Adoption of Collaborative Technologies in Library and Information Science Teaching: A Study of Tertiary Institutions in Rivers and Imo States, Nigeria

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Abstract - This study examines lecturers' adoption of collaborative technologies in teaching Library and Information Science (LIS) in tertiary institutions in Rivers and Imo States, Nigeria. The research employed a descriptive survey design. The study population consisted of forty-two (42) LIS lecturers from four tertiary institutions across the two states, which also served as the sample. Data were collected using an online questionnaire, validated by two senior lecturers from the Department of Library and Information Science at Niger Delta University, Bayelsa State, Nigeria. The instrument was not pilot-tested based on the assumption that a valid test is inherently reliable. A total of forty-two validated questionnaires were distributed, with thirty-seven (37) completed questionnaires retrieved and deemed usable for data analysis, yielding a response rate of 88.10%. Data were analyzed using weighted mean and standard deviation. Findings revealed that the extent of lecturers' adoption of collaborative technologies in teaching LIS is low; they primarily utilize these technologies for tutorial sessions and delivering course materials. However, factors such as insufficient ICT facilities and funding, limited awareness of pedagogical collaborative technologies, unstable internet connectivity, and low digital literacy hinder the optimal use of these tools. Among other recommendations, the researchers suggested the provision of adequate ICT resources, stable internet connectivity, and web-based instructional training for lecturers by both the government and institutional management.

Keywords: Collaborative Technologies, Library and Information Science (LIS), Tertiary Institutions, Digital Literacy, ICT Resources

I. INTRODUCTION

No doubt, the 21st century is known for several useful innovations, one of which is Information and Communication Technology (ICT). The concept of ICT can be defined as electronic facilities that aid the processes of collecting, processing, storing, accessing, retrieving, and disseminating information for personal, organizational, corporate, and national needs. ICT has made human, organizational, corporate, and national activities easier and more efficient. One of the human activities that ICT has positively influenced is education. Education can be defined as the process through which an individual imparts knowledge to another with the goal of changing the totality of that individual's life. Olugbemi (2019) views education as "the process of facilitating learning and acquiring knowledge, skills, values, beliefs, and habits." The means by which knowledge is imparted to an individual is referred to as teaching. In this process, the individual who imparts knowledge is called the teacher, while the individual receiving knowledge is referred to as the learner, pupil, or student. Traditionally, teaching takes place in the classroom, where there is face-to-face interaction between the teacher and the learner. Moreover, the process is often facilitated by using a blackboard or chalkboard, marker board, chalk, duster, pen, hard copy notes, physical textbooks, sound systems such as microphones, and other teaching aids. However, with the advent of ICT, new methods of teaching have emerged. Various forms of ICT represent these new means for teaching. According to Guma Faruque and Khushi (2018), ICT is seen as "an innovative approach introduced to enhance the efficiency of teaching and learning using electronic information." This new approach to teaching has been adopted by educators in institutions of higher learning worldwide.

Teachers in higher education have recently been seeking ways to impart knowledge to students anytime and anywhere. Thus, there has been a widespread shift in the role of academics from being transmitters of information to facilitators and creators of learning environments (Bubou & Work, 2021). The authors further found that Nigerian academics have moved from traditional teaching methods and have embraced the use of technology in instruction, similar to their counterparts in Europe, America, Asia, Australia, and other parts of Africa. One of the emerging technologies facilitating this transition is the adoption of collaborative technologies. Rogers (2003) defines adoption as the decision of an individual to utilize an innovation as the best course of action available. Rogers suggests that the process of adoption begins with initial awareness of an innovation and concludes with full adoption. Conversely, collaboration can be seen as the activities of a group or gathering of at least two individuals focused on achieving a shared goal. Atkinson (2018) envisions collaboration as a

mutually beneficial and evident relationship entered into by at least two parties to achieve shared objectives. Technology may be defined as any man-made device or tool that makes work or tasks easier and more efficient. It is noted that collaboration fundamentally involves sharing and exchanging knowledge and skills.

