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Level of Digital Literacy among Library and Information Science Doctoral Students in South-West Nigeria

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Abstract

The rapid growth of digital technologies in research and academic communication has heightened the demand for advanced digital literacy among doctoral students in Nigeria. Yet, despite its central role in knowledge production, persistent gaps remain in students' digital readiness, particularly in access, application, and critical evaluation of resources. These challenges are compounded by infrastructural limitations, unequal access to tools, and inadequate integration of digital literacy training in postgraduate curricula. This study investigated the level of digital literacy among Library and Information Science (LIS) doctoral students in Information Resources Management programmes across six National Universities Commission-accredited institutions in South-West Nigeria during the 2024/2025 academic session. A survey design was employed to obtain standardized data from a total population of 375 doctoral students, using a total enumeration approach. Data were collected through a structured, self-administered questionnaire developed by the researcher and validated by academic experts. The instrument, guided by Gilster's (1997) conceptual framework, assessed digital competencies across five domains: media literacy, information literacy, digital communication, cybersecurity awareness, and digital citizenship. Reliability testing yielded a high internal consistency coefficient (Cronbach's Alpha

= 0.954). Descriptive analysis revealed that LIS doctoral students possessed a high level of digital literacy, age and employment status significantly influenced digital literacy levels, whereas gender and marital status showed no significant effect. The study concludes by recommending the integration of structured digital literacy programmes within doctoral curricula, regular skill assessments, and equitable access to digital resources for critically aware, ethically grounded, and technologically proficient researchers in the field of LIS.

Keywords: Digital competencies, digital literacy, doctoral students, Gilster framework, information literacy, Library and Information Science, South-West Nigeria

Introduction

In an increasingly globalized and digitized world, individuals must rapidly acquire the requisite skills and knowledge to navigate the complexities of contemporary life. Among the most critical of these is digital literacy, now recognized as a fundamental competence for effective participation in the 21st century. As societies transition into knowledge-based economies, university students and most especially at doctoral level, are expected to develop digital competencies that are indispensable not only for academic achievement but also for active engagement in the digital culture that defines modern life (Martínez-Bravo et al., 2021). Digital literacy, often referred to as digital competence, has become central to functioning effectively in today's information-intensive environments (George-Reyes & Avello-Martínez, 2021).

In this current era, marked by rapid technological and pedagogical changes, it is vital to continuously evaluate the development of digital infrastructure, the emergence of new educational models, and the integration of advanced digital tools. More importantly, digital literacy encompasses not only technical proficiency but also the cognitive, ethical, and evaluative abilities needed to navigate complex digital ecosystems (George-Reyes & Avello-Martínez, 2021). Originally conceptualised by Gilster (1997), digital literacy refers to the capacity to use digital technologies effectively for lifelong learning and informed decision-making. Over time, the concept of digital literacy has expanded to encompass a broad array of abilities, including critical evaluation of online information, digital safety, and responsible digital citizenship.

Digital literacy is defined as the ability to use, understand, and create with digital media and technologies, covering skills from basic computer operations to sophisticated tasks like programming and data interpretation (Jibrin et al., 2024). It includes the capacity to critically evaluate online information for accuracy and bias, promoting responsible digital citizenship.

Furthermore, digital literacy encompasses cognitive, emotional, and social dimensions that empower individuals to operate ethically and analytically in digital spaces. As digital technology increasingly shapes the domains of education, communication, governance, and commerce, the need for robust digital literacy has grown exponentially (Awari & Krishnamurthy, 2017).

Digital literacy today extends far beyond basic operational skills. It encompasses a broad set of higher-order cognitive abilities such as critical thinking, problem-solving, and creative engagement within digital environments. Audrin and Audrin (2022) affirm that true digital literacy involves the application of critical and reflective thinking in navigating digital platforms, while Silamut and Petsangsri (2020) stress the importance of self-directed learning in nurturing these skills. In the academic environment, digital literacy plays a significant role in helping postgraduates manage the vast and often overwhelming landscape of digital information. By equipping them with strategies to filter, interpret, and apply digital content meaningfully, it reduces anxiety linked to digital demands and fosters more confident learning. Yustika and Iswati (2020) observe that students with higher digital literacy tend to demonstrate improved academic outcomes, as they are better positioned to interact effectively with digital learning materials. Moreover, digital literacy contributes to personal development by enhancing self-regulation and fostering resilience in the face of online risks. Purnama et al. (2021) found that while parental mediation plays a role in online safety, it is ultimately digital literacy and self-control that better predict young people's ability to avoid digital threats such as cyberbullying and misinformation.

