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Exploiting Virtual Realities for Library Serial Services to Nigeria Disabled Patrons

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Abstract

Disabled patrons have faced unparalleled marginalization in Nigerian libraries due to facilities designed for ordinary users, which the disabled find challenging to navigate. As a result, access to serial services supplied by these institutions is constrained. The challenge of libraries is apparent, as seen by the decline of disabled patronage. In the face of this difficulty, they must act quickly to guarantee that their primary goal of fulfilling the information requirements of all classes of people is met. Librarians must re-strategize their serial services utilizing virtual realities in order to remain relevant. The article delves into the practical application of virtual realities and strategies to several aspects of serial services. It examines and recommends solutions to potential problems in deploying virtual reality for serial services in Nigeria. The paper concludes that it is essential for libraries to embrace virtual realities to maintain continuous patronage by disabled users and keep on track with their primary goal.

Keywords: *Virtual Realities, Serial Services, Disability, Library*

INTRODUCTION

The amount of people living with disabilities is increasing all around the world. Globally, there are one billion individuals with disabilities which account for 15% of the world's population with one or more types of disability. One-fifth of the projected worldwide total, or between 110 million and 190 million people, have significant disabilities (The World Bank, 2021). With a national population of 209 million (Worldometers, 2021), the subpopulation of people living with disabilities may be about 25 million since one in every eight Nigerians has at least one kind of disability (Uduu, 2020). Visual impairment, hearing impairment, physical impairment, intellectual impairment, and communication impairment are the most prevalent of these disabilities.

Disabilities can be caused by preventable diseases, congenital malformations, birth-related incidents, physical injury, or psychological dysfunction. Literature suggests that there are significantly more women with disabilities than men in Nigeria and that the Northeast has the highest number of persons with disabilities due to the insurgency (Grassroot Researchers Association, 2020). In Nigeria and other developing nations, horrible circumstances for persons with disabilities are growing, and it's becoming a global problem. This has created a necessity for the disabled to be well informed in order to be on the same page as abled individuals. The library is one such institution that offers such services.

It is worth mentioning that libraries serve patrons with a broad range of needs, abilities, and impairments (Graves & German, 2018), including visual, speaking, hearing, physical, cognitive, and other disabilities (Intahchomphoo & Jeske, 2016). As a result, libraries bear the obligation of ensuring that their patrons' information requirements are adequately met and without prejudice, allowing them to thrive in their research and learning (Kaunda & Chizwina, 2018). Contrary to worldwide norms and best practices, it has been observed that the physically challenged in Nigeria do not fully benefit from different library facilities and services (Momodu, 2014). This is further demonstrated by the fact that many library buildings and associated infrastructure were constructed without considering the capacity of wheelchair users to have enough passage and movement while entering the library and accessing information items in the library (Akolade et al., 2015). Furthermore, there are no employees who have been trained and are ready to help wheelchair users in gaining access to the libraries.

There should be no architectural impediments when creating appropriate library buildings for all people, which present problems for users with physical disabilities, taking mind that disability restricts persons and hinders them from accessing the library's resources. It is in the best benefits of libraries to remove these apparent hurdles to ensure equitable access to knowledge in order to improve the performance of the disabled. Although libraries strive to meet their users' requirements, they continue to overlook some customers in information and service offering (Akolade et al., 2015). These individuals are frustrated not only in academic libraries but also in other types of libraries. The International Federation of Library Associations and Institutions (1994) said that libraries must not discriminate based on age, race, gender, religion, nationality, language, or socioeconomic status. Libraries should not overlook physically challenged people but rather provide an atmosphere that allows all users to access library materials.

Serial librarians are among those tasked with providing such services. The duties of a serial librarian include managing publications that are issued in successive parts or at regular intervals, such as periodicals, newspapers, annuals (reports, yearbooks) journals, indexes, abstracts, reports, memoirs, proceedings transaction of societies, and numbered monographic series. Serials offer consumers, particularly academics, relevant and up-to-date information. Serials supplement monographs by providing library users with another way to access and receive current knowledge critical for survival and decision-making, which might be for personal, organizational, or societal progress.

