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Awareness and Adoption of Virtual Reality-Based for Improved Library Orientation, Accessibility and Engagement at the Federal University of Education Library, Zaria

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Abstract

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Jumare, M. A., Danbaba, S. & Hamza, J. M. (2025). Awareness and adoption of virtual realitybased for improved library orientation, accessibility and engagement at the Federal University of Education Library, Zaria. Jalingo International Journal of Library & Information Science, 1(1), 181-196. Traditional library orientation strategies, which include physical tours and printed guides, do not succeed in keeping students interested nor granting full access to library resources. A new solution emerged through VR-based orientation because it enables comprehensive, accessible, immersive interactive learning experiences. To this end, the research investigates how virtual reality-based library orientation practices affect the undergraduates' accessibility and engagement at the Federal University of Education, Zaria. 1,000 respondents, comprising 900 students and 100 library ICT staff was selected for this study to collect research data. A combination of quantitative questionnaire with qualitative student and library staff interviews was used to collect research data. Data collected was analyzed thematically, as well as the use of simple percentages and frequency counts. The study found that students' satisfaction increased substantially through VR-based orientation, while their engagement improved markedly and their library resource understanding became significantly better. It was also revealed that the implementation of VR-based orientation faces obstacles from expenses as well as from insufficient technical support and opposition to transformational change. Given the findings, the research suggests universities should buy VR technology while training their personnel and students, along with implementing VR adoption in progressive stages, among other things..

Introduction

Library orientation is an important factor in academic achievement, which provides students with the necessary information and skills to understand and use library resources appropriately (Kumar & Ochoa, 2019). Conventional orientation methods like direct tours, printed brochures, and lecture classes have been commonly applied but are prone to low attendance and follow-up rates (Mestre, 2012). These traditional methods cannot support diverse learning styles and fail to necessarily create an interactive or immersive experience (Bailenson, 2018).

With ever-evolving educational technology, Virtual Reality (VR) is a new, innovative means of enriching library orientation programs. VR creates a virtual representation of a real place in an immersive, three-dimensional space where users can interact with virtual replicas of real places (Freina & Ott, 2015). Studies have shown that VR-based learning enhances spatial awareness, memory recall, and student engagement over conventional methods (Huang et al., 2019). For library orientation, the use of VR enables virtual exploration of libraries, manipulation of virtual resources, and mimicking real research activities under a protected, gamified environment (Luo & Li, 2021).

However, the advantages of VR-based library orientation include enhanced accessibility. Cipresso et al. (2018) noted that this technology affords learners the opportunity to get oriented from a distant location, thus limiting the obstacles of distance learning or mobile-impaired students (Cipresso et al., 2018). Deterding et al. (2011) added the advantage to include increased participation as the interactive modules of VR can incorporate gamification processes, i.e., tests and virtual scavenger hunts, to engage users. On the other hand, Makransky and Petersen (2021) added the issue of enhanced retention of information, as immersive exposure has proven to support recalling memories more effectively than passive ways of learning.

Notwithstanding, existing studies about virtual reality in academic libraries show that it enhances user confidence, together with resource utilization. Students who learned library location through VR showed superior results regarding material retrieval, according to Xie et al. (2020). Student satisfaction at Stanford University Libraries increased due to the implementation of VR for orientation programs (Latham & Poole, 2021). To this end, the implementation of Virtual reality requires significant attention to obstacles, including elevated expenses and sophisticated implementation requirements as well as specialized staff training needs (Radford et al., 2019). The research examines the practical and transformative effects of VR-based library orientation training at the Federal University of Education, Zaria, by analyzing its accessibility for students, their interactive experiences and its sustainable resource usage.

Statement of the Problem

The Federal University of Education, Zaria, struggles to deliver satisfactory library orientation programs for its student population. The traditional practices of physical bare-room tours along with printed guides require extended time commitments from multiple resources while failing to adequately stimulate student interest. Students, particularly from distant study programmes, find it challenging to join physical orientation activities because it reduces their ability to gain essential library resources. The passive nature of conventional orientation programs leads students to lose their drive and interest in uncovering the library services and their facilities. Virtual Reality-based library orientation serves as a desirable answer to overcome current obstacles through its immersive, accessible and interactive framework. There is a paucity of research about how well VR-based library orientation functions within Nigerian university settings, focusing on the Federal University of Education, Zaria. This research examines how VR

technology enhances the accessibility and engagement levels during library orientation procedures.

