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Awareness and Adequacy of Emerging Technologies for Scholarly Communication Among Library and Information Science Professionals in Federal Universities in North-East, Nigeria

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Abstract

This study investigated the awareness and adequacy of emerging technologies for scholarly communication among Library and Information Science professionals in Federal Universities in North-East Nigeria. The objectives of the study are to determine the awareness and adequacy of emerging technologies for scholarly communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria. The research adopted the quantitative approach using a survey designed to elicit responses from 263 respondents in Three (3) selected federal universities of North-East Nigeria where copies of a structured questionnaire were distributed using a census sampling technique. Data collected were analysed using frequency counts, percentages, mean and standard deviation. The null hypotheses were tested using chi-square and multiple regression analysis using SPSS. The study, therefore, recommends that Federal University management review and enhance support structures for scholarly communication. This includes investing in technical upgrades tailored to improve the adequacy of emerging technologies, which currently fall below acceptable standards among Library and Information Science professionals in North-East Nigeria.

Keywords: Awareness, Adequacy, Emerging Technologies, Library and Information Science

Introduction

Emerging technologies have significantly transformed scholarly communication by enhancing research quality, promoting digital competencies, encouraging inclusivity, and shaping the future of library services. These technologies provide innovative platforms that support research activities, streamline workflows, and increase the visibility of scholarly outputs. In particular, tools such as artificial intelligence, open-access repositories, and digital collaboration platforms enable greater accessibility, global engagement, and real-time knowledge exchange. The integration of emerging technologies in scholarly communication is vital for Library and Information Science (LIS) professionals, who must remain current with global trends and respond effectively to evolving information needs. These technologies not only facilitate access to research outputs but also enhance collaboration, content dissemination, and user experience. According to Adeyeye and Oladokun (2023), emerging technologies play a critical role in optimizing research processes and ensuring the appropriate exposure of scholarly results. Similarly, Lund, Teel, and Wang (2023) emphasized that tools such as AI-driven systems and adaptive learning platforms help eliminate barriers in academia, fostering diversity, equity, and inclusion.

Awareness plays a critical role in the effective adoption of emerging technologies. It increases receptiveness by helping professionals understand the features, benefits, and implications of the technologies. Van Wyk (2020) observed that heightened awareness reduces uncertainty and enhances technology adoption. Moreover, Lukovics et al. (2019) highlighted that awareness empowers users to make informed decisions, ensuring that technologies align with their professional needs. Despite the generally low level of adoption of emerging technologies in Nigerian academic libraries, there is evidence of growing readiness and positive perception among LIS professionals. Read and Cox (2020), in a study involving UK-based librarians, found that scholarly communication increasingly requires digital competencies, including the use of metadata, repositories, and collaborative tools. This trend is similarly relevant in the Nigerian context, where awareness may influence perceived adequacy and potential adoption of such technologies for research, teaching, and information management.

The adequacy of emerging technologies is another critical factor influencing their adoption and effective use in scholarly communication. When technologies are deemed sufficient, reliable, and tailored to the professional needs of LIS practitioners, their integration into daily practice becomes more seamless. Tools such as ResearchGate, Google Scholar, Zoom, Microsoft Teams, and institutional repositories have broadened access and improved research dissemination globally (Piwowar et al., 2018; Pink et al., 2016). Furthermore, the rise of AI tools like ChatGPT offers new possibilities for content generation, literature review writing, and overall research productivity (Hutson, 2022; Pividori & Greene, 2024; Queirós et al., 2023). This study investigated the awareness and adequacy of emerging technologies for scholarly communication among Library and Information Science professionals in Federal Universities in North-East Nigeria.

Research Questions

The following questions guided the study:

1. What is the level of awareness of emerging technologies for scholarly communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria?
2. What is the level of adequacy of emerging technologies for scholarly communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria?