The authors hold that collaboration is defined by its inclination and level, such as collaboration among individuals, among groups, among departments, within departments, inter-departmental, within institutions, inter-institutional, within sectors, inter-sectoral, nations—national/international, or regional/inter-regional. These are what this current study refers to as types of collaboration. It can also be either informal or formal (Ocholla, 2008). In the context of this study, collaborative technologies are defined as electronic devices that, regardless of distance or geographical location, enable a teacher to have close interaction with students to impart knowledge effortlessly and efficiently. Various classes of collaborative technologies exist.

Two groups of collaborative technologies have been identified: collocated collaborative technologies, which allow users to perform tasks together in one place, and non-collocated collaborative technologies, which allow users to work together from different locations. The various forms of collaborative technologies include institutional repositories, integrated library systems, LibraryThing, LinkedIn, Facebook, WhatsApp, blogs, wikis, texting, smartphones, digital boards, email, and others (Igwela, Adomi, & Nsirim, 2022). These technologies facilitate the teaching-learning experience in various ways. With the aid of available open-source web 2.0 tools (such as WhatsApp, Facebook, and YouTube), virtual conferencing platforms (such as Zoom and Google Meet), and learning management systems (like Google Classroom and Moodle), educators can schedule classes, post announcements, assign tasks/tests, and receive feedback messages.

Meanwhile, students can collaborate and share learning materials in their respective departmental group discussions (Ogudu, 2023). This technology gives educators the opportunity to engage with students just as they do in a physical classroom. Consequently, Smith and McKeen (2011) note that collaborative technology allows users to feel as if they are in live collaboration with a remote participant. Thus, the adoption of collaborative technologies in teaching courses in institutions of higher learning is capable of enabling educators to overcome geographical barriers to instruction and enhance the teaching-learning experience. Accordingly, these technologies have become a source of interest for educators in higher education.

In contemporary times, there has been a growing interest in the adoption of collaborative technologies in teaching courses across virtually all fields of study in advanced educational institutions worldwide. This is substantiated by studies indicating that electronic and online teaching activities rank as the second and third most prominent technology-based teaching activities in public and private universities in Central Punjab, Lahore, Pakistan (Afridi & Chaudhry, 2019). In Nigeria, 33% and 56.5% of 69 Business Education lecturers in higher institutions across five states reported using social media for instructional and other classroom activities, respectively (Morrison, Oyedele, Oladunjoye, & Maman, 2017). Library and Information Science educators in higher education institutions worldwide seem to apply similar technologies for educational purposes. Regarding the need to adopt these technologies, Funmilayo and Ayo, cited in Eiriemiokhale and Amzat (2023), emphasize that information professionals need to upgrade themselves in order to provide user-based services by adapting to current online technologies used globally to deliver library services, as any information professional who is not equipped to meet the emerging challenges and adopt new ICT will be left behind.

Library and Information Science (LIS) is a discipline responsible for the education and formal training of personnel expected to manage library and information centers (Nmecha & Nsirim, 2022). This field of study is also referred to as Library Science or Library Studies. LIS is taught in institutions of higher learning, such as polytechnics, colleges of education, and universities. Universities serve as the primary grounds for teaching LIS. Internationally, the teaching of LIS has evolved over the years. Concerning the inception of LIS education in Nigeria, Saleh (2012) notes that the first Library School in Nigeria was established at the University College, Ibadan, in 1959. This set the pace for LIS education in the country's tertiary institutions. Over time, this school became a full-fledged university and began offering various degree programs in the field. Other pioneering universities in Nigeria also introduced the course. This trend continues, and many Nigerian universities now offer LIS at various levels of study. According to the Nigerian Association of Library and Information Science Educators (NALISE, 2020), there are currently 37 LIS schools in Nigerian universities, comprising federal, state, and private institutions.

