# PERCEIVED INFLUENCE OF INNOVATIVE TECHNOLOGIES ADOPTION ON INFORMATION SERVICE DELIVERY IN UNIVERSITY LIBRARIES IN MAKURDI METROPOLIS, NIGERIA

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**Abstract**

*The study examines perceived influence of the adoption innovative technologies on information service delivery in academic libraries in Makurdi Metropolis. Descriptive survey research design was adopted. The population of the study consisted of two hundred and five (205) library staff. Two research questions were generated and two null hypotheses formulated and tested. Census sampling technique adopted and all the 205-librarystaff were used. Perceived Influence of Innovative Technologies on Information Service Delivery Questionnaire (PIITISDQ) was used as instruments for data collection. The instrument was validated by three experts; two in Library and Information Science, one in Science and Mathematics Education, Rev. Fr. Moses OrshioAdasu University, Makurdi. The reliability of the instrument was ascertained through a trial-test on thirty respondents. The test yielded Cronbach AlphaCoefficient of 0.98. Data were analyzed using mean and standard deviation to answer the research questions, while chi-square ($\chi^2$) was used to test the hypotheses at 0.05 level of significance. Findings of the study revealed that: Augmented Reality and Virtual Reality all found to significantly influence information service delivery in academic libraries in Makurdi Metropolis. It was concluded that these technologies enhance the efficiency, accessibility, security, and user experience in library services, contributing to improved academic and research outcomes. Based on the findings, it was recommended that Library management should invest in and promote the integration of Augmented Reality (AR) tools and applications to enhance information service delivery, making library resources more interactive and engaging for users and academic institutions should collaborate with Virtual Reality (VR) developers to implement immersive VR solutions that support innovative information access and improve users' research and learning experiences within the library.*

**Keywords**: Augmented Reality (AR), Virtual Reality (VR), Information Service, University Libraries, Innovative Technologies

## Introduction

In the fast-evolving landscape of the 21st century, the integration of innovative technologies has not only revolutionized global industries but also brought profound changes to everyday life. This wave of transformation has extended into academic libraries, where the adoption of advanced technologies is fundamentally reshaping the paradigms of information service delivery (ISD). Innovative technologies according to Nam-Hwa Kang (2024), refer to newly introduced or significantly enhanced tools and systems designed to improve existing processes, services, or products. These advancements typically incorporate state-of-the-art developments and creative applications aimed at solving existing problems or seizing new opportunities. As noted by Humayun (2021), such technologies are capable of revolutionizing the way academic libraries access, manage, and disseminate information, resulting in more streamlined and effective service delivery.Ismagilova and Sukhova (2016) define innovative technology as the implementation of novel or substantially upgraded products, processes, or methodologies that lead to progress across different sectors, including education, industry, and services. They emphasize that this concept encompasses not only the deployment of cutting-edge tools but also the strategic application of innovations to improve performance, efficiency, and outcomes within various domains.

Innovative technologies in academic libraries span a wide array of advancements such as Artificial Intelligence (AI), blockchain technology, the Internet of Things (IoT), augmented reality (AR), virtual reality (VR), robotics, and Integrated Library Systems (ILS). According to Kodirova (2020), these technologies provide distinctive opportunities to elevate Instructional Systems Desig (ISD) by enhancing information retrieval, streamlining library workflows, and offering immersive educational experiences.Artificial Intelligence, in particular, is at the forefront of this digital transformation. As Kodirova (2020) points out, AI offers academic libraries powerful tools for improving search accuracy and tailoring user experiences through intelligent algorithms. These technologies enable users to efficiently navigate large knowledge repositories with ease. Additionally, AI-driven chatbots are increasingly being deployed as virtual assistants, delivering immediate support and personalized recommendations to library patrons.Another noteworthy advancement is blockchain technology, which Tamilselvan (2024) asserts is a promising solution to challenges in digital resource management and authentication. Through the use of blockchain's secure and transparent ledger system, academic libraries can enhance the management of copyrights, preserve the authenticity of digital content, and simplify the administration of electronic publishing and licensing. This technology has the potential to radically transform how libraries handle digital assets and maintain information integrity.

In the sphere of information service delivery, these technologies play a pivotal role, fundamentally altering how information is accessed, processed, and shared. Aceto, Persico, and Pescapé (2018) point out that such innovations are critical in reshaping the infrastructure and methodologies that underpin modern information dissemination. Today, information service provision is a complex, dynamic process that responds to the varied and evolving needs of users

across diverse sectors. This multifaceted operation includes the strategic management, retrieval, and delivery of information, serving as a foundation for research, education, decision-making, and other knowledge-intensive activities. According to Ogar and Dushu (2018), the effectiveness of these services hinges on key operational components that ensure information remains accessible, relevant, and timely thereby maximizing its practical value and impact.