Hypothesis

H_{01}: The Awareness of Emerging Technologies will not significantly influence the Utilisation of Emerging Technologies for Scholarly Communication among Library Information Science Professionals of Federal Universities in North East Nigeria.

H_{02}: The Adequacy of Emerging Technologies will not significantly influence the Utilisation of ET for Scholarly Communication among Library Information Science Professionals of Federal Universities in North East Nigeria.

Methodology

This study employed a quantitative research approach using a descriptive survey design to examine the awareness and adequacy of emerging technologies for scholarly communication. The study population comprised 263 Library and Information Science (LIS) professionals, including academic librarians and lecturers, drawn from three federal universities in North-East Nigeria: Abubakar Tafawa Balewa University (Bauchi), University of Maiduguri (Borno), and Modibbo Adama University (Yola). The census sampling technique was employed to include the participation of the target population because they were manageable for the study. Data were collected using a structured questionnaire developed in line with the study objectives. The questionnaire captured variables relating to awareness, adequacy, and utilisation of emerging technologies in scholarly communication. Data were analysed using both descriptive and inferential statistics. Descriptive statistics (frequency counts, percentages, means, and standard deviations) were used to summarize the responses, while inferential statistics, including chi-square tests and multiple regression analysis, were employed to test the null hypotheses at a 0.05 level of significance. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS).

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Results

Research Question 1: What is the level of awareness of emerging technologies for scholarly communication among Library and Information Science professionals of Federal Universities in North-East Nigeria?

To determine the level of awareness of emerging technologies for scholarly communication, responses from 263 Library and Information Science (LIS) professionals across three Federal Universities in North-East Nigeria were analysed. The findings are presented in Table 1.

Emerging Technologies	VHA	HA	MA	SA	NA	M	SD	Decision
Learning Management Systems (LMS)	13 (5%)	184 (70%)	39 (15%)	13 (5%)	13 (5%)	3.75	0.76	High
Open Educational Resources (OER)	13 (5%)	171 (65%)	53 (20%)	13 (5%)	13 (5%)	3.65	0.78	High
Virtual Reality	13 (5%)	53 (20%)	11 (4%)	86 (33%)	100 (38%)	2.15	1.14	Low
Digital Archives and Repositories	210 (80%)	39 (15%)	13 (5%)	0 (0%)	0 (0%)	4.55	0.50	High
Social Media	200 (76%)	70 (27%)	0 (0%)	0 (0%)	0 (0%)	4.74	0.44	High
Citation Management Software	13 (5%)	132 (50%)	92 (35%)	13 (5%)	13 (5%)	3.45	0.84	Moderate
Research Data Management Tools	13 (5%)	105 (40%)	79 (30%)	39 (15%)	26 (10%)	3.25	0.93	Moderate
Podcasting and other Audio Technologies	13 (5%)	79 (30%)	92 (35%)	53 (20%)	26 (10%)	2.95	1.04	Low
Generative Artificial Intelligence (GAIs)	13 (5%)	92 (35%)	92 (35%)	39 (15%)	26 (10%)	3.05	0.98	Moderate

3D Printing and Scanning	13 (5%)	92 (35%)	66 (25%)	53 (20%)	39 (15%)	2.90	1.06	Low
Cloud Computing and Storage	26 (10%)	145 (55%)	53 (20%)	26 (10%)	13 (5%)	3.35	0.87	Moderate
Internet of Things (IoT)	13 (5%)	171 (65%)	53 (20%)	13 (5%)	13 (5%)	3.65	0.78	High
Blockchain Technology	13 (5%)	39 (15%)	26 (10%)	92 (35%)	92 (35%)	2.15	1.14	Low

Table 1:
Level of awareness of emerging technologies for scholarly communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria. **N=263**
Source: *Field Survey, 2024*
Key: VHA: Very Highly Aware, HA: Very Aware, MA: Moderately Aware, SA: Slightly Aware, NA: Not at All-Aware, M: Mean, SD: Standard Deviation