Adaptive/assistive technology, whether in public, academic, or school libraries, acts as a link between people with disabilities and the information they require (Ezeani et al., 2017). Emerging new technologies have not only altered libraries and library workers, but they have also given birth to a new generation of library users that are highly interested in technology. Therefore, the success of libraries in their roles is decided by patron satisfaction, which is also dependent on the speed with which information services are delivered and the veracity of information (Bhoi, 2017). In this sense, libraries must implement technology that allows disabled users to access serial services. This technology is known as virtual reality (VR).

Virtual reality is a class of technologies that enable interactive and immersive experiences of computer-generated worlds. These experiences are produced by combining visual, aural, haptic, and/or olfactory inputs that engage the different physiological system and give the user the sensation of being present in a virtual world.. VR technologies have returned to popular consciousness after years of experimentation and, ultimately, failure to gain widespread acceptance, beginning in the late 1980s and continuing into the early 2000s. With

the debut of the Oculus Rift headset in March 2016, followed by the HTC Vive in April 2016, high-fidelity has become a reality.

An increasing portion of the public, including academics, can now afford virtual reality. Educational institutions are currently actively investigating the benefits of virtual reality technology and are beginning to incorporate them into academic research and education (Lischer-Katz et al., 2018). VR can be utilised as a strong analytic platform by including users' embodied motions, stereoscopic vision, and wide-angle vision to enhance understanding when combined with high resolution digital 3D models, which can take the form of cultural heritage artefacts, scientific models, or medical imaging data. VR, being a type of technology that engages many senses, can immerse users' bodies and senses in a holistic, immersive experience. This implies that virtual reality has much promise for helping individuals with a wide range of sensory, motor, and cognitive skills.

A "3D digital heritage ecosystem" may be built using collections of 3D models and the analytic affordances of VR systems (Limp et al., 2011), allowing disabled customers to engage with representations of objects and locations that are too uncommon, fragile, or remote to access directly. Libraries have become VR deployment locations, furthering their role in providing curation, infrastructure, and training services for both conventional and emerging types of information resources. Libraries are also interested in growing their patron base and continuing to promote education, whether through on-site programmes or modern methods of accessing information, such as virtual reality (American Library Association, 2017).

Virtual reality, three-dimensional data, and other spatial technologies are being adopted. as creative and immersive tools in libraries to improve research and teaching (Cook & Lischer-Katz, 2019). VR offers a very realistic and dynamic visualisation tool for interacting with 3D data, such as models created from cultural heritage sites or medical imaging data, opening up many academic areas. While these technologies are not new, they have grown cheaper, allowing them to be widely used outside their usual niches.

Furthermore, because the Internet has connected individuals with information, disabled patrons may now access information at the press of a button from anywhere at any time. Many libraries may use VR to access a range of information such as e-resources, e-databases, news, and more to guarantee optimum access and usage of serial resources. Unfortunately, only those without disabilities have reaped significant benefits, while people with disabilities have continued to suffer (Dodamani & Dodamani, 2019), despite having the same information demands as those without disabilities. This leads to the social exclusion of people with disabilities because they are denied access to knowledge, preventing them from participating in society as citizens, making informed decisions that influence their lives, and fully taking advantage of all that society offers. This is despite the fact that virtual reality has made a significant difference in the lives of those with visual and physical disabilities. Based on this foundation, the paper proposes that serial librarians in Nigeria can use virtual reality to provide serial services to disabled patrons.

Objectives

The major objective of this work is to contextualize the application of virtual realities for serial services to Nigeria disabled patrons. Other specific objectives are to:

i. examine the concept of library serial services;
ii. highlight the understanding of disabilities;
iii. examine the encounters of disabled patrons in Nigeria libraries;;

iv. explore the concept of virtual realities; and
v. recommend virtual realities strategies fir serial services in Nigeria libraries.