Finally, using author affiliation and citation data from Scopus for an immunology paper, Satish (2021) explores the impact of international collaboration on "neutralizing the origin of country bias." Country bias significantly affects scholars' perceptions of collaborative technologies in teaching and learning. This highlights the need for collaboration in research using collaborative technologies. Furthermore, regarding "sustainable development initiatives," which are major in the adoption of collaborative technologies, Manna and De Sarker (2022) uphold the view that "the challenges faced by librarians in their efforts to go green were identified" as a result of the lack of adoption of collaborative technologies. Therefore, their paper concludes by providing an "overview of sustainable development initiatives" where library and information science professionals are encouraged to adopt collaborative technologies.

II. STATEMENT OF THE PROBLEM

In recent times, teachers, including Library and Information Science lecturers in higher educational institutions, have been employing newer forms of Information and Communication Technology (ICT) to enhance the teaching process. An emerging practice in tertiary institutions worldwide is the utilization of collaborative technologies by lecturers to aid pedagogy. This appears to help lecturers not only establish closer relationships with their students but also communicate course-related information more effectively and conveniently. Furthermore, it seems to enable lecturers to teach students in a manner that does not require face-to-face interaction.

Preliminary research by the authors reveals that while some Library and Information Science lecturers in higher institutions in Rivers and Imo States of Nigeria have begun using collaborative technologies for educational purposes, some educators still prioritize traditional face-to-face teaching methods. This has prevented these lecturers from maintaining close engagement with their students and from adapting their teaching processes in the event of disruptions to school activities. As a result, they have struggled to deliver smooth instruction, which tends to lead to poor learning outcomes for the students.

Globally, researchers appear to be showing growing interest in studying issues surrounding the adoption of collaborative technologies for teaching, especially in advanced educational institutions. In Southern Nigeria, there are broad studies, such as that of Olannye-Okonofua and Oji (2023), which did not focus on a specific group of educators. In contrast, discipline-specific studies in Southern Nigeria have primarily engaged with Business Education lecturers in public universities in Enugu State (Anetu, Ugwoke, & Moghalu, 2020; Gold & Vitalis, 2023). There is also research on the adoption of collaborative technologies for information sharing among librarians in tertiary institutions in Rivers State, Nigeria (Igwela, Adomi, & Nsirim, 2022). However, this research examined the use of these technologies for educational purposes among librarians. Therefore, this study analyzed lecturers' adoption of collaborative technologies in teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria.

III. OBJECTIVES OF THE STUDY

The main purpose of the study was to investigate lecturers' adoption of collaborative technologies in teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria. The specific objectives were to:
1. Ascertain the extent of adoption of collaborative technologies by lecturers in teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria;
2. Examine the areas in which lecturers adopt collaborative technologies for teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria;
3. Identify the challenges faced by lecturers in adopting collaborative technologies for teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria.

IV. RESEARCH QUESTIONS

The following research questions were posed to guide the study:
1. What is the extent of lecturers' adoption of collaborative technologies in teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria?
2. What are the areas of lecturers' adoption of collaborative technologies in teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria?
3. What challenges do lecturers face in adopting collaborative technologies for teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria?

V. LITERATURE REVIEW

A. Extent of Lecturers' Adoption of Collaborative Technologies in Teaching Library and Information Science in Tertiary Institutions of Learning

As educational technologies infiltrate the educational process, especially in higher education institutions, higher education teachers have been experimenting with more innovative forms of these technologies, including collaborative technologies, to instruct students. A number of studies have shown the extent to which teachers in tertiary educational institutions adopt these technologies for teaching purposes, but the findings have not been consistent. Some results suggest that they adopt the technologies to a high extent, while others indicate a moderate or low extent of use. For example, Roebuck Siha and Ringer (2013) found that 63% of a sample of 201 higher education instructors in the U.S. utilized social media tools in their teaching.

Moorhouse and Wong (2021) found that a sample of 83 primary and secondary school English language teachers in Hong Kong adopted various asynchronous and synchronous digital technologies and instructional approaches to facilitate students' learning, assess learning, and communicate with students and parents during class suspensions caused by COVID-19. A similar outcome was reported for a sample of 268 Italian higher education instructors, who indicated a significant increase in the use of synchronous online tools (videoconferencing systems and social media) and a decrease in the use of interactive whiteboards during the pandemic. It was also revealed that the extent of educators using these methods in face-to-face mode was higher than those who did so online during

Emergency Remote Teaching (ERT) (Pozzi Manganello & Persico, 2023). A unified outcome was found among instructors at Universiti Utara Malaysia, where 70% reported using social media for purposes such as conducting online teaching, facilitating discussions, and engaging in academic activities (Hashim & Zamani, 2015).