Decision Rule: ($M < 3.0$ = Low; $M \geq 3.0$ = Moderate; $M \geq 3.5$ = High)

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Table 1 shows the level of awareness of emerging technologies for scholarly communication among Library and Information Science Professionals in Federal Universities in North-East Nigeria. The table indicates that Learning Management Systems (LMS) exhibits a high level of awareness, with 13 (5%) respondents being very highly aware, 184 (70%) highly aware, 39 (15%) moderately aware, 13 (5%) slightly aware, and 13 (5%) not aware at all, with a mean and standard deviation of (M = 3.75, SD = 0.76); Open Educational Resources (OER) also has a high level of awareness, with 13 respondents (5%) very highly aware, 171 (65%) highly aware, 53 (20%) moderately aware, 13 (5%) slightly aware, and 13 (5%) not aware at all, with a mean and standard deviation of (M = 3.65, SD = 0.78); Digital Archives and Repositories shows a high level of awareness, with 210 (80%) respondents very highly aware, 39 (15%) highly aware, 13 (5%) moderately aware, and none (0%) slightly or not aware at all, with a mean and standard deviation of (M = 4.55, SD = 0.50); Social Media exhibits a high level of awareness, with 200 (76%) respondents very highly aware, 70 (27%) highly aware, and none (0%) moderately, slightly, or not aware at all, with a mean and standard deviation of (M = 4.74, SD = 0.44); the Internet of Things (IoT) demonstrates a high level of awareness, with 13 (5%) respondents very highly aware, 171 (65%) highly aware, 53 (20%) moderately aware, 13 (5%) slightly aware, and 13 (5%) not aware at all, with a mean and standard deviation of (M = 3.65, SD = 0.78); Citation Management Software shows a moderate level of awareness, with 13 (5%) respondents very highly aware, 132 (50%) highly aware, 92 (35%) moderately aware, 13 (5%) slightly aware, and 13 (5%) not aware at all, with a mean and standard deviation of (M = 3.45, SD = 0.84); Cloud Computing and Storage exhibits a moderate level of awareness, with 26 (10%) respondents very highly aware, 145 (55%) highly aware, 53 (20%) moderately aware, 26 (10%) slightly aware, and 13 (5%) not aware at all, with a mean and standard deviation of (M = 3.35, SD = 0.87); Research Data Management Tools shows a moderate level of awareness, with 13 (5%) respondents very highly aware, 105 (40%) highly aware, 79 (30%) moderately aware, 39 (15%) slightly aware, and 26 (10%) not aware at all, with a mean and standard deviation of (M = 3.25, SD = 0.93); Generative Artificial Intelligence (GAIs) exhibits a moderate level of awareness, with 13 (5%) respondents very highly aware, 92 (35%) highly aware, 92 (35%) moderately aware, 39 (15%) slightly aware, and 26 (10%) not aware at all, with a mean and standard deviation of (M = 3.05, SD = 0.98); Podcasting and other Audio Technologies shows a low level of awareness, with 13 (5%) respondents very highly aware, 79 (30%) highly aware, 92 (35%) moderately aware, 53 (20%) slightly aware, and 26 (10%) not aware at all, with a mean and standard deviation of (M = 2.95, SD = 1.04); 3D Printing and Scanning exhibits a low level of awareness, with 13 (5%) respondents very highly aware, 92 (35%) highly aware, 66 (25%) moderately aware, 53 (20%) slightly aware, and 39 (15%) not aware at all, with a mean and standard deviation of (M = 2.90, SD = 1.06); Blockchain Technology shows a low level of awareness, with 13 (5%) respondents very highly aware, 39 (15%) highly aware, 26 (10%) moderately aware, 92 (35%) slightly aware, and 92 (35%) not aware at all, with a mean and standard deviation of (M = 2.15, SD = 1.14); Virtual Reality exhibits a low level of awareness, with 13 (5%) respondents very highly aware, 53 (20%) highly aware, 11 (4%) moderately aware,

86 (33%) slightly aware, and 100 (38%) not aware at all, with a mean and standard deviation of (M = 2.15, SD = 1.14).