THEORETICAL FRAMEWORK

Social Model of Disability

Disability rights campaigners created the model in the 1970s and 1980s (Buder & Perry, 2021). According to the model, if societies were designed and built so that people with disabilities could participate fully in the world around them, they would not be limited from doing so. In other words, individuals are disabled because of societal constraints, not because of our impairment or difference. Physical barriers can exist, such as buildings without accessible restrooms. They can also be created by people's attitudes toward diversity, such as believing disabled individuals could not perform particular tasks. The social model assists us in identifying impediments that make a living more difficult for disabled people. By removing these barriers, we can achieve equality and provide disabled individuals with more independence, choice, and control.

Library Serial Services

Serial services are services provided by a serial librarian with the primary goal of providing up-to-date information from serial publications. On the other hand, serial publications are publications in any media published in successive sections with numerical or chronological designations and are meant to be continued indefinitely. Serials and periodicals are often used interchangeably. As a result, serials are collections that are published regularly. In the words of Nutsupkui and Owusu-Ansah (2017), there are many kinds of serials. These include newspapers, magazines, newsletters, accessions, journals, indexes, abstracts, reports, proceedings, and transactions of societies and so on. Serials are exceptional because they are used for teaching, learning and research purpose.

Serials are an essential element of a library's collection and the beating heart of the institution. As a result, serials constitute the foundation of research efforts (Dare & Ikegune, 2018). Madu and Adeniran (2005) described serials as having various publisher names, varied material in each issue, and varying publishing intervals. Some are published bi-annually, monthly, quarterly, fortnightly, weekly, daily, and annually; there is no set end date for the series; they are current and up to date; they are more costly than books; and, unlike textbooks, some are subscribed to based on the time it takes for the next issue to be published.

Serials publication is a significant reference source because of their size and because they reflect a variety of values that the monograph media does not provide. Serials include the most recent and most up-to-date information. They also protect scholars from having to sift through a maze of irrelevant materials in order to find the important ones. Furthermore, where the timeliness of information is critical, serials have a clear advantage over monographs. However, the value of serials in academic libraries cannot be overstated; they serve as a conduit for current ideas being examined by the scientific community, necessitating maintaining and retaining their essential and intellectual content.

Serials are kept in a different area or division of the library (Komolafe et al., 2020). Due to competing information sources such as search engines and academic social media available on the Internet, this area in Nigerian academic libraries has been mostly underutilized. It is

believed that similar materials can be gotten at the click of a button, and that deter some to access serial collections from the library.

Understanding Disabilities

A disability is defined as any mental or physical condition that makes it more difficult for the person with the disorder to do specific tasks and interact with the environment around them (CDC, 2020). Disabled individuals may also be referred to as special needs in a library. In the context of library services, the phrase "special needs" refers to the needs of persons who are unable to access traditional libraries, library resources, or library services (Abdelrahman, 2016). There are different types of disabilities, such as visual, hearing, intellectual disability, and physical disability. Likewise, Sze and Christensen (2017) described the disabled types as visual, hearing, speech and mobility impairments.

Visual impairment is a phrase used by specialists to describe any type of vision loss, whether the person cannot see or has partial vision loss. Hearing impairment happens when one or more components of the ear are damaged or malfunction. Intellectual impairment is characterized by a considerably diminished capacity to comprehend new or complicated information as well as to learn and apply new abilities (impaired intelligence). Physical disability refers to persons who have a physical impairment or limited movement. As a result, their upper or lower body movement may be limited (Inclusive City Maker, 2021). People with physical disabilities frequently use wheelchairs, crutches, and braces to go around (Akolade et al., 2015).
Accidents, sickness, or hereditary abnormalities can all lead to disability. A disability might be visible or hidden, permanent or temporary, and have a minor or major influence on a person's skills. Despite the fact that some people are born with disabilities,, many others acquire them. A person may acquire a disability due to a job accident or a vehicle accident, or they may develop a disability as they age. There is a significant link between age and disability; as people get older, they are more likely to develop diseases that cause impairment (Australian Network on Disability, 2021). Persons with disabilities are more likely to have negative socioeconomic consequences such as less schooling, poorer health outcomes, fewer employment levels, and greater poverty rates.

Encounters of Disabled patrons in Nigeria libraries

The achievement gap between children with and without impairments is widening, and those with disabilities are falling behind (Ibok, 2015). This is the terrible state of Nigeria. According to Lawal-Solarin (2013) research, libraries lack amenities for customers with disabilities, such as mobile facilities, adjustable shelves, seats, audiovisual and multimedia services, translation services, and shelves that are not suitable to wheelchair users.