Similarly, instructors at King Fahd University of Petroleum and Minerals and Dammam College in the Eastern Region of Saudi Arabia were found to utilize learning management systems extensively (Khan & Adams, 2016). Additionally, subsequent research by Anetu et al. (2020) suggests that a sample of 26 business education instructors in public universities in Enugu State, Nigeria, use video conferencing, learning management systems, email, and interactive whiteboards to a significant extent.

Conversely, some results indicate that the level of adoption of these technologies by instructors for teaching methods is low. One finding reveals minimal use of social media by a sample of 69 business education teachers in higher institutions across five Nigerian states, which included 41 instructors from polytechnics, 22 from colleges of education, and 5 from universities (Morrison *et al.,* 2017). Additionally, a follow-up study by Isaac, Karnilius, Anjili, and Hyelaiti (2023) found that all members of a sample of 121 electrical engineering instructors in eight universities in Northeast Nigeria seldom used virtual laboratories.

Mukherjee and Majhi (2023) developed an "extraction task" tool used to identify significant terms for machine learning algorithms. In their study titled "Automatic Extraction of Significant Terms from the Title and Abstract of Scientific Papers Using Machine Learning Algorithms," they revealed that the importance of adopting technological tools in various fields is now a significant concern in education. They contend that "non-specialists in that subject field need collaborative technologies to perform automatic extraction of significant terms and understand patterns in the teaching and learning experiences."

Furthermore, outside of library and information science, collaborative creation has been encouraged within the academic community. Kumari and Kumar (2023) maintain that "based on the analysis of the data, we observed that the proportion of single-authored papers was significantly high in theoretical computer science." To justify their findings, the authors concluded that "values of collaborative indicators are also high for journals, except for the machine learning (ML) subfield." This finding has motivated the current paper to explore the reasons behind the low interest of scholars in collaborative technologies and its subfields.

B. Areas of Adoption of Collaborative Technologies in Teaching Library and Information Science in Tertiary Institutions of Learning

Lecturers in institutions of higher learning tend to utilize collaborative technologies for instructional purposes in specific areas of the teaching process. Some studies provide insights into this trend. Olannye-Okonofua and Oji (2023) discovered that a sample of 15 lecturers from twelve Nigerian tertiary institutions, including state and federal universities and polytechnics in the South-South, South-East, and South-West regions of Nigeria, significantly used social media platforms for communication with students. This communication typically occurs in various aspects of the teaching process.

Research demonstrates that a sample of 67 professors in the Faculty of Communication Sciences at Anadolu University in Turkey primarily use Facebook as a medium to connect with students for sharing and delivering information, sharing reference materials, group assignments, and course sessions (Tiryakioglu & Erzurum, 2011). Roebuck et al. (2013) found that a sample of 201 U.S. higher education educators predominantly utilized social media tools for communication, content delivery, interaction, and collaboration in their teaching.

In a subsequent study, a majority of a sample of fifty teachers from the disciplines of Computer Education, Educational Technologies, Distance Education, and Communication in the Faculty of Education at four universities in Turkey primarily used social networking sites to communicate with students and, secondarily, to share course materials, make announcements about assignments and surveys, and create an interactive learning environment (Durak, 2017).

Additionally, expert observations and studies suggest the areas where higher education instructors apply learning management systems for instructional purposes. For example, Zanjani, Edwards, Nykvist, and Geva (2016) indicate that teachers can use learning management systems to develop online course content, enhance critical thinking skills, and foster academic collaboration among university students. Similarly, Goh, Hong, and Gunawan (2014) note that instructors use these systems to share course content and teaching materials with students, as well as to promote collaboration and engagement among students through virtual discussions.