This indicates that emerging technologies such as social media, Digital Archives and Repositories, and Learning Management Systems (LMS) have high levels of awareness among the respondents, as indicated by their mean scores exceeding $M \geq 3.0$ while Virtual Reality and Blockchain Technology have lower levels of awareness, with mean scores below the $M < 3.0$ benchmark. The low awareness of these technologies could be attributed to their relatively recent emergence, limited practical applications in the current scholarly communication landscape, or a lack of training and resources to familiarise professionals with these tools.

Research Question 2: What is the level of Adequacy of Emerging Technologies for Scholarly Communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria?

The researcher sought to determine the level of adequacy of Emerging Technologies for Scholarly Communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria. Responses from the respondents were collected, analysed and presented in Table 2.

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Table 2:

Level of adequacy of emerging technologies for scholarly communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria. **N=263**

Emerging Technologies	VHA	HA	MA	LA	NA	M	SD	Decision
Learning Management Systems (LMS)	2 (1%)	39 (15%)	183 (70%)	26 (10%)	13 (5%)	2.966	0.695	Low
Open Educational Resources (OER)	97 (37%)	39 (15%)	101 (38%)	16 (6%)	10 (4%)	3.75	1.13	High
Virtual Reality	0 (0%)	26 (10%)	26 (10%)	132 (50%)	79 (30%)	1.996	1.303	Low
Digital Archives and Repositories	184 (70%)	39 (15%)	13 (5%)	27 (10%)	0 (0%)	4.45	0.978	High
Social Media	184 (70%)	39 (15%)	26 (10%)	10 (4%)	4 (1%)	4.487	0.922	High
Citation Management Software	39 (15%)	85 (32%)	100 (38%)	26 (10%)	13 (5%)	3.422	0.981	Moderate
Research Data Management Tools	17 (7%)	39 (15%)	115 (44%)	79 (30%)	13 (4%)	2.878	0.941	Low
Podcasting and other Audio Technologies	13 (5%)	39 (15%)	133 (51%)	28 (11%)	50 (19%)	2.76	1.082	Low
Generative Artificial Intelligence (GAIs)	153 (42%)	97 (27%)	54 (15%)	40 (11%)	18 (5%)	3.989	1.191	High
3D Printing and Scanning	0 (0%)	39 (15%)	79 (30%)	132 (50%)	13 (4%)	2.548	0.797	Low
Cloud Computing and Storage	0 (0%)	39 (15%)	184 (70%)	26 (10%)	13 (4%)	2.947	0.688	Low
Internet of Things (IoT)	0 (0%)	13 (5%)	39 (15%)	26 (10%)	253 (70%)	1.432	0.835	Low
Blockchain Technology	7 (2%)	29 (8%)	18 (6%)	131 (50%)	92 (35%)	2.018	1.182	Low

Source: *Field Survey, 2024*

Key: VHA: Very High Adequate, HA: Highly Adequate, MA: Moderately Adequate, LA: Low Adequacy, NA: Not Adequate level, M: Mean, SD: Standard Deviation

Decision Rule: (M < 3.0 = Low; M ≥ 3.0 = Moderate; M ≥ 3.5 = High)