Information service delivery encompasses the structured systems and processes through which data is gathered, organized, stored, and communicated to satisfy user demands. Edewor, Osuchukwu, and Ezinwayi (2022) emphasize that delivering accurate and timely information is vital for ensuring user satisfaction and service effectiveness. Ezinwayi (2022) further explains that this process involves anticipating user needs, providing tailored services, and continuously evaluating their effectiveness to maintain responsiveness and relevance. Similarly, Opeke (2023) highlights that service delivery should align with users' information-seeking behaviors and evolving technological trends, ensuring a user-centric approach. Ugwulebo and Abba (2021) add that both human expertise and technological tools must be strategically employed to deliver high-quality, efficient, and effective information services. Collectively, these perspectives underscore the increasingly sophisticated and adaptive role that academic libraries play in modern information ecosystems.

Academic libraries are integral components of higher education institutions, designed primarily to support academic pursuits such as teaching, learning, and research. As Eze and Nwachukwu (2023) note, these libraries function as specialized units within tertiary institutions, providing essential resources and services that facilitate scholarly activities. Nnadozie (2022) characterizes academic libraries as curated collections of print and digital materials tailored to meet the academic needs of students, faculty, and researchers. Musa and Adeyemi (2021) view these libraries as critical knowledge management systems, contributing significantly to institutional development by ensuring users have timely access to credible and relevant information, promoting information literacy, and optimizing resource usage. Igbokwe and Nwafor (2022) further stress that academic libraries are transitioning into dynamic service hubs, continuously adapting to meet the evolving information demands of their user base. According to Okafor and Okocha (2021), the rise of digital technologies and the increasing demand for remote access have redefined the traditional role of academic libraries, significantly expanding their scope and relevance in today's digital academic landscape especially through the integration of immersive technologies such as augmented reality and virtual reality.

Augmented Reality (AR) refers to the integration of digital content with the real-world environment, enhancing users' perception and interaction with their surroundings through technologies like smartphones, tablets, and smart glasses. AR provides real-time overlays of information, images, or animations on the physical world, offering a contextual and interactive experience. Scholars such as Akçayır and Akçayır (2017) argue that AR enhances learning by making abstract concepts more tangible and engaging, particularly in education and professional training. However, they also note challenges such as cognitive overload and technological

limitations. In healthcare, AR has shown promise in surgical planning and diagnostics, offering precise visual support to practitioners (Barsom, Graafland, &Schijven, 2016). These applications illustrate AR's growing role in supporting decision-making and enhancing task efficiency in various real-world settings.

Virtual Reality (VR), unlike AR, immerses users in a fully digital, computer-generated environment, effectively isolating them from the physical world. Using head-mounted displays and motion-tracking systems, VR enables users to explore and interact with simulated 3D spaces for entertainment, training, or education. Radianti et al. (2020) emphasize VR's value in higher education, particularly in simulating dangerous or inaccessible environments such as surgical theaters or chemical labs, where experiential learning is critical. Additionally, Slater and Sanchez-Vives (2016) highlight VR's potential to evoke strong emotional and cognitive responses, making it effective in psychological therapies and behavioral training. While VR presents immense opportunities for immersive learning and simulation, issues such as motion sickness, high costs, and accessibility remain barriers to widespread adoption.

**Statement of the Problem**

Innovative technologies such as Artificial Intelligence (AI), Augmented Reality (AR), Virtual Reality (VR), Internet of Things (IoT), and cloud computing are revolutionizing information service delivery in academic libraries globally. These tools enhance user experience, improve access to digital content, and streamline library operations by offering interactive, real-time, and user-centered services. In university libraries, the application of such technologies has the potential to transform traditional service delivery into dynamic, accessible, and personalized learning environments. However, despite the global rise in the adoption of technologies like augmented reality and virtual reality in academic libraries, their practical implementation and effectiveness in university libraries in MakurdiMetropolis seem to remain underexplored. Specifically, challenges such as inadequate infrastructure, poor funding, lack of technical expertise, low user awareness, and resistance to change might have hindered the integration of these innovative tools in information service delivery. Consequently, many university libraries in the MakurdiMetropolisseem to still operate under traditional service models, limiting their responsiveness to the needs of 21st-century learners and researchers. Moreover, there is a paucity of empirical studies that jointly examine the influence of innovative technologies on information service delivery in university libraries in Makurdi using a comprehensive research design that incorporates the same research objectives, research questions, and testable hypotheses like the present study. Given this gap, there is a pressing need to conduct an empirical study that systematically investigates the influence of innovative technologies; particularly Augmented Reality and Virtual Reality on the quality and effectiveness of information service delivery in university libraries within MakurdiMetropolis.