The modern conception of digital literacy has evolved to include a variety of interconnected competencies. According to Martínez-Bravo et al. (2021), these include media literacy, information literacy, communication and collaboration skills, cybersecurity awareness, and responsible digital citizenship. Each of these dimensions serves a unique but complementary purpose. Information literacy, for instance, promotes lifelong learning by encouraging critical engagement with diverse sources, while media literacy enables users to both analyse and produce media content, empowering democratic participation and informed choices (Mrisho et al., 2023). Cybersecurity literacy is particularly essential in safeguarding personal and institutional data especially for academic researchers who routinely handle sensitive information. As Al-Sanad (2024) explains, digital literacy in this area reduces stress and vulnerability associated with potential cyber-attacks or data breaches. Similarly, internet literacy which is regarded a as a foundational element of digital literacy, entails the ability to access, evaluate, and create online

content, while being aware of and managing risks such as privacy violations and the spread of misinformation (Lee & Chae, 2012). Likewise, effective digital communication skills further enhance one's ability to participate in academic and social spaces by promoting clarity, collaboration, and mutual understanding. Malia and Patil (2023) as well as Wang and Chang (2019) both highlight how strong communication skills, fostered through digital literacy, contribute meaningfully to students' academic performance and social integration.

Yet, digital literacy levels are not uniform among students. Studies by Masai et al. (2024) and Jibrin et al. (2024) reveal considerable variation in digital competence among postgraduate students, suggesting the need for more proactive digital education strategies across different populations. These variations underscore the importance of context-specific interventions aimed at improving digital readiness. Ultimately, scholars like Visser (2013) argue that digital literacy must be understood as a socially situated practice. It is not only a set of technical and cognitive skills but also encompasses ethical, legal, and cultural dimensions.

By integrating these elements, digital literacy empowers individuals to engage responsibly and meaningfully in the digital world, supporting lifelong learning and active citizenship within the knowledge society. Despite the increasing prominence of digital literacy, several studies indicate a persistent gap between frequent digital tool usage and actual digital proficiency. Onursoy (2018) noted that daily engagement with technology does not necessarily equate to critical or effective digital utilisation. Empirical studies by Dönmez (2019), Kaya (2020), and Kul (2020) revealed significant disparities in digital competencies, with particular weaknesses in areas such as information validation, cybersecurity, and ethical online practices. Even among postgraduate students, Kozan and Bulut Özek (2019) identified high levels of digital awareness in some cohorts, while Yıldız (2020) observed deficits in analytical and evaluative skills essential for meaningful digital engagement.

Several studies have equally demonstrated high digital literacy levels among postgraduate students. For instance, Oseghale (2023) examined digital literacy skills and the use of electronic resources by humanities postgraduates at the University of Ibadan and reported high proficiency levels. Similarly, Jibrin, Mohammed, Umar, and Maifatu (2024) found that postgraduate students in Kaduna State possessed strong competencies in accessing and using digital resources and services in university libraries. Other international studies echo these findings. Parvathamma and Pattar (2013), Awari and Krishnamurthy (2017), and Saikia (2017) all documented high digital

literacy levels among postgraduates in different contexts. Krishnamurthy and Shettappanavar (2019) specifically examined female postgraduate students and found a commendable level of digital competence. Bell (2021), through a qualitative study, affirmed that doctoral students exhibited advanced digital literacy practices. In the Latin American context, López de Ramos, Casado, and González Sevillano (2023) evaluated digital literacy among university students in Panama and also reported high literacy levels.

Within higher education, this need is particularly acute. Students are no longer passive recipients of knowledge but active contributors to its production and dissemination via digital platforms. Doctoral students, in particular, are expected to harness digital tools for research collaboration, data analysis, academic writing, and scholarly publishing activities that demand advanced digital competence. In relation to this study, doctoral students in Library and Information Science (LIS) occupy a distinctive and critical position. As emerging scholars in a field intrinsically rooted in digital information management, their academic performance and professional trajectory depend on their ability to utilize digital research environments effectively. The LIS discipline inherently demands proficiency in digital information retrieval, bibliographic management, digital archiving, and the use of advanced research tools (Okechukwu et al., 2024).