Table 2 presents the level of adequacy of emerging technologies for scholarly communication among Library and Information Science Professionals in Federal Universities in North-East Nigeria. Learning Management Systems (LMS) adequacy is low, with 2 (0.8%) respondents reporting very high adequacy, 39 (15%) high adequacy, 183 (70%) moderate adequacy, 26 (10%) low adequacy, and 13 (5%) not adequate at all, resulting in a mean of M = 2.97 and a standard deviation of SD = 0.70; Open Educational Resources (OER) adequacy is high, with 97 (37%) respondents reporting very high adequacy, 39 (15%) high adequacy, 101 (38%) moderate adequacy, 16 (6%) low adequacy, and 10 (4%) not adequate at all, resulting in a mean of M = 3.75 and a standard deviation of SD = 1.13; Virtual Reality adequacy is low, with no 0 (0%) respondents reporting very high adequacy, 26 (10%) high adequacy, 26 (10%) moderate adequacy, 132 (50%) low adequacy, and 79 (30%) not adequate at all, resulting in a mean of M = 2.00 and a standard deviation of SD = 1.30; Digital Archives and Repositories adequacy is high, with 184 (70%) respondents reporting very high adequacy, 39 (15%) high adequacy, 13 (5%) moderate adequacy, 27 (10%) low adequacy, and none (0%) not adequate at all, resulting in a mean of M = 4.45 and a standard deviation of SD = 0.98; Social Media adequacy is high, with 184 (70%) respondents reporting very high adequacy, 39 (15%) high adequacy, 26 (10%) moderate adequacy, 10 (4%) low adequacy, and 4 (1%) not adequate at all, resulting in a mean of M = 4.49 and a standard deviation of SD = 0.92; Citation Management Software adequacy is moderate, with 39 (15%) respondents reporting very high adequacy, 85 (32%) high adequacy, 100 (38%) moderate adequacy, 26 (10%) low adequacy, and 13 (5%) not adequate at all, resulting in a mean of M = 3.42 and a standard deviation of SD = 0.98; Research Data Management Tools adequacy is low, with 17 (7%) respondents reporting very high adequacy, 39 (15%) high adequacy, 115 (44%) moderate adequacy, 79 (30%) low adequacy, and 13 (4%) not adequate at all, resulting in a mean of M = 2.88 and a standard deviation of SD = 0.94; Podcasting and other Audio Technologies adequacy is low, with 13 (5%) respondents reporting very high adequacy, 39 (15%) high adequacy, 133 (51%) moderate adequacy, 28 (11%) low adequacy, and 50 (19%) not adequate at all, resulting in a mean of M = 2.76 and a standard deviation of SD = 1.08; Generative Artificial Intelligence (GAIs) adequacy is high, with 153 (42%) respondents reporting very high adequacy, 97 (27%) high adequacy, 54 (15%) moderate adequacy, 40 (11%) low adequacy, and 18 (5%) not adequate at all, resulting in a mean of M = 3.99 and a standard deviation of SD = 1.19; 3D Printing and Scanning adequacy is low, with no 0 (0%) respondents reporting very high adequacy, 39 (15%) high adequacy, 79 (30%) moderate adequacy, 132 (50%) low adequacy, and 13 (4%) not adequate at all, resulting in a mean of M = 2.55 and a standard deviation of SD = 0.80; Cloud Computing and Storage adequacy is low, with no 0 (0%) respondents reporting very high adequacy, 39 (15%) high adequacy, 184 (70%) moderate adequacy, 26 (10%) low adequacy, and 13 (4%) not adequate

at all, resulting in a mean of M = 2.95 and a standard deviation of SD = 0.69; Internet of Things (IoT) adequacy is low, with no 0 (0%) respondents reporting very high adequacy, 13 (5%) high adequacy, 39 (15%) moderate adequacy, 26 (10%) low adequacy, and 185 (70%) not adequate at all, resulting in a mean of M = 1.43 and a standard deviation of SD = 0.84; Blockchain Technology access is low, with 7 (2%) respondents reporting very high adequacy, 29 (8%) high adequacy, 18 (6%) moderate adequacy, 131 (50%) low adequacy, and 92 (35%) not adequate at all, resulting in a mean of M = 2.02 and a standard deviation of SD = 1.18.