Furthermore, Sambo, Rabiu, and Shaba (2016) confirmed that problems confronting information needs of the physically challenged include: furniture in the library that is not conducive to relaxation (100%), a lack of infrastructure (82%), a lack of information materials (76%), a lack of architectural design (73%), a discouraging staff attitude (67%), and a library environment is not accommodating (61%). In this regard, libraries, stakeholders, and the government should be committed to providing equal access to all categories of students, whether regular or challenged, and libraries, librarians, and information centres must ensure that wheelchair users have access to and can use information resources wherever they are located.

In addition, poor infrastructure makes movement and lecture attendance difficult for many students with vision and mobility impairments, while inadequate library facilities limit the

number of study materials available to these patrons. Furthermore, a lack of support personnel for patrons with disabilities, such as sign language interpreters for those with hearing impairments and guides for those with vision impairments, makes studying harder, which can harm concerned patrons (Momodu, 2014).

Another research by Lawal found that just two of four Nigerian universities had facilities to increase accessibility for individuals using wheelchairs (E. Lawal-Solarin, 2012). Furthermore, during their examination of the University of Nigeria library, Nsukka, Eskay, and Chima discovered that there were no braille books, computer screen reading software, or other assistive devices. The only available audiobooks were not particularly bought to help people with visual impairment but came with textbooks and encyclopaedias purchased by the library (Eskay & Chima, 2013).

Librarians may face several obstacles in providing the necessary services to these users' classes. They require methods for dealing with these unique users, and librarians must be aware of disabled students' required services in the library. According to Adamu (2009), as quoted in Iroeze et al. (2017), there are more than 19 million disabled students. Because of society's disregard, between 75 and 90 per cent of them live below the poverty line, owing to a lack of access to paid labour in particular. Disabled people in Nigeria live in opposition to their wants and ambitions. Nonetheless, they can be rehabilitated through the library's resources, which may prevent them from becoming a liability to society. Being the main point of knowledge, Libraries cannot forget about the disabled, whose main responsibility is to educate the populace.

Conceptualizing Virtual Realities

The concept of virtual realities is part of the "virtuality continuum" (Milgram & Kishino, 1994). This term refers to a progression from reality to virtual reality created by a computer. Within the virtual continuum, we find the subset of mixed reality, which has been described as anything between reality and a completely virtual environment. There are various definitions of Virtual Reality. However, perhaps the most general and encompassing is as follows: A virtual reality is described as a real or simulated setting in which a perceiver has the sensation of telepresence, as described by Jonathan Steuer (Steuer, 1992).

Virtual reality technology refers to the use of computer technology as the foundation of modern high-tech production of realistic visual, auditory, tactile, and other integrated virtual environments, in which users interact with objects in the virtual world in a natural way using necessary devices, producing feelings and experiences similar to being in the real world. It is a new type of human-computer interaction that has emerged due to the advancement of new technologies such as computational graphics, multimedia technology, artificial intelligence, human-machine interface technology, sensor technology, highly parallel real-time computing technology, and human behaviour.

The 3Is (immersion, interaction, and imagination) are essential aspects of VR. Immersion is described as the physical sensation of being in a virtual world. This is accomplished through the sensory interfaces that surround the person. Interaction refers to the user's capacity to change the environment and get feedback due to the interaction. The objective is to give the user a sense of presence. Imagination is how VR allows individuals to see non-existent objects, producing the illusion that they are real (Sheridan, 2000).

Users can enjoy an immersive, first-person 360-degree vision of a computer-generated environment using virtual reality technology (Greene & Groenendyk, 2018). Virtual reality technology offers consumers a virtual environment that may accomplish interoperability as

well as a sense of immersion with a high degree of immersion, making virtual reality technology extensively utilized in product creation and presentation in a variety of sectors (Hu et al., 2019). A specific headset is usually worn, which both projects pictures of the virtual world onto screens or lenses in front of the user's eyes and tracks at least the wearer's head motions. With surround sound systems provided by stereo headphones and specialized hand-held controllers, the immersive experience may be improved. These are tools for selecting and manipulating virtual things.