This aligns with findings by Sarfo and Yidana (2016), which show that a sample of two Information and Communication Technology lecturers and five non-Information and Communication Technology lecturers at the University of Education, Winneba, Ghana, use Moodle (Modular Object-Oriented Dynamic Learning Environment) to design and deliver lessons and assess students when face-to-face instruction occurs in the classroom. A recent study by Pozzi et al. (2023) indicates that discussion and brainstorming are the most commonly used techniques by a sample of 268 Italian higher education teachers, while case studies, peer reviews, and role plays are moderately adopted, and techniques like Pyramid and Jigsaw are less frequently utilized.

C. Challenges Faced by Lecturers in Adopting Collaborative Technologies in Teaching Library and Information Science in Tertiary Institutions of Learning

A number of studies have outlined the variables that obstruct lecturers from optimizing collaborative technologies for teaching Library and Information Science and other courses in higher educational institutions worldwide. One study indicates that the barriers to using social media among lecturers at Universiti Utara Malaysia revolve around concerns about student privacy invasion, perceptions of social media as a source of distraction, and a lack of skills in using social media for teaching purposes (Hashim & Zamani, 2015).

A subsequent study reveals that significant challenges faced by lecturers in designing and creating MOODLE-based courses at the University of Education, Winneba, Ghana, include low technology skills, a cumbersome institutional culture, and a lack of adequate Information and Communication Technology (ICT) resources (Sarfo & Yidana, 2016). Findings from a study by Pima and Mtui (2017) show that the five primary obstacles experienced by a sample of 120 lecturers in adopting collaborative web technologies in Tanzanian higher education institutions are: a lack of a guiding framework on collaborative web technologies; absence of an ICT policy on collaborative web technologies; problematic ICT infrastructure; lack of awareness; and poor internet connectivity.

Results from a subsequent study by Mamman (2019) demonstrate that a lack of technical expertise and discomfort with openness and public speaking are among the reasons why web tools are not utilized in teaching by a sample of 38 Business Education lecturers at four universities in Southwestern Nigeria (Ahmadu Bello University, Zaria; Kwara State University, Malete; Tai Solarin University of Education, Ijagun; and Ekiti State University, Ado Ekiti, Nigeria).

In related research, it was found that the absence of clear strategies, lack of commitment, resistance to change, low levels of readiness to exchange skills among lecturers and staff regarding the use of Higher Education Learning Management Systems (LMS), and low regard for the level of discipline are significant barriers to the use of LMS experienced by a sample of 25 lecturers in four public universities in Afghanistan (Bamyan University, Kunduz University, Kabul University, and Herat University) (Mohammadi, Mohibbi, & Hedayati, 2021). In a subsequent study, Igwela *et al.,* (2022) found that the challenges affecting sixty Library and Information Science lecturers in information sharing using collaborative technologies in four tertiary institutions in Rivers State, Nigeria, include lack of equipment, absence of policy and guidelines, and difficulty among staff.

Results from research by Gold and Vitalis (2023) reveal that a sample of 22 Business Education lecturers' challenges in utilizing blended teaching in two public universities (one state and one federal) in Enugu State, Nigeria, include students' class size, lack of supportive staff in the use of blended instructional tools, quality of curriculum content to deliver, poor supply of electrical power, inadequate knowledge of ICT-based materials for teaching, lack of motivational packages for students, and insufficient time for using blended learning, among others.

Finally, it is noteworthy that research findings by Bharath and Sudhier (2022) show that only 9.1% of users of the Kerala State Central Library (KSCL) are highly satisfied with the e-resources provided by the library, while over 43.2% express a preference for physical resources. Based on these findings, the present study advocates for the adoption of collaborative technologies to bridge gaps in teaching and learning.

VI. METHODOLOGY

The study adopted a descriptive survey research design. The choice of this design was based on the objective of eliciting and interpreting the opinions of lecturers regarding their adoption of collaborative technologies in teaching Library and Information Science (LIS) in higher institutions of learning. This aligns with Nworgu (2015), who asserts that the purpose of a survey research design is to gather and systematically describe information and facts about a given population.