This indicates that technologies such as Open Educational Resources (OER), Digital Archives and Repositories, social media, and Generative Artificial Intelligence (GAIs) are perceived as highly adequate for scholarly communication among Library and Information Science professionals in Federal Universities in North-East Nigeria. Conversely, technologies like Virtual Reality, 3D Printing and Scanning, Internet of Things (IoT), and Blockchain Technology are considered less adequate, suggesting areas where infrastructure or training may be lacking.

H_{01}: The Awareness of Emerging Technologies will not significantly influence the Utilisation of Scholarly Communication for scholarly communication among Library Information Science Professionals of Federal Universities in North East Nigeria.

Table 3:

Chi-square results of the Availability of Emerging Technologies influence the Utilization of emerging technologies for Scholarly Communication among Library Information Science Professionals

		O	E	df	χ^2 cal	χ^2 critical	P-value	Decision
Awareness of Emerging Technologies on the utilization		263	52.6	4	18.72	7.815	0.001	$H0_2$ Rejected

Source: Field Survey, 2024

Key: O = Observed value, E = expected value, df = degree of freedom

Table 3 contains the summary of Chi-square analysis on Chi-square results of the availability of emerging technologies influence the utilization of emerging technologies for scholarly communication among Library Information Science Professionals of Federal Universities in North East Nigeria. The results showed χ^2 calculated value 18.72 is greater than χ^2 critical 7.815 and p value 0.001 is less than 0.05 level of significance. The null hypothesis was rejected at $P<0.05$. Therefore, Awareness of Emerging Technologies will significantly influence the Utilisation of Scholarly Communication for scholarly communication among Library Information Science Professionals of Federal Universities in North East Nigeria.

H_{02}: The Adequacy of Emerging Technologies will not significantly influence the Utilisation of Emerging Technologies for Scholarly Communication among Library Information Science Professionals of Federal Universities in North East Nigeria.

Table 4:

Chi-square results of the Adequacy of Emerging Technologies' influence on the Utilisation of Emerging Technologies for Scholarly Communication among Library Information Science Professionals

		O	E	df	χ^2 cal	χ^2 critical	P-value	Decision
Adequacy of Emerging Technologies on Utilization		263	52.6	4	9.45	7.815	0.023	$H0_4$ Rejected

Source: Field Survey, 2024

Key: O = Observed value, E = expected value, df = degree of freedom

Table 4 contains the summary of Chi-square analysis on Adequacy of Emerging Technologies' influence on the Utilisation of Emerging Technologies for Scholarly Communication among Library Information Science Professionals of Federal Universities in North East Nigeria. The results showed χ^2 calculated value 18.72 is greater than χ^2 critical 7.815 and p value 0.023 is less than 0.05 level of significance. The null hypothesis was rejected at $P<0.05$. Therefore, Adequacy of Emerging Technologies will significantly influence the Utilisation of Scholarly Communication among Library Information Science Professionals of Federal Universities in North East Nigeria.

Discussion

The results and findings in research question and hypothesis one on the level of awareness of emerging technologies for scholarly communication among researchers is critical as it influences the integration and utilisation of these technologies in academic settings and directly impacts the ability of LIS professionals to stay current with technological advancements and incorporate them into their scholarly practices. The findings show that social media and digital archives and repositories have the highest levels of awareness, well above the threshold of "High Availability" (mean ≥ 3.5). This indicates that these technologies are well integrated into the daily operations and scholarly activities of the professionals. The lowest levels of awareness are observed for virtual reality and blockchain technology, 3D printing and scanning, and podcasting and other audio technologies. This suggests a significant gap in knowledge for the remaining technologies, which could be attributed to their recent emergence, limited practical applications, or a lack of training and resources. These findings align with previous research that highlights the widespread adoption of social media and digital archives (Sambe & Raphael, 2015) and the slower uptake of more complex technologies like VR and Blockchain (World Economic Forum, June 21, 2024).