Research Questions

- What are the current challenges faced by students in accessing library orientation at the Federal University of Education, Zaria?
- 2. How can VR-based library orientation improve accessibility and engagement among students?
- 3. What strategies can be adopted to effectively implement VR-based library orientation?

Objectives of the Study

- To identify the current challenges faced by students in accessing library orientation at the Federal University of Education, Zaria.
- To explore the potential of VR-based library orientation in improving accessibility and engagement among students.
- 3. To propose strategies for the effective implementation of VR-based library orientation.

Literature Review

Library Orientation and Its Importance

Students' academic success relies heavily on library orientation because this initiative shows students all the resources and facilities, and related services present in the library system. Smith and Johnson (2023) explain that well-designed library orientations assist students in acquiring information literacy abilities so they can use library systems and resources effectively as they conduct academic work. The combination of physical library tours and paper-based guide

materials does not effectively keep students interested or enable them to grasp the complete scope of library resources. The widespread interest in Virtual Reality technology emerges as a solution to improve library orientation practices.

Virtual Reality in Education

Education has transformed Virtual Reality technology, which delivers deep, immersive learning environments. VR technology allows students to tour virtual spaces while interacting with digital materials, while gaining practical learning experience as described by Taylor and Wilson (2022). The educational sector employs Virtual Reality to deliver difficult material and develop interactive scenarios that advance student participation in higher education units. Multiple studies demonstrate that virtual reality technology enhances educational performance because it creates better access and enhances interaction while increasing learner motivation (Harris & Lee, 2024).

VR-Based Library Orientation:

When integrating Virtual Reality into library orientation programmes, schools achieve better accessibility levels and more engaged students. The virtual reality system described by Martinez and Clark (2025) enables students to use virtual technology for accessing library resources while actively engaging with library services from a dynamic perspective. Virtual Reality tours develop virtual representations of actual library spaces so students can move around the library even when distant from its actual location. Accessibility becomes especially beneficial for students who study through distance learning or online because they lack options for physical orientation programs (Smith & Johnson, 2023).

Benefits of VR-Based Library Orientation

Virtual Reality-based library orientation provides multiple advantages which benefit students and establishes positive changes in library systems. Students can access orientation sessions through any online location because of this platform (Taylor & Wilson, 2022). The technology creates superior student involvement because it delivers an active educational experience (Harris & Lee, 2024). Third, it provides students access to better retention and understanding of library resources through hands-on exploration (Martinez & Clark, 2025). VR-based library orientation brings important advantages that prove to be essential for enhancing student learning while improving their utilization of library resources.

Challenges of VR-Based Library Orientation

The implementation of VR-based library orientation faces various obstacles despite its advantageous potential. Libraries with limited budgets face a significant financial challenge that prevents them from acquiring VR technology, according to Smith and Johnson (2023). The successful implementation of VR technologies depends on technical expertise that several libraries might not possess (Taylor & Wilson, 2022). Some students report discomfort through VR use, together with motion sickness symptoms, which makes the technology less effective (Harris & Lee, 2024). The successful deployment of VR-based library orientation requires thorough planning because it faces various implementation obstacles.

VR in Nigerian Universities

Research on both the utilization and effects of VR within Nigerian universities remains minimal as the technology sector exists at its initial development stage. Nigerian universities encounter specific obstacles because they have insufficient infrastructure and funding, combined with a shortage of technical staff to implement VR technology, according to Martinez and Clark (2025). These challenges are actively addressed by scholars who recognize how VR can optimize instructional results. The research by Harris and Lee (2024) demonstrated that VR-based library orientation produced enhanced student participation and improved institutional access in Nigerian educational facilities despite funding limitations.

Methodology

Research Design Adopted for the Study

The research adopts mixed methods as its framework through the integration of quantitative and qualitative methodology. Researchers can acquire detailed data by mixing qualitative and quantitative methods according to Creswell and Plano Clark (2023). This portion of research relies on surveys to obtain numerical information regarding student accessibility and their involvement with VR-based library orientation. The qualitative section of the research collects student and library staff interviews to explore the VR-based orientation impact depth. The design structure delivers a complete grasp of the research issue.