The study population consisted of 42 LIS lecturers from four tertiary institutions in Rivers and Imo States of Nigeria (Rivers State University, Chief Elechi Amadi Polytechnic, Imo State University, and Federal Polytechnic Nekede, Owerri). A total enumeration sampling method was adopted because the population was small and manageable.

The study employed a Google Forms survey for data collection, which included three sections: A, B, and C. Section A addressed the research questions, with a total of 24 items across the sections. Section A contained ten items rated on a four-point scale: "Very High Extent (4)," "High Extent (3)," "Low Extent (2)," and "Very Low Extent (1)." Section B, which included five items, was rated on a two-point scale: "Adopted (2)" and "Not Adopted (1)." Section C contained nine items rated on a four-point scale: "Strongly Agree," "Agree," "Disagree," and "Strongly Disagree."

The study established cut-off points of 2.50 for Sections A and C and 1.50 for Section B. The decision rule for interpreting results from data analysis for Section A indicated that items with mean scores below 2.50 were considered "Low Extent," while those with mean scores equal to or greater than 2.50 were categorized as "High Extent." Specifically, mean scores within the ranges of "3.50-4.49," "2.50-3.49," "1.50-2.49," and "0.50-1.49" were classified as "Very High Extent," "High Extent," "Low Extent," and "Very Low Extent," respectively. The

grand mean for this section was also interpreted in the same manner. For Section B, items with mean scores below 1.50 were categorized as "Not Adopted," whereas items with mean scores equal to or greater than 1.50 were considered "Adopted."

In Section C, items with mean scores below 2.50 were classified as "Disagree," while those with mean scores equal to or greater than 2.50 were categorized as "Agree." Specifically, items in Section C with mean scores within the ranges of "3.50-4.49," "2.50-3.49," "1.50-2.49," and "0.50-1.49" were considered "Strongly Agree," "Agree," "Disagree," and "Strongly Disagree," respectively.

VII. RESULTS

This section of the paper presents the findings of the study in tables, in line with the research questions posed earlier to guide the research. Out of the 42 copies of the instrument administered, only 37 were returned and found usable, resulting in an 88% return rate. Analyses were based on this.

Research Question 1: What is the extent of lecturers' adoption of collaborative technologies in teaching Library and Information Science in tertiary institutions of learning in Rivers and Imo States of Nigeria?

TABLE I MEAN RATINGS OF RESPONDENTS REGARDING THE EXTENT OF LECTURERS' ADOPTION OF COLLABORATIVE TECHNOLOGIES IN TEACHING LIBRARY AND INFORMATION SCIENCE IN TERTIARY INSTITUTIONS OF LEARNING IN RIVERS AND IMO STATES OF NIGERIA

Sl. No.	Items	VGE	GE	LE	VLE	X	SD	Remark
1	Twitter	0	1	11	25	1.35	0.14	VLE
2	Facebook	0	0	14	23	1.38	0.14	VLE
3	Email	5	17	13	2	2.68	0.27	GE
4	Blogs	1	0	15	21	1.49	0.15	VLE
5	Wikis	2	0	9	26	1.41	0.14	VLE
6	Cloud computing	2	0	8	27	1.38	0.14	VLE
7	Zoom	1	4	19	13	1.81	0.81	LE
8	Google/online classroom	0	2	7	28	1.30	0.13	VLE
9	WhatsApp	12	17	5	3	3.03	0.30	GE
10	Learning management system	3	6	18	10	2.05	0.21	LE
Grand Mean and Standard Deviation						1.79	0.18	VLE

Key: X=Mean; SD=Standard Deviation

Table I shows that, in teaching Library and Information Science in tertiary institutions of learning in Rivers and Imo States of Nigeria, lecturers adopt Twitter, Facebook, blogs, wikis, cloud computing, and Google/online classroom to a "Very Low Extent"; Zoom and Learning Management Systems to a "Low Extent"; while Email and WhatsApp are adopted to a "Great Extent." The grand mean of 1.79 falls within the range of 1.50 to 2.49, which was previously set

as "Low Extent." Thus, lecturers adopt collaborative technologies for teaching purposes to a "Low Extent."