While such studies underscore a generally high level of digital competence among postgraduate students globally and nationally, there remains a distinct gap in empirical research focused specifically on doctoral students in LIS within South-West Nigeria. This region houses some of the nation's premier academic institutions like University of Ibadan, Obafemi Awolowo University, Olabisi Onabanjo University, Lead City University, Tai Solarin University of Education, University of Lagos amongst others, yet there is a paucity of data assessing digital literacy among doctoral students in LIS, a field that is both technologically intensive and critical to information infrastructure. The post-pandemic era has further entrenched digital methodologies in research workflows, encompassing remote data collection, online collaboration, digital archiving, and the dissemination of findings via digital channels (Dowling & Wilson, 2020).

Given the strategic importance of doctoral-level research to national development, it is essential to assess the preparedness of LIS doctoral candidates in utilizing digital tools efficiently. These students play a crucial role in knowledge production, innovation, and capacity development. Understanding their digital competencies has far-reaching implications, not only for academic success but also for informing digital policy, training, and institutional development. National

policy frameworks such as the National Digital Economy Policy and Strategy (NDEPS 2020–2030) and the Nigerian Communications Commission's Digital Literacy Framework (2022) affirm the centrality of digital literacy to Nigeria's developmental aspirations. However, current research on digital competence among LIS doctoral students remains limited and fragmented.

University libraries and LIS professionals are, therefore, uniquely positioned to bridge the gap between digital access and digital efficacy. By implementing targeted training programmes in digital literacy, focusing on academic databases, data analysis software, digital publishing, and responsible information use these institutions can enhance both the quality and impact of doctoral research. In light of these observations, this study aims to assess the level of digital literacy among LIS doctoral students in South-West Nigeria. It seeks to evaluate their digital competencies, identify gaps and challenges, and propose evidence-based strategies to enhance digital engagement. The findings will contribute meaningfully to ongoing conversations around digital transformation in Nigerian higher education, while also offering strategic insights to inform training, institutional support, and policy development.

Objective of the study

i. To find out the level of digital literacy among LIS doctoral students in South-West Nigeria;
ii. To examine the influence of demographic information on digital literacy levels among LIS doctoral students in South-West Nigeria.

Research Questions

i. What is the level of digital literacy among LIS doctoral students in South-West Nigeria?

Research Hypothesis

This hypothesis was tested at 0.05α level of significance

i. There is no significance influence of demographic information on digital literacy level among LIS doctoral students in South-West Nigeria.

Methodology

This study employed a survey research design, which is suitable for obtaining standardized data from a defined population. The target population comprised all doctoral students enrolled in Library and Information Science (LIS) and Information Resources Management programmes across six accredited universities in South-West Nigeria during the 2024/2025 academic year. These universities, both public and private are officially approved by the National Universities Commission (NUC) to offer doctoral-level education in LIS. A total of 375 doctoral students formed the study population. Given the manageable size and ease of access to the respondents, the researcher adopted a total enumeration technique, which allowed for the inclusion of the entire population without the need for sampling. This approach was considered appropriate to enhance the generalizability of findings across the selected institutions.

Data collection was carried out using a structured, self-administered questionnaire designed by the researcher. The instrument was organized into two major sections. Section A captured demographic data such as gender, age, and institutional affiliation. Section B addressed digital literacy, utilizing indicators drawn from Gilster's (1997) conceptual framework. This section featured items that assessed competencies in media literacy, information literacy, digital communication, cybersecurity awareness, and digital citizenship. To establish validity, the instrument underwent expert review by academic supervisors and scholars specializing in Information Resources Management.

A pilot study was conducted involving 39 doctoral students from universities not included in the primary study population. The pilot test was conducted among Ph.D. students in Library and Information Science at Kwara State University and the University of Ilorin. The results of the pilot test produced high internal consistency coefficients, as shown in table 1 below. However, data collected were analysed using descriptive statistics.

Table 1: Reliability Results

Variable	Cronbach's Alpha	Number of Items
Digital Literacy	0.954	30

Data Analysis and Discussion

Table 2: Distribution of Respondents by Demographic Information

Variable	Category	Frequency	Percentage (%)
Gender	Male	139	44.1
	Female	176	55.9
	Total	**315**	**100**
Age Group	< 30 years	24	7.6
	30–39 years	52	16.5
	40–49 years	151	47.9
	50–59 years	73	23.2
	60 years or more	15	3.8
	Total	**315**	**100**
Marital Status	Single	39	12.4
	Married	267	84.8
	Divorced/Separated	3	1.0
	Widow/Widower	6	1.9
	Total	**315**	**100**
Employment Status	Full Time	285	90.5
	Part Time	12	3.8
	Self Employed	15	4.8
	Not Employed	3	1
	Total	**315**	**100**
Sources of Funding	Self-Funded	246	78.1
	TETFund	56	17.8
	Institution/Employer	12	3.8
	Others	1	0.3
	Total	**315**	**100**

Table 2 presents the demographic distribution of the doctoral students who participated in the study across various institutions in Southwest Nigeria. Findings above indicated that most doctoral students were female (55.9%) and aged between 40–49 years (47.9%). The majority were married (84.8%) and in full-time employment (90.5%). Most funded their studies personally (78.1%), with few receiving institutional or TETFund support.

