video resources on library utilization of medical students in selected Nigerian Universities is very low. Testing of the corresponding null hypothesis also revealed that there is no significant influence of video resources on library utilization by medical students. The implication of this finding is that available video resources are not adequately utilized, as such, engaging the audience with the video content becomes a problem. The findings of this study corroborate with the findings of Boyle (2017) that video as multimedia resource can serve as a text replacement if an instructor records a video in addition to the explanations that follows a paragraph of text or lecture presentations. This kind of video if adequately utilized makes learning more interactive and allows users to process the content at their pace.

- **The Influence of Image Resources on Library Utilization by Medical Students in selected Nigerian Universities**

Findings of the study on the influence of image resources and library utilization and testing of the corresponding null hypothesis revealed that there is no significant influence of image resources on library utilization by medical students in selected Nigerian Universities. This could be attributed to the fact that the use of images in today's education for visual representation of the message has been ignored. The finding of this study is strengthened with assertion of Li and Drew, (2014) that an image is a critical component of multimedia that is a replica of a physical or imaginary object. It is quite useful when the physical object is not available or inaccessible.

## **CONCLUSION**

With respect to the findings of this study, it was concluded the entire academic and research process is fully dependent on library network. The library is a driver of knowledge and the gateway through which goals and objectives of the university are assured. Academic libraries is saddled with the responsibility to collect, organize, preserve, and provide access to knowledge and information in not only printed materials such as manuscripts, books, newspapers, and magazines, but also art reproductions, films, sound and video recordings, maps, photographs, microfiches, CD-ROMs, computer software, online databases, and other media. Because educational process functions in a world of books, the library becomes "the heart" of a university or an institute offering higher education. Hence, this research concludes that multimedia resources such as text, audio, and video exert significant influence on library utilization by medical students in selected Nigerian Universities, if made available. But image resources do not significantly influence utilization of Libraries in selected universities in south south Nigeria.

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