Research Question 2: What are the areas of lecturers' adoption of collaborative technologies in teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria?

TABLE II AREAS OF LECTURERS' ADOPTION OF COLLABORATIVE TECHNOLOGIES IN TEACHING LIBRARY AND INFORMATION SCIENCE IN TERTIARY INSTITUTIONS IN RIVERS AND IMO STATES OF NIGERIA

Sl. No.	Items	Adopted	Not Adopted	X	SD	Remarks
1	Course development	10	27	1.27	0.13	NA
2	Holding of tutorial sessions with students	22	15	1.60	0.16	A
3	Sharing of course content to students	29	8	1.78	0.18	A
4	Assessment of students	11	26	1.30	0.13	NA
5	Dissemination of assessment result to students	9	28	1.24	0.12	NA
Grand Mean and Standard Deviation				1.44	0.14	NA

Table II reveals that the Library and Information Science lecturers in the institutions use collaborative technologies primarily to hold tutorial sessions with students and to share course content.

Research Question 3: What challenges do lecturers face in adopting collaborative technologies for teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria?

TABLE III CHALLENGES FACED BY LECTURERS IN ADOPTING COLLABORATIVE TECHNOLOGIES FOR TEACHING LIBRARY AND INFORMATION SCIENCE IN TERTIARY INSTITUTIONS IN RIVERS AND IMO STATES OF NIGERIA

Sl. No.	Items	SA	A	D	SD	$\overline{X}$	SD	Remark
1	Inadequate ICT facilities	27	5	3	2	3.54	0.35	SA
2	Technophobia	4	7	17	9	1.92	0.19	D
3	Lack of policy framework	3	5	18	11	2.00	0.20	D
4	Lack of awareness of collaborative technologies	10	17	7	2	2.97	0.30	A
5	Unstable internet connectivity	9	19	6	3	2.92	0.29	A
6	Insufficient fund	18	11	5	3	3.19	0.32	SA
7	Irregular power supply	10	23	3	1	3.14	0.31	A
8	Poor digital literacy	9	18	7	3	2.89	0.29	A
9	Negative attitude of students towards use of collaborative technologies	8	3	24	2	2.46	0.25	D
	Grand Mean and Standard Deviation					2.78	0.29	A

Table III indicates that the Library and Information Science lecturers in the institutions encounter barriers such as inadequate ICT facilities, lack of awareness of collaborative technologies, unstable internet connectivity, insufficient funds, and poor digital literacy in teaching Library and Information Science.

VIII. DISCUSSION OF FINDINGS

The study demonstrates that the extent to which lecturers adopt collaborative technologies in teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria is low. This result is consistent with Morrison et al. (2017), who reported low use of social media by 69 Business Education lecturers in Nigerian tertiary institutions. Furthermore, it aligns with research by Isaac *et al.,* (2023), which indicates that all 121 Electrical Engineering teachers in eight North-Eastern Nigerian colleges barely embrace virtual research centers for educational purposes. Conversely, this outcome contradicts Roebuck *et al.,* (2013), who found that 63% of 201 U.S. higher education teachers have utilized social media for instructional methods. It also contrasts with findings that 268 Italian higher education educators significantly adopted videoconferencing systems and social networking tools for teaching activities during the COVID-19 pandemic (Pozzi e*t al.,* 2023). Additionally, it is at odds with the finding that 70% of Universiti Utara Malaysia instructors have initiated the use of social media for similar purposes (Hashim & Zamani, 2015). Furthermore, it differs from the finding that lecturers at Prince Fahd University of Petroleum and Minerals and Dammam Community College in Eastern Saudi Arabia use learning management systems for teaching purposes (Khan & Adams, 2016). It also varies from Anetu *et al.'s* (2020) finding that 26 Business Education teachers in public universities in Enugu State, Nigeria, use video conferencing, learning management systems, email, and interactive whiteboards to a significant degree.