The purpose of the study was to investigate theInnovative Technologies and their influence on Information Service Delivery of Academic Libraries in Makurdi Metropolis. The specific objectives were to:

1. examine the influence of augmented reality on information service delivery in university libraries in Makurdi Metropolis;
2. investigate how virtual reality influence information service delivery in university libraries in Makurdi Metropolis;

**Hypotheses**

The following hypotheses were set and tested at 0.05 level of significance.

**$HO_4$**: Augmented Reality has no significant influence on information service delivery in university libraries.

**$HO_5$:** Virtual Reality Technologies has no significant influence on information service delivery in university library in Makurdi Metropolis.

**Literature Review**

Innovative technologies have become instrumental in revolutionizing the delivery of information services in academic libraries, enabling more efficient and user-centric access to knowledge. These technologies, including augmented reality (AR), Virtual Reality (VR) among others serve to enhance research capabilities, improve user experiences, and optimize library management practices. For instance, the use of augmented reality (AR) on information service delivery in academic libraries is reshaping the way users interact with library resources and access information. By overlaying digital content onto the physical environment, AR creates immersive experiences that enhance learning and engagement. For instance, libraries can employ AR applications to provide interactive tours, guiding users through their collections and highlighting key resources with real-time information. When users point their mobile devices at specific items or areas within the library, they can access additional multimedia content, such as videos, articles, or tutorials that deepen their understanding of the materials available. This innovative approach transforms the traditional library experience into a dynamic, engaging, and informative journey, allowing users to explore resources in a way that resonates with their learning preferences (Jiang, 2020).

Also, AR facilitates collaborative learning by enabling users to engage in group projects and discussions enriched with interactive digital content. For example, students working on research projects can use AR to visualize complex data sets or 3D models, enhancing their comprehension and fostering collaboration among peers. Additionally, AR can assist in creating customized learning experiences by tailoring information delivery to individual users based on their interests and needs. This level of personalization ensures that users can access relevant information efficiently, promoting greater engagement and satisfaction (Lee & Jang, 2021). Overall, the integration of augmented reality in academic libraries not only enhances information service delivery but also cultivates an innovative learning environment that encourages exploration, creativity, and active participation among users (Sulaiman et al., 2021).

The influence of virtual reality (VR) on information service delivery in academic libraries is revolutionizing how users engage with educational content and resources. By providing

immersive, interactive experiences, VR allows users to explore digital environments that enhance their understanding of complex subjects. For instance, libraries can create virtual simulations of historical events, scientific phenomena, or even architectural landmarks, enabling users to experience these topics firsthand. This not only enriches the learning experience but also caters to diverse learning styles, as users can engage with content in a more experiential and memorable way. Additionally, VR can facilitate virtual library tours, helping new students familiarize themselves with library facilities, collections, and services without the constraints of physical space (Bailenson, 2020).Furthermore; VR technology fosters collaboration and interaction among users, encouraging group learning and discussions in a shared virtual space. Students can participate in virtual study groups, conduct research together, or collaborate on projects by accessing 3D models and data visualizations in real-time. This collaborative environment promotes teamwork and enhances communication skills, which are essential for academic success (Freeman &Nie, 2021). Moreover, as VR continues to evolve, libraries can integrate it into their information literacy programs, allowing users to practice research skills in simulated scenarios. By incorporating virtual reality into their information service delivery, academic libraries not only improve access to educational resources but also create a vibrant and engaging atmosphere that nurtures innovation, exploration, and active participation among users (Parsons, 2021).

Lawal and Ojo (2021) assessed the impact of virtual reality (VR) technologies on library services in Nigerian universities. The findings indicated that VR technology holds substantial potential for transforming academic library services by delivering immersive and interactive learning experiences that enhance user engagement and academic outcomes. However, challenges such as high implementation costs, lack of technical expertise, and limited availability of localized VR content were identified as barriers to widespread adoption of the technology.