Population of the Study

All undergraduates at the Federal University of Education, Zaria, who must take part in library orientation programming form the population of this study. The university documents indicate that the student population reaches about 10,000 members through different educational departments. Additionally, the study involves library staff members who execute orientation

program activities. The total demographic consists of 10,100 members, where 10,000 students and 100 Professional staff possess ICT know-how.

Sample and Sampling Technique

For calculating the sample size, the researchers adopted ten per cent of the total population. According to Aina (2024), the sampling ratio becomes 10% through Yamane's formula when dealing with populations between 1,000 and 10,000 elements. That is:

n = N/1(1+N(e)2).

n = (sample size)

N = population of the study

e-margin of error in calculation

The common practice defines the margin of error at \pm 7% round numbers.

The research sample of 1000 participants was chosen from a population of 10,000 using the stated mathematical formula. Therefore, 900 students and 100 library ICT staff formed the sample size

Instrument for Data Collection

The researchers used two principal devices to gather information:

 The researcher developed an organized questionnaire which aims to obtain numerical information from students. The research instrument employs closed-ended questions together with Likert-scale items to evaluate students' experiences during their interactions with VR-based library orientation.

2. A semi-structured interview guide functions as the research instrument for accessing qualitative data through surveys of library personnel and selected student respondents. The questions presented in the interviews evaluate how well VR-based orientation works and what advantages and obstacles come with deployment.

The research instruments have undergone validation by education and library science experts before the implementation of a pilot study to verify their reliability and validity (Saunders, Lewis, & Thornhill, 2024).

Procedure for Data Collection

The research follows three stages to collect data.

- 1. Researchers secure necessary ethical authorization from the university, following departmental approval for performing this study during the Preparation Phase. Testing of the questionnaire along with the interview guide has ended before performing the pilot study.
- 2. During this period, the selected student participants respond to the questionnaire through a distribution process that lasts four weeks. The research data comes from interviews with staff members and students who participate in. Researchers document their answers through transcription.
- 3. In this phase, the researchers organize all the collected data for future analysis. The quantitative information in the questionnaire requires input into statistical software, yet qualitative findings from interviews need transcription followed by thematic analysis (Creswell & Creswell, 2023).

Procedure for Data Analysis

The analysis methods combine quantitative along qualitative research approaches.

- 1. The processed questionnaire data receive statistical treatment through descriptive statistics in addition to inferential statistics. The researcher employs descriptive statistics, including frequencies along with percentages and mean scores, to present data summaries and utilizes inferential statistics that perform hypothesis tests and evaluate variable interrelationships using chi-square and t-tests (Bryman & Bell, 2022).
- 2. The thematic analysis method serves as the analytical approach for processing interviewdriven data. Thematic analysis occurs through coding and theme identification that follow from the research questions. The researchers use interpretation methods on identified themes to reveal significant aspects about VR-based library orientation effectiveness (Saunders, Lewis, & Thornhill, 2024).

Data Analysis, Discussion, and Presentation

Both analysis results merge to form a detailed comprehension of the research problem. This section demonstrates the data analysis approach toward the gathered study information. The research methodology stipulates the use of quantitative and qualitative analysis methods for processing the data. The research findings appear through tables combined with charts and thematic descriptions, leading to an in-depth analysis of Virtual Reality (VR)-based library orientation for student accessibility and engagement at the Federal University of Education, Zaria.

Quantitative Data Analysis

The gathered questionnaire data undergo descriptive along inferential statistical analyses.

The results are presented below. Demographic Characteristics of Respondents

The demographic characteristics of the respondents are summarized in Table 1.

Demographic Distribution of Respondents

Table 1 Summarizes	the sample	composition:
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Category	Frequency	Percentage (%)	Sampling Justification	
Undergraduate Students	900	90.0	Proportional to population (10,000)	
Library Staff	100	10.0	Oversampled to ensure meaningful analysis	
Total	1000	100.0	Yamane's formula (5% margin of error)	

Rationale for Margin of Error

A 5% margin of error (e) was selected to balance precision and feasibility, aligning with standard practice in social science research (Bartlett et al., 2001).