The low utilization of these technologies by the lecturers in the current study may be attributed to their lack of awareness of various types of technologies and their apparent preference for using them for professional information sharing and collaboration rather than for instructional purposes. Moreover, the low usage may be due to the lecturers' poor digital literacy skills, which tend to be a significant barrier to the adoption of these technologies.

The research also reveals that lecturers apply collaborative technologies to hold classes with students and to deliver course content. This finding aligns with Tiryakioglu and Erzurum (2011), who found that 67 lecturers in the Faculty of Communication Sciences at Anadolu University in Turkey primarily use Facebook to connect with students, share information, and distribute reference materials, group assignments, and course sessions. It also corroborates Roebuck *et al.'s* (2013) finding that 201 U.S. higher education educators primarily use social media to communicate, deliver content, and collaborate in their teaching. Additionally, Durak (2017) found that over 50 ICT-based and education-focused lecturers in four Turkish universities primarily use social networking sites to communicate with students and, secondarily, to share course content and make announcements, thus fostering an interactive learning environment. Similarly, Sarfo and Yidana (2016) reported that two ICT teachers and five non-ICT lecturers at the University of Education, Winneba, Ghana, use Moodle to prepare and deliver lessons and to engage with students during face-to-face classes. Providing course material to students and teaching them are fundamental aspects of the instructional process, which may explain these current findings.

The investigation further shows that lecturers encounter challenges in utilizing collaborative technologies for teaching due to a lack of information and communication technology (ICT) resources, a lack of awareness regarding collaborative technologies, unstable internet connectivity, and poor digital literacy. This outcome is consistent with Hashim and Zamani (2015), who observed that lack of expertise in using social media for teaching is one of the challenges faced by lecturers at Universiti Utara Malaysia. Additionally, it agrees with Sarfo and Yidana's (2016) finding that lecturers at the University of Education,

Winneba, Ghana, have been unable to design and develop Moodle-based courses primarily due to their low technical skills, cumbersome institutional culture, and lack of adequate ICT resources. Furthermore, Pima and Mtui (2017) identified five key factors that hinder 120 Tanzanian tertiary education lecturers from adopting collaborative web technologies, including inconsistent ICT tools, a lack of awareness about the technologies, and weak internet connectivity. This is also consistent with findings from Mamman (2019), which indicated that lack of technical skills is a reason why 38 Business Education lecturers in South-Western Nigerian universities do not use web tools for educational purposes. It further resonates with Gold and Vitalis's (2023) finding that 22 public university Business Education lecturers in Enugu State, Nigeria, have been unable to effectively utilize blended teaching approaches due to poor power supply and insufficient awareness of ICT-based teaching materials.

The current results may be attributed to the government's neglect of funding and training for Nigerian public higher educational institutions, as well as the apparent widespread lack of ICT skills among the lecturers in these institutions.

IX. RECOMMENDATIONS

Based on the findings of the study, the researchers recommend the following:

1. Lecturers should be informed that collaborative technologies can be used for teaching and learning, not just for social interactions. They can take advantage of Tetfund manpower training opportunities to equip themselves with the skills needed to maximize these technologies for educational purposes.
2. University management should collaborate with academic librarians and Information and Communication Technology (ICT) staff to provide web-based instructional and library user education programs aimed at raising lecturers' awareness and adoption of these technologies for pedagogy.
3. The government should ensure adequate provision of ICT resources and stable internet connectivity in institutions. Increasing the budgetary allocation to these institutions could be an effective means of addressing this deficiency.

X. CONCLUSION

The study examined lecturers' adoption of collaborative technologies in teaching Library and Information Science in tertiary institutions in Rivers and Imo States of Nigeria. The findings indicate that the lecturers make limited use of collaborative technologies for teaching Library and Information Science in these institutions. Despite this, the lecturers utilize these technologies to hold classes with students and share course materials. However, a lack of ICT facilities and funding, ignorance of collaborative technologies, unstable internet connectivity, and weak

digital literacy prevent the lecturers from optimizing these technologies.

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