Research Question one: What is the level of digital literacy skills among LIS doctoral students in South -West Nigeria?

Table 3. Descriptive Statistics showing the level of digital literacy skills among LIS doctoral students

S/N	Digital literacy	VHL	HL	LL	VLL	Mean	SD
	Internet Literacy						
	My ability to …						
1	effectively use search engines to find academic information online is…	137 (43.5%)	155 (49.2%)	23 (7.3%)	-	3.36	0.61
2	distinguish between reliable and unreliable online sources of information is...	124 (39.4%)	167 (53.0%)	24 (7.6%)	-	3.32	0.61
3	effectively search, access, and evaluate academic resources using online databases and electronic journals is…	127 (40.3%)	155 (49.2%)	30 (9.5%)	3 (1.0%)	3.29	0.67
4	locate open-access resources for my academic work using online search tools and repositories is …	110 (34.9%)	157 (49.8%)	42 (13.3%)	6 (1.9%)	3.18	0.73
5	use advanced search techniques (e.g., Boolean operators) to refine online information retrieval is …	101 (32.1%)	143 (45.4%)	62 (19.7%)	9 (2.9%)	3.07	0.79
	Average Mean =					**3.24**	
	Media Literacy						
	My ability to …						
6	evaluate the credibility of various media sources is …	94 (29.8%)	191 (60.6%)	24 (7.6%)	6 (1.9%)	3.18	0.65
7	navigate different media platforms to gather information relevant to my studies is ...	78 (24.8%)	207 (65.7%)	27 (8.6%)	3 (1.0%)	3.14	0.59
8	understand the ethical implications of using and sharing media content in my research is …	70 (22.2%)	206 (65.4%)	36 (11.4%)	3 (1.0%)	3.09	0.61
9	assess the influence of media on public opinion and academic discourse is ...	55 (17.5%)	202 (64.1%)	52 (16.5%)	6 (1.9%)	2.97	0.65
10	create multimedia presentations to communicate my research findings is ...	78 (24.8%)	164 (52.1%)	58 (18.4%)	15 (4.8%)	2.97	0.79
	Average Mean =					**3.07**	
	Information Literacy						
	My ability to …						
11	understand the principles of academic integrity and avoiding plagiarism in my writing is ...	101 (32.1%)	187 (59.4%)	21 (6.7%)	6 (1.9%)	3.22	0.65
12	evaluate the quality and relevance of information sources is ...	72 (22.9%)	231 (73.3%)	9 (2.9%)	3 (1.0%)	3.18	0.51
13	synthesize information from various sources to support my research arguments is …	78 (24.8%)	212 (67.3%)	25 (7.9%)	-	3.17	0.55
14	identify and articulate information needs for academic research is …	73 (23.2%)	206 (65.4%)	36 (11.4%)	-	3.12	0.58
15	use citation management tools to organize and reference my sources correctly is ...	54 (17.1%)	181 (57.5%)	65 (20.6%)	15 (4.8%)	2.87	0.74
	Average Mean =					**3.11**	