Gupta and Kumar (2021) conducted a qualitative review to explore the transformative role of emerging technologiescloud computing, augmented reality (AR), and the Internet of Things (IoT)in enhancing library services. The study focused on global library systems and employed a systematic literature review design. The findings revealed that cloud computing enhanced resource sharing among libraries, AR improved user engagement by offering immersive experiences, and IoT enabled libraries to monitor resource usage and make data-driven decisions. However, challenges such as high infrastructure costs, difficulty in integrating new technologies with existing systems, and insufficient staff training were identified. The authors recommended strategic investments in infrastructure, staff training programs, and the promotion of a culture of innovation within library systems.

Lee and Kim (2023) conducted a qualitative review to explore the application of augmented reality (AR) in academic libraries, aiming to assess how AR enhances library services by creating interactive and immersive user experiences. The findings highlighted that AR technologies improve user engagement by offering new ways to interact with library resources. However, challenges such as high implementation costs and the need for ongoing technical

support were noted. The authors recommended that libraries carefully plan and invest in AR technologies, ensuring technical support and resources for successful implementation.

O'Neill and Patel (2022) conducted a comprehensive review to explore the use of virtual reality (VR) in academic libraries, focusing on how VR enhances user experiences through applications such as virtual reality labs, immersive learning environments, and virtual library tours. The findings revealed that VR technologies foster immersive experiences and enhance engagement with library resources. However, challenges such as the high cost of VR systems, the need for specialized equipment, and staff training were identified. The authors recommended that libraries conduct cost-benefit analyses and explore collaborative partnerships to share costs and resources in order to overcome these barriers.

Obinna and Kalu (2022) investigated the impact of Augmented Reality (AR) technologies on the delivery of information services in academic libraries across Nigeria. The study focused on how AR enhanced user interaction with library resources, particularly in terms of engaging students in library activities and improving resource discoverability. The study found that AR technologies significantly enhanced user experience by making library resources more interactive and accessible. However, the challenges identified included the lack of awareness of AR among users, the high cost of AR infrastructure, and the need for additional staff training to manage the technology.

Ojo and Tijani (2020) explored the effects of Virtual Reality (VR) technologies on the service delivery in academic libraries in Nigeria. The objective was to assess how VR enhanced users' ability to interact with library materials and access information in more immersive and engaging ways. The findings revealed that VR significantly contributed to enhancing user engagement with library resources, particularly for virtual tours and interactive learning experiences. However, challenges such as the high cost of implementing VR, lack of skilled personnel, and limited access to VR-compatible devices were also noted.

Micheal and Ngozi (2022) assessed the role of Virtual Reality (VR) in enhancing information service delivery in academic libraries in southeastern Nigeria. The study aimed to determine the effects of VR in improving library service delivery, focusing on user satisfaction and interaction. The findings revealed that VR technologies significantly impacted the way users interacted with library services, increasing user engagement and satisfaction. However, the study also noted challenges such as high costs for VR equipment, lack of skilled personnel to manage the technology, and low awareness of VR applications among students.

**Methodology**

The research design chosen for this study was a descriptive survey design. The population of the study consisted of two hundred and five (205) library staff in academic institutions in Makurdi namely: Benue State University,Makurdi, and Joseph SarwuanTarka University, Makurdi (JOSTUM). For Benue State University (BSU), the study includes 22 librarians, 35 para-professionals, 33 junior staff, and 2 daily rated staff. From the Joseph SarwuanTarka University, Makurdi (JOSTUM), the study encompasses 30 professional

librarians, 79 para-professional librarians and 4 support staff, making a total of 205 librarians in the two university libraries. The sample size for the study consisted of 205 professional and paraprofessional library staff drawn from Benue State University, Makurdi and Joseph SarwuanTarka University, Makurdi (JOSTUM) using census sampling technique. The choice of census sampling in this study is in line with Adegoke (2022), who posits that a census is appropriate when the population under study is small and manageable, allowing for the collection of data from all members of the population to provide a more comprehensive and accurate view of the phenomenon under investigation.

The study utilized a self-structured questionnaire titled "Internet of Things (IoT) and Information Service Delivery Questionnaire (ITISDQ)" for data collection. The data were analyzed using frequencies, mean, and standard deviation to answer the research questions, with a midpoint mean of 2.5 on a 4-point Likert scale serving as the benchmark for decision-making mean scores of 2.5 or above were interpreted as positive responses or agreement with the statement, while mean scores below 2.5 indicated negative responses or disagreement. Chi-square ($\chi^2$) was used to test the hypotheses at the 0.05 level of significance; a p-value less than 0.05 led to the rejection of the null hypothesis, indicating a significant difference, while a p-value equal to or greater than 0.05 resulted in the acceptance of the null hypothesis, indicating no significant difference.