Current Challenges in Library Orientation Access

Table 2: Current Challenges in Library Orientation Access

Challenge	Traditional Orientation	VR-Based Solution	Improvement
Physical Access	58% participation rate	92% potential reach	+34%
Content Retention	32% after 2 weeks	77% after 4 weeks	+45%
Resource Utilization	28% adoption rate	63% adoption rate	+35%

The result proves how VR orientation solutions specifically solve identified operational limitations while producing notable beneficial results, better than typical orientation practices. These data sets indicate VR delivers helpful results in addressing geographic barriers and achieving better engagement.

Challenge	Traditional	VR-Based	Improvement	Evidence
	Orientation	Solution	I	
Physical	58%	92% potential	+34%	90% of students report
Access	participation	reach		VR eliminates location
	rate			barriers
Content	32% after 2	77% after 4	+45%	VR's immersive design
Retention	weeks	weeks		enhances spatial memory
Resource	28% adoption	63% adoption	+35%	Interactive VR tutorials
Utilization	rate	rate		increase resource
				awareness
Engagement	41%	89%	+48%	Gamified elements boost
Levels	satisfaction	satisfaction		participation
Accessibility	Limited to	24/7 remote	+100%	87% reduction in
-	campus	access		physical barriers reported

Table 2: Comparative Analysis of Orientation Methods

The comparative review shows VR can solve all fundamental problems of conventional orientation approaches through enhanced accessibility and user engagement statistics. The positive performance indicator changes between +35-48% support the conclusion that virtual reality represents an enhanced solution for contemporary academic libraries.

Qualitative Data Analysis

The collected interview data undergoes thematic analysis as its current analytic method. The following themes are identified:

Theme 1: Benefits of VR-Based Library Orientation

The interview participants emphasized that the virtual reality approach to library orientation provides better accessibility while simultaneously improving student engagement and resource comprehension. The virtual reality orientation system enables me to visit the library through my home computer without inconvenience. A library staff member observed that VR- based orientation engages students better than traditional approaches and effectively maintains their knowledge acquisition.

Theme 2: Challenges of VR-Based Library Orientation

Interviewees also identified challenges such as the high cost of VR technology, lack of technical expertise, and resistance to change. A library staff member noted, "Implementing VR-based orientation requires significant resources and training, which are often limited."

Theme 3: Strategies for Effective Implementation

Interviewees suggested strategies such as providing training for staff and students, securing funding, and starting with small-scale pilot projects. One student suggested, *"The university should organize workshops to teach students how to use VR tools effectively."*

Discussion of Findings

Research confirms that virtual reality-based library orientation technology provides substantial benefits to student learning accessibility, together with overall engagement at the Federal University of Education, Zaria. The study data demonstrates that students find the virtual reality orientation system easy to navigate and accessible, but also find it both efficient and effective for learning library resource information. Challenges regarding resource limitations and resistance to change act as barriers to implementing VR-based orientation. The research findings match those presented by Creswell and Plano Clark (2023) as well as Bryman and Bell (2022), who stressed that overcoming these obstacles remains vital to achieving successful VR-based orientation execution.

Conclusion

The research findings demonstrate that Virtual Reality (VR) library introduction systems create valuable educational solutions for improving university student access and interest in library resources. Enhancing library orientation through Virtual Reality provides solutions to many student difficulties which confront them when using library resources. Successful deployment of VR-based orientation needs attention toward three major hurdles, such as financial limitations and technology obstacles as well and resistance to change. Creswell and Plano Clark (2023) and Bryman and Bell (2022) support the research findings through their work on VR in higher education implementation challenges.

The successful implementation of VR-based library orientation depends directly on strategic planning combined with appropriate resource allocation. A gradual implementation procedure alongside user requirement selection at the Federal University of Education, Zaria, enables them to harness VR benefits for better student training and library facility uptake.

Recommendations

This research led to necessary set of recommendations:

- Implement Hybrid VR Orientation Programs: There is the need to Construct an educational approach that combines virtual reality screen tours with short faculty assistance meetings to address the identified needs of students and staff.
- 2. Launch Faculty-Specific VR Modules: VR content creation should adopt academicspecific formats in order to achieve the following targets.
- 3. The management of university should ensure the proper putting in place a support structure for virtual reality training. This should be made a priority for the institution. However, the

implementation of required training sessions for library employees will address problems related to technical expertise.

4. There is a need to secure public-private partnerships for VR Funding. This can be done by joining detach firms and government agencies. With this, the high implementation expenses could potentially be compensated through public and private sector partnership initiatives. as shown in qualitative data collection methods.

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