S/N	Digital literacy	VHL	HL	LL	VLL	Mean	SD
	Communication Skills						
	My ability to …						
16	write and edit academic papers using word processing software is …	127 (40.3%)	147 (46.7%)	35 (11.1%)	6 (1.9%)	3.25	0.73
17	use email and other communication tools to maintain professional relationships in my field is …	112 (35.6%)	170 (54.0%)	27 (8.6%)	6 (1.9%)	3.23	0.68
18	present research findings clearly and concisely using digital presentation tools is …	90 (28.6%)	187 (59.4%)	35 (11.1%)	3 (1.0%)	3.16	0.64
19	use academic networking platforms to share my research findings is …	75 (23.8%)	204 (64.8%)	30 (9.5%)	6 (1.9%)	3.10	0.63
20	use digital tools to collaborate with peers and supervisors on research work is …	80 (25.4%)	187 (59.4%)	36 (11.4%)	12 (3.8%)	3.06	0.72
	Average Mean =					**3.16**	
	Cyber Security						
	My ability to …						
21	recognize scammers and how to avoid them is …	92 (29.2%)	167 (53.0%)	53 (16.8%)	3 (1.0%)	3.19	0.63
22	maintaining strong, unique passwords for my online accounts is …	107 (34.0%)	158 (50.2%)	41 (13.0%)	9 (2.9%)	3.15	0.75
23	update software and use of antivirus programs to protect my devices is …	79 (25.1%)	150 (47.6%)	74 (23.5%)	12 (3.8%)	3.10	0.70
24	understand the ethical and legal issues related to digital privacy and data protection is …	94 (29.8%)	189 (60.0%)	29 (9.2%)	3 (1.0%)	3.01	0.64
25	avoid the potential risks associated with sharing personal information online is …	95 (30.2%)	184 (58.4%)	30 (9.5%)	6 (1.9%)	2.94	0.80
	Average Mean =					**3.08**	
	Digital Citizenship						
	My ability to …						
26	engage in lifelong learning to continuously improve digital literacy skills is …	112 (35.6%)	185 (58.7%)	15 (4.8%)	3 (1.0%)	3.29	0.60
27	ethically make use of digital resources and have respect for intellectual property rights is …	103 (32.7%)	188 (59.7%)	21 (6.7%)	3 (1.0%)	3.24	0.61
28	practice respectful and responsible behaviour in online academic communities is …	82 (26.0%)	212 (67.3%)	18 (5.7%)	3 (1.0%)	3.18	0.57
29	understand digital footprint and its potential impact on my professional reputation is …	62 (19.7%)	197 (62.5%)	53 (16.8%)	3 (1.0%)	3.17	0.67
30	understand the importance of digital inclusion and strive to make my digital content accessible to all is …	68 (21.6%)	217 (68.9%)	27 (8.6%)	3 (1.0%)	3.11	0.57
	Average Mean =					**3.20**	
	Overall Mean =					**3.14**	

Source: Researcher's field work, 2025. Decision rule: If mean is 1-1.74 = Very low level, 1.75-2.49= Low Level, 2.5-3.24= High Level, 3.25-4.00=Very high level Key: **Very High Level (VHL) = 4, High Level (HL) =3, Low Level (LL) = 2, and Very Low Level (VLL) =1**

Table 3 shows that doctoral LIS students in Southwest Nigeria possess a high level of digital literacy ($\bar{x}$ = 3.14). Among the six indices, Internet Literacy ranked highest ($\bar{x}$ = 3.24),

followed by Digital Citizenship ($\bar{x}$ = 3.20), Communication Skills ($\bar{x}$ = 3.16), Information Literacy ($\bar{x}$ = 3.11), Cybersecurity ($\bar{x}$ = 3.08), and Media Literacy ($\bar{x}$ = 3.07). While all components scored within the high range, students were strongest in online research skills and ethical digital use, with slightly lower competence in media literacy and digital safety.

Research Hypothesis I: Is there any significance influence of demographic information on Digital Literacy level among doctoral students in LIS, South-West Nigeria?

Table 4: Tests of Between-Subjects Effects of Demographic Characteristics on Level of Digital Literacy

Tests of Between-Subjects Effects						
Dependent Variable: Digital Literacy						
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	15333.024[a]	24	638.876	5.295	.000	.305
Intercept	456782.809	1	456782.809	3786.153	.000	.929
Gender	9.861	1	9.861	.082	.775	.000
Age	2533.797	5	506.759	4.200	.001	.068
Marital	103.234	2	51.617	.428	.652	.003
Employment	1297.761	3	432.587	3.586	.014	.036
Error	34987.230	290	120.646			
Total	2852492.000	315				
Corrected Total	50320.254	314				
a. R Squared = .305 (Adjusted R Squared = .247)						

Table 4 presents the results of the Tests of Between-Subjects Effects examining the influence of demographic characteristics on the digital literacy levels of doctoral LIS students in South-West, Nigeria. The corrected model was significant at $p < .05$, with an R^2 value of .305, indicating that about 30.5% of the variance in digital literacy can be explained by the combined demographic factors considered in the study. This suggests that demographic characteristics collectively have a moderate explanatory power on doctoral LIS students' digital literacy levels.