Consumer-oriented VR headsets first appeared in the late 1980s, but due to high prices and several technological hurdles, such as significant latency in interactive graphics processing, they were eventually unsuccessful in the consumer market. With the debut of the Oculus Rift and HTC Vive systems in 2016, cheaper and technically better mass-market VR headsets became readily accessible. VR is now within the financial and technological capabilities of libraries of all sizes to embrace and implement (Cook et al., 2019). Several types of consumer headsets are on the market, which may be generally classified into three groups (Greene & Groenendyk, 2018). These categories cover entry-level, mid-range, and high-end VR headsets.

Entry-level VR headsets, such as Google Cardboard, provide a rudimentary VR experience at a cheap cost as long as the operator has access to a smartphone. A basic headset made out of a pair of plastic lenses placed into cardboard or plastic casing is augmented by a smartphone that sits in front of the lenses with the screen facing the user's eyes. A VR viewing app is used to show two different pictures, one for each eye, on the phone's screen. The inbuilt accelerometer of the smartphone is used to detect the user's head movements and adjust the pictures on the screen appropriately. Mid-Range VR headsets often employ a smartphone inserted into a separate headset. The headsets, however, are optimized for a particular brand of phones with adequate processing power to deliver a high-quality VR experience. The Samsung Galaxy Gear headset is one example. To improve the VR experience, the headgear has high-quality optics as well as extra gyroscope and accelerometer technology.

The Oculus Rift and HTC Vive are instances of high-end VR headsets in the final category. Rather than cellphones, these headsets are powered by desktop PCs outfitted with powerful video cards. The inclusion of external sensors also enables monitoring the user's location in space, allowing for more freedom of movement in VR settings. These VR headsets deliver a seamless and high-quality VR experience; however, they are also the most costly consumer gadgets to buy and must be connected to a suitably powerful PC to function (Smith & Bridle, 2018).

Virtual reality has been demonstrated to influence student attitudes, such as boosting student engagement or self-efficacy. Furthermore, research has demonstrated that 3D and VR visualization may have a favourable influence on analytic work for researchers, indicating the value of having this sort of technology and assistance available through academic libraries (Donalek et al., 2015). These experiences immerse the user in a stereoscopic, interactive world, with interface controls based on natural embodied motions and movements.

Several libraries in developed countries have begun to use virtual reality. A simple Google search, for example, yields abundant evidence of acceptance by North American libraries, particularly public libraries, such as the Toronto Public Library and the California State Libraries (Lambert, 2017). This technology is already used to deliver a wide range of services, and it is quickly increasing. Technical demos, gaming evenings, technology lending programmes, virtual exhibits, and other events are among them (Everett-Green, 2015).

Benefits of Virtual Realities by Disabled to access serials

VR can assist the disabled broaden their knowledge, abilities, and attitudes in ways that would not have been possible otherwise, allowing them to participate in serial services that are largely free of the constraints imposed by their disability and completely safe. Here are a few of the more obvious benefits.

Overcoming physical restrictions: For patrons with physical impairments that limit their movement, VR can provide access to previously inaccessible serial collections. By granting people the freedom to browse virtual collections at their leisure. VR may also be utilised to provide a virtual tour of the library, providing the disabled with a realistic virtual experience of the library facility.

Creating safe spaces: Virtual reality might be utilised to assist patrons who struggle with communication to study serial collections from the safety and comfort of their own home. It will also enable them to relate with a virtual librarian similar to a real one.

Providing risk-free serial experiences: For patrons learning how to deal with new physical or sensory impairments, challenging or dangerous learning experiences can be completed securely through VR without the risks associated with visiting library facilities.

Access to thesis and faculty publications: The majority of publications published by Nigerian institutions are in print and can be rather voluminous. These papers can be summarised and made available virtually. Disabled customers can then utilise VR to get access to them.