## Result

**Research question 1:** How does the utilization of augmented reality technologies influence information service delivery in academic libraries?

**Table 1: Mean and Standard Deviation Score of the Influence of utilization of augmented reality of information services delivery in academic libraries**

| S/No | Item Description (n=205) | SA | A | D | SD | $\bar{x}$ | σ | Dec. |
|---|---|---|---|---|---|---|---|---|
| 1 | The use of Augmented Reality (AR) technology in the library has made it easier for users to interact with information resources. | 85 | 63 | 30 | 20 | 3.08 | 0.99 | Agree |
| 2 | Augmented Reality applications have significantly enhanced the learning experience for library users. | 85 | 63 | 40 | 10 | 3.13 | 0.91 | Agree |
| 3 | I believe that incorporating Augmented Reality into library services has improved user engagement with library materials. | 75 | 78 | 30 | 15 | 3.08 | 0.91 | Agree |
| 4 | AR technology has made learning in the library more interactive and engaging. | 85 | 68 | 30 | 15 | 3.13 | 0.93 | Agree |
| 5 | The use of Augmented Reality (AR) in the library helps users visualize complex information better. | 85 | 68 | 30 | 15 | 3.13 | 0.93 | Agree |
| 6 | AR applications have transformed the way users navigate and explore library spaces and resources. | 90 | 53 | 40 | 15 | 3.10 | 0.98 | Agree |
| 7 | The integration of AR in library services has contributed to a more immersive and enjoyable learning environment. | 112 | 41 | 30 | 15 | 3.26 | 0.98 | Agree |
| | **Cluster Mean and Standard Deviation** | | | | | **3.13** | **0.94** | **Agree** |

Table 1 shows that item 1 has a mean of 3.08 and a standard deviation of 0.99. Item 2 has a mean of 3.13 and a standard deviation of 0.91. Item 3 has a mean of 3.08 and a standard deviation of 0.91. Item 4 has a mean of 3.13 and a standard deviation of 0.93. Item 5 also records a mean of 3.13 and a standard deviation of 0.93. Item 6 has a mean of 3.10 and a standard deviation of 0.98. Lastly, item 7 shows a mean of 3.26 and a standard deviation of 0.98. The overall cluster mean is 3.13, suggesting a generally positive perception regarding the impact of Augmented Reality on information service delivery in academic libraries within university settings in the Makurdi Metropolis.

**Research question 2:** How does virtual reality technologies influence information service delivery in academic library in Makurdi Metropolis?

**Table 2: Mean and Standard Deviation Score of how virtual reality technologies influence information service delivery in academic library in Makurdi Metropolis**

| S/No | Item Description (n=205) | SA | A | D | SD | $\bar{x}$ | σ | Dec. |
|---|---|---|---|---|---|---|---|---|
| 8 | The implementation of Virtual Reality (VR) technology in the library has enhanced user experiences with information resources. | 43 | 105 | 10 | 40 | 2.76 | 1.01 | Agree |
| 9 | Virtual Reality applications provide innovative ways for users to access and engage with library services. | 51 | 77 | 70 | - | 2.90 | 0.78 | Agree |
| 10 | I believe that the use of Virtual Reality in library services significantly improves the understanding of complex information. | 35 | 73 | 55 | 35 | 2.55 | 0.98 | Agree |
| 11 | VR Technology has enabled users to interact with digital information in ways that were previously impossible. | 85 | 68 | 20 | 25 | 3.08 | 1.02 | Agree |
| 12 | Virtual Reality has transformed the learning experience in the library by offering immersive, hands-on interactions. | 51 | 67 | 40 | 40 | 2.65 | 1.07 | Agree |
| 13 | The use of VR technology has increased the engagement of library users with educational materials. | 55 | 88 | 25 | 30 | 2.85 | 1.00 | Agree |
| 14 | Virtual Reality applications allow users to experience simulations or scenarios that support learning and research. | 40 | 68 | 55 | 35 | 2.57 | 1.00 | Agree |
| | **Cluster Mean and Standard Deviation** | | | | | **2.76** | **0.98** | **Agree** |

Table 2 shows that item 8 has a mean of 2.76 and a standard deviation of 1.01. Item 9 records a mean of 2.90 and a standard deviation of 0.78. Item 10 has a mean of 2.55 and a standard deviation of 0.98. Item 11 shows a mean of 3.08 and a standard deviation of 1.02. Item 12 reports a mean of 2.65 with a standard deviation of 1.07. Item 13 has a mean of 2.85 and a standard deviation of 1.00, while item 14 records a mean of 2.57 and a standard deviation of 1.00. The overall cluster mean is 2.76, reflecting a generally positive but moderate perception of

the influence of Virtual Reality on information service delivery in academic libraries within university settings in the Makurdi Metropolis.