In research question and hypothesis two, the adequacy of emerging technologies for scholarly communication is a critical factor influencing research productivity and knowledge dissemination within academic institutions. Adequacy does not solely imply the availability of technologies but also their sufficiency in addressing the evolving communication needs of scholars (Lawal & Olawale, 2020). The findings from this study revealed significant disparities in the perceived adequacy of these emerging technologies, indicating a digital divide in the technological infrastructure of Federal Universities in North-East Nigeria. Emerging Technologies such as Digital Archives and Repositories (mean = 4.45), social media (mean = 4.49), and Open Educational Resources (OER) (mean = 3.75) emerged as highly adequate for scholarly communication. These technologies facilitate seamless information sharing, research dissemination, and collaboration among scholars. The high adequacy of Digital Archives and Repositories aligns with prior research indicating that these platforms enhance research visibility and accessibility (Saliu, Ngozi & Lawal, 2023). Similarly, the high adequacy of social media platforms for academic purposes corresponds with the findings of Chakava, Mberia, and Gatero (2019), who noted the increasing use of social networking sites like ResearchGate and LinkedIn for academic collaboration. The strong adequacy of OER suggests that many scholars in the region rely on freely available educational materials to supplement their research and teaching, in line with Piwowar et al. (2018). Emerging Technologies such as Learning Management Systems (LMS) (mean = 2.97), Citation Management Software (mean = 3.42), and Research Data Management Tools (mean = 2.88) show moderate adequacy. While these emerging technologies are present, their effectiveness is limited, possibly due to inadequate institutional support, technical expertise, or infrastructure.

The moderate adequacy of LMS indicates that while universities have adopted these platforms, challenges such as limited customization, lack of training, and internet connectivity issues hinder their full utilization (Turk, 2017). Citation Management Software, though beneficial for research organizations, appears to have limited adoption due to inadequate awareness and training, a concern similarly noted by Tenopir et al. (2020). Conversely, technologies such as Virtual Reality (mean = 2.00), 3D Printing and Scanning (mean = 2.55), Internet of Things (IoT) (mean = 1.43), and Blockchain Technology (mean = 2.02) were found to be the least adequate. The low adequacy of Virtual Reality suggests a lack of necessary hardware and software infrastructure, which limits its use in academic settings. This finding supports Kim and Stanton (2016), who identified cost and accessibility as major barriers to adopting emerging technologies in developing institutions. The inadequacy of IoT and Blockchain Technology further underscores the digital divide, as these technologies require advanced infrastructure and technical know-how, which many universities in North-East Nigeria may lack (Abubakar, 2012).

Conclusion

This study concludes that awareness and adequacy of emerging technologies significantly influence their utilisation for scholarly communication among Library and Information Science professionals in Federal Universities in North-East Nigeria. Enhancing these factors is therefore critical to improving technology adoption and research productivity among LIS professionals in the region and the nation at large.

Recommendations

To further enhance and encourage the adoption of emerging technologies in North East Nigeria, the following were recommended:

1. Federal Universities in North-East Nigeria should secure more financial support and establish partnerships. They should collaborate with technology providers and research institutions to improve access to underrepresented technologies. This includes ensuring the availability of necessary equipment and promoting resource-sharing arrangements that support scholarly communication among LIS professionals in the region.
2. Federal Universities in North-East Nigeria should promote integration and practical application of emerging technologies. This can be achieved through targeted training for LIS professionals, the introduction of incentive structures for scholarly work, and regular awareness programs. These initiatives will boost the overall utilisation of emerging technologies, particularly those currently underused.
3. Federal Universities in North-East Nigeria should engage relevant stakeholders to address existing barriers. Stakeholders such as the NUC, LRCN, NLA, NGOs, and private sector organizations should be supported to provide financial investment, grants, and infrastructure development. These efforts should prioritize capacity-building initiatives that empower LIS professionals in their scholarly communication practices.

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