Access Peer-Reviewed Journals: Peer-reviewed journals are published on a regular basis. As a result, many individuals, especially the disabled, struggle to keep up with the newest findings. VR may be utilised to create an appealing and entertaining virtual overview of key publications. This will keep disabled patrons up to date on the most recent research.

Eliminating distractions: Because the virtual reality headgear entirely covers the user's field of view, VR can provide a distraction-free experience for patrons with attention deficit disorders. A VR experience's immersive setting can encourage prolonged focus and attention. Furthermore, VR could give persons with ADHD with high levels of stimulation as well as fast, realistic responses to behaviour in the virtual world, making them feel more at ease and less nervous (Chandrashekar, 2018).

Virtual Realities strategies for serial services to Nigeria Disabled patrons

Rayini (2017) claimed that disabled persons have the exact information requirements as abled people and that they should be provided with the same wide range of information options as abled people. Sehic and Tanackovi (2014) discovered that academic libraries utilized by visually impaired undergraduate and postgraduate students in Croatia only respond to their requirements on a sporadic basis. As a result, they frequently rely on interpersonal sources and the Internet for academic knowledge items. Therefore, assistive technologies play a major role in their educational experiences.

A VR system often includes visual, audio, olfactory, taste, touch, and other perceptual information. Participants must interact with digital gloves, data clothes, spherical screens, head blue display, stereo headphones, and other devices to integrate into the realistic virtual environment. However, they must also interact with the virtual environment generated by computer software environment and development tools. This makes it ideal for persons with various impairments. Jeremy Bailenson has suggested that virtual reality is especially well-suited for providing students with field excursions, i.e., learning experiences that allow

students to explore new locations, while Chris Dede has outlined the benefits of VR field trips (Dede, 2009).

Figure 1 portrays the process of developing the strategies required to adopt VR in Nigerian libraries. To begin, VR goggles will be required in order to access a serial book space. A virtual environment for reference services will also be provided. A technological backend will largely facilitate all functionality with information retrieval capabilities.

VR Goggles: VR goggles or a headset are required to experience VR. Libraries must purchase this and make it available to disabled users. The place where these goggles will be kept must be conveniently accessible to disabled patrons, preferably near the library's entrance. VR goggles can be made available at the dormitory for academic libraries. Virtual reality allows those with poor eyesight to see better. Because VR goggles are so near to the user's eyes, the VR picture is enlarged by filling the user's field of view. Automatic gain control is a feature in VR devices that helps keep the device contrast at a consistent level. VR games and experiences frequently use eye-catching imagery, colours, and text (Bureau of internet Accessibility, 2020).

Serial Book Space: For serial collections, a virtual reality book space may be built where persons with severe disabilities can readily access and read serials virtually. Weir et al. (2020) created a virtual reality personal library environment that may be used to accomplish this goal. The setting serves as a personal study or library for someone who would not otherwise be able to access or utilize a library or a physical study at home.

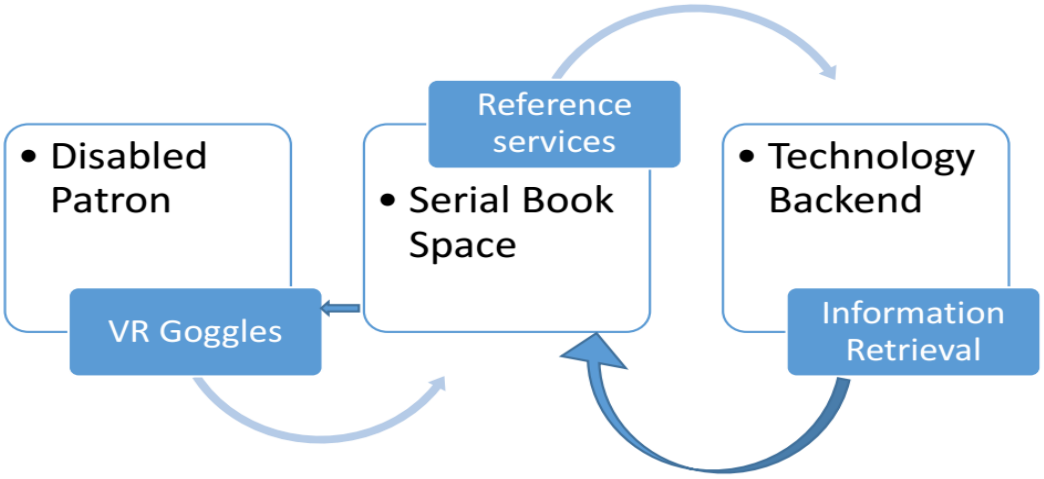
Reference services for serial collections: With the spread of virtual reality reference services, reference library desks can work like call centres, allowing disabled users to ask inquiries using virtual reality headsets from anywhere, at any time. Furthermore, embedded librarians may offer reference training classes and lessons on browsing serial databases from anywhere as long as both the librarians and the user are wearing virtual reality headsets (Adetayo, 2021). This enables disabled clients to receive library education from anywhere, at any time, to accommodate their schedules.