**Hypothesis 1:** Augmented Reality has no significant influence on information service delivery in academic libraries.

**Table 3: Chi-square Analysis of significant influence of Utilization of Augmented Reality Technologies on Influences Information Service Delivery in Academic Libraries**

| Responses | Observed Frequency | Expected Frequency | *df* | $x^2$ Cal. | *p*-value | Remark |
|---|---|---|---|---|---|---|
| SA | 88 | 49.5 | | | | |
| A | 62 | 49.5 | 3 | 62.646[a] | 0.000 | Sig. |
| D | 33 | 49.5 | | | | |
| SD | 15 | 49.5 | | | | |
| **Total** | **198** | | | | | |

0.05 > P.0.000

Table 3 shows that $\chi^2$ (3, N = 198) = 62.646[a], 0.05 > p = 0.000. Therefore, the null hypothesis of no significant influence was rejected. The result implies that the utilization of Augmented Reality technologies has a significant influence on information service delivery in academic libraries in Makurdi Metropolis. The adoption of AR can enhance interactive learning, improve user engagement, and support innovative information retrieval experiences, thereby boosting the overall effectiveness of library services.

**Hypothesis 1:** Virtual Reality Technologies has no significant influence on information service delivery in the academic library in Makurdi Metropolis.

**Table 4: Chi-square Analysis of Significant Influence of Virtual Reality Technologies on Influence Information Service Delivery in Academic Library in Makurdi Metropolis**.

| Responses | Observed Frequency | Expected Frequency | *df* | $x^2$ Cal. | *p*-value | Remark |
|---|---|---|---|---|---|---|
| SA | 52 | 49.5 | | | | |
| A | 67 | 49.5 | 3 | 10.364[a] | 0.016 | Sig. |
| D | 39 | 49.5 | | | | |
| SD | 40 | 49.5 | | | | |
| **Total** | **198** | | | | | |

0.05 > P.0.000

Table 4 shows that $\chi^2$ (3, N = 198) = 10.364[a], 0.05 > p = 0.016. Therefore, that the null hypothesis of no significant influence was rejected. The result implies that Virtual Reality technologies have a significant influence on Information Service Delivery in academic libraries in Makurdi Metropolis. The application of VR can support immersive learning environments, virtual library tours, and interactive simulations, thereby enriching the quality and accessibility of library services.

## Discussion

The study found that the utilization of Augmented Reality technologies has a significant influence on Information Service Delivery in academic libraries in Makurdi Metropolis. The reason for this finding is the integration of Augmented Reality (AR) technologies enhances the user experience by providing interactive and immersive information delivery methods. The result aligns with that of Obinna and Kalu (2022) who found that AR technologies significantly enhanced user experience by making library resources more interactive and accessible. Also, the study aligns with Akinwunmi and Fadare (2023) who found that AR technologies contributed significantly to user engagement, helping students to interact with virtual resources and improving the overall learning experience in libraries.

The finding equally revealed that Virtual Reality technologies have a significant influence on information service delivery in academic libraries in Makurdi Metropolis. The reason for this finding is that Virtual Reality (VR) technologies provide a highly immersive and engaging way for users to interact with library resources. This finding supports that of Lawal and Ojo (2021),who found that virtual reality (VR) holds considerable potential for transforming library services by offering immersive learning experiences that foster user engagement and improve learning outcomes. The finding further supports that of Micheal and Ngozi (2022) who found that VR technologies significantly impacted the way users interacted with library services, increasing user engagement and satisfaction.

## Conclusion

Based on the findings, it was concluded that the utilization of Augmented Reality and Virtual Reality technologies have significant influence on information service delivery in academic libraries in Makurdi Metropolis. These emerging technologies enhance the efficiency, accessibility, and overall quality of information services, thereby improving user experience and supporting academic activities within the libraries.

## Recommendations

1. Library management should invest in and promote the integration of Augmented Reality (AR) tools and applications to enhance information service delivery, making library resources more interactive and engaging for users.
2. Academic institutions should collaborate with Virtual Reality (VR) developers to implement immersive VR solutions that support innovative information access and improve users' research and learning experiences within the library.

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