When examined individually, gender was not a significant predictor of digital literacy ($F = 0.082$, $p = .775$), implying that male and female doctoral students had relatively similar levels of digital literacy. However, age showed a statistically significant effect on digital literacy level of Doctoral LIS students ($F = 4.200$, $p = .001$). This suggests that students' age groups differ in their digital literacy competencies, with younger doctoral students possibly showing higher proficiency due to earlier exposure to digital tools compared to older counterparts.

On the other hand, marital status was not found to significantly influence level of digital literacy of LIS doctoral students ($F = 0.428$, $p = .652$). This indicates that whether students are single, married, or otherwise does not significantly affect their ability to engage with digital tools for academic purposes. Similarly, employment status showed a significant effect ($F = 3.586$, $p = .014$). This suggests that students' work engagements influence their digital literacy levels. Those employed, especially in technology-driven roles, may have better opportunities to practice and refine digital skills compared to their unemployed counterparts.

Discussion of Findings

The study revealed that doctoral students in Library and Information Science (LIS) in South-West Nigeria possess a high level of digital literacy. This finding is consistent with previous research both within and outside Nigeria. Studies by Oseghale (2023) and Jibrin et al. (2024) confirmed strong digital competencies among postgraduate students, while international research by Parvathamma and Pattar (2013), Awari and Krishnamurthy (2017), and Bell (2021) similarly reported high levels of digital literacy. The above findings suggest that doctoral LIS students are well-equipped to use digital tools for academic research, data analysis, and scholarly communication, which are essential within a discipline centred on digital information management. However, despite this generally positive trend, there are still significant variations in digital literacy levels across different student groups. Studies by Masai et al. (2024) and Jibrin et al. (2024) highlighted disparities in digital competence, suggesting that digital literacy is not evenly distributed and may depend on individual contexts.

Visser (2013) argued that digital literacy should be seen as a socially situated practice involving not only technical skills but also ethical, legal, and cultural dimensions. Other researchers, including Onursoy (2018), Dönmez (2019), Kaya (2020), and Kul (2020), also pointed out that frequent use of digital tools does not automatically lead to effective or critical engagement.

They noted gaps in areas such as information validation, cybersecurity, and digital ethics. Yıldız (2020) similarly identified weaknesses in analytical and evaluative skills among some postgraduate students. The findings based on demographic information revealed patterns that align with, and in some cases contradict, previous studies.

With respect to marital status, the results of this study are consistent with Mahmod et al. (2021), who asserted that marital status does not exert a significant influence on digital literacy (DIL) competencies. Similarly, Hafez et al. (2024) also reported no significant differences in digital literacy levels when analyzed by marital status, further reinforcing the current study's findings.In terms of gender, the present findings corroborate the work of Chomtohsuwan et al. (2023), who examined factors influencing digital technology skills in a developing country and found no significant gender differences. This position is also supported by Diyaolu et al. (2012), whose study demonstrated no gender-based differences in ICT usage. Likewise, Hafez et al. (2024) reported similar outcomes, showing no statistically significant variations in digital literacy between male and female respondents.

When considering age, the results of this study are in line with Adepoju (2017), who found that students below the age of 20 tend to use ICT more actively compared to their counterparts in the 20–30 years age group and above. This suggests that younger students are more engaged in digital practices, possibly due to early exposure to technology. However, in terms of employment status, the present study produced results that contrast with the findings of Habibija-Ražanica and Mekić (2021). While their study reported no statistically significant difference in digital literacy between employed and unemployed respondents, the current findings indicate otherwise. This divergence suggests that employment status may, under certain contexts, play a meaningful role in shaping digital literacy levels. Nonetheless, Habibija-Ražanica and Mekić (2021) emphasized that educational attainment had a statistically significant effect on digital literacy, which highlights the complex interplay of demographic variables in influencing digital competencies.

Conclusion and Recommendations

In conclusion, enhancing digital literacy among doctoral students requires total and inclusive approach that addresses both skill development and contingent factors. Educational institutions should prioritize continuous and personalized digital literacy training that integrates technical proficiency with critical thinking, ethical awareness, and cultural sensitivity. In line with

the above, it is therefore recommended that structured digital literacy programme should be implemented among doctoral students at the beginning of their Ph.D. programme and this should also be embedded within academic curricula, alongside regular assessments to identify and bridge skill gaps. Institutions should also foster collaborative learning environments that encourage peer support and knowledge sharing. Furthermore, investment in infrastructure and access to up-to-date digital resources is essential to ensure equitable opportunities for all students. By adopting these measures, universities worldwide can cultivate digitally competent graduates equipped to navigate and contribute meaningfully to the evolving digital landscape.

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