Information Retrieval: In library information retrieval, the visual retrieval mode enabled by VR technology may accomplish rapid integration of resources and a quick search of appropriate literary material, assuring retrieval efficiency and giving users a superior retrieval service experience. Through scene design, VR technology may also provide a complete search environment, improving the accuracy and comprehensiveness of search content (Hu et al., 2019).

VR technology may be used to simulate the real-world environment of the library's serials reading room in accordance with the actual proportions; create a precise placement system for Web-based collections with seamless linkages to bibliographic retrieval systems. Not only can the system retrieve the precise position of the gathered papers, but it can also graphically tell readers of the three-dimensional surroundings, specific orientation, and path of the document. This programme allows readers to grasp the position of magazines easily, overcomes the problem of reader annoyance in traditional serial services, and increases accessibility efficiency. The conventional retrieval process and outcomes may be displayed and evaluated via multidimensional visualization using virtual reality technology, and readers can participate in the whole retrieval process. It will give readers in-depth information discovery and direction, making it a valuable attempt for library service discipline development and scientific research innovation.

Figure 1

Virtual Realities strategies for serial services



Challenges of exploiting virtual realities for serial services in Nigeria

Cost: Despite decreasing costs and a growing understanding of the potential benefits of the technology, the cost and sustainability constraints involved with introducing these sorts of technology into the library continue to be a source of concern in the library sector (Adetayo et al., 2021). Also, the high cost of designing and building the virtual environments could be a challenge; however, as Bailenson points out, once produced, they may be duplicated and disseminated indefinitely.

Technical Know-how: Librarians do not have the technical know-how to produce virtual services as new materials arrive continuously. The general technical skills needed include video editing, 3D modelling, experience in computer-aided design, VR operation tools, and DSLR 2D images and videos, Proficiency in creating VR content with the available resources, exposure to digitalization trends, knowledge of various device specifications and hardware and experience in operating wearables such as HTC VIVE, Oculus, and HoloLens (Sharma, 2019).

Unique disabilities: VR may be a challenge for those that are totally unable to move their hands, legs and head. This is because some form of mobility is essential to experience the functionalities of virtual realities fully. Therefore, some disabled patrons may still be left out in the experience, except there are alternative ways to manoeuvre around it. While virtual reality can assist many persons with visual difficulties improve their quality of life, each person is distinctive, and what works well for one user may be an impediment for the next. VR that enhances the image, in particular, can aggravate those with tunnel vision or weak peripheral vision.

CONCLUSION

Libraries in Nigeria can use virtual reality capabilities to provide uninterrupted serial services to disabled users. They can make an effort to obtain the appropriate VR goggles to access a designed serial book space with references services capability that quickly responds to the

queries of disabled users. The use of virtual reality (VR) would address many of the issues that disabled patrons confront in Nigeria today since they have restricted access to library serial services. However, there are still problems implementing VR for serial services regarding funding, skill sets, and accessibility issues for certain disabilities; hence, libraries must participate in infopreneurial activities to contribute to parent organizations' or institutions' internal generated income (Adetayo & Hamzat, 2021). Furthermore, government assistance is required to ensure the program's long-term viability at public libraries. In the design of VR, key people with disabilities need to be involved. This will aid in the abolition of all forms of marginalisation of those patrons.

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