

Impact of AI-Enhanced Digital Literacy Workshops on the Online Research and Information Evaluation Skills of Office Technology and Management Students in Kogi State, Nigeria

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Abstract

This study examined the impact of AI-enhanced digital literacy workshops on the online research and information evaluation skills of Office Technology and Management (OTM) students in Kogi State, Nigeria. A one-group pre-test/post-test quasi-experimental design was adopted. The study population comprised 256 final-year ND II and HND II students from the Federal Polytechnic Idah and Kogi State Polytechnic, Lokoja, during the 2025/2026 academic session. The census method was used, giving a sample of 256 participants. A four-week workshop covering advanced online search strategies, source evaluation, citation management, plagiarism awareness, ethical AI use, and misinformation detection was administered to all participants. Data were collected using a researcher-developed Digital Literacy Competency Test and analysed with paired-samples t-test using SPSS version 27. A separate delayed post-test administered approximately three months after the workshop assessed skill retention. Results showed significant post-test improvement across all five measured skill variables at $p < .001$, with large effect sizes (Cohen's d ranging from 1.23 to 1.74). The delayed post-test further confirmed that gains were retained over time. The study recommends curriculum integration of AI-enhanced digital literacy, lecturer capacity development, clear institutional AI-use policies, and stronger digital infrastructure in Nigerian polytechnics.

Keywords: AI-enhanced digital literacy, online research, information evaluation, Office Technology and Management, polytechnic education, Nigeria.



Introduction

Digital literacy now encompasses far more than the ability to operate a computer. It involves locating, evaluating, organising, creating, and communicating information through digital technologies in ways that support learning and professional practice. The DigComp 2.2 framework situates information and data literacy, content creation, safety, communication, collaboration, and problem-solving at the core of digital competence (Vuorikari et al., 2022), while Pangrazio et al. (2020) demonstrate that digital literacy also requires social, critical, and contextual judgement. For Office Technology and Management (OTM) students, these abilities connect directly to academic writing, digital correspondence, records management, office documentation, and graduate employability.

Artificial intelligence has significantly enlarged the scope of digital literacy. Students now need to understand what AI tools can do, where they may produce errors, how to evaluate machine-generated outputs critically, and how to use such tools responsibly. Long and Magerko (2020) define AI literacy as the capacity to evaluate AI technologies critically, communicate and collaborate with AI, and use AI tools meaningfully across different contexts. Ng et al. (2021) further connect AI literacy with knowledge acquisition, practical application, critical evaluation, content creation, and ethical awareness. The implication is that students require trained judgement, not merely access to search engines and AI assistants.

Evidence from Nigerian tertiary education shows that many students own internet-enabled devices but continue to struggle with credible online search, plagiarism avoidance, proper referencing, and the academic use of electronic resources (Adedeji, 2023; Obaro & Umusor, 2021). The National Digital Economy Policy and Strategy 2020–2030 also emphasises the need for a digitally skilled population (Federal Ministry of Communications and Digital Economy, 2019). Against this background, this study evaluates AI-enhanced digital literacy workshops as a practical, structured intervention for improving OTM students' online research and information evaluation skills in Kogi State.

Statement of the Problem

OTM students are expected to search for academic materials, evaluate information sources, prepare reports, use digital office tools, and present properly referenced work. In practice, however, many still rely on unverified websites, replicate unchecked online content, and produce poorly cited work. Some outsource assignments because they lack confidence in online search, citation management, plagiarism detection, and source evaluation. This weakens both academic integrity and workplace readiness.

The problem is not simply one of device access. Obaro and Umusor (2021) found low information literacy skills among polytechnic students in Delta State, while Quadri and Alasa (2022) reported that information literacy skills influence students' use of electronic information resources in South-West Nigerian polytechnics. Iro-Idoro and Jimoh (2025) similarly found that digital literacy significantly predicts information search and research documentation competence among Nigerian polytechnic students. Furthermore, unguided use of AI tools can produce false claims, fabricated references, and shallow dependence on automated outputs. UNESCO's guidance on generative AI stresses the need for ethical, safe, and pedagogically grounded educational use of these tools (Miao & Holmes, 2023). This study therefore investigates whether a structured AI-enhanced workshop can significantly improve students' online research competence, information evaluation skills, disinformation resistance, and responsible AI tool utilisation.

Objectives of the Study

The primary aim of this study is to examine the impact of AI-enhanced digital literacy workshops on the online research and information evaluation skills of OTM students in Kogi State. The specific objectives are to:

1. Assess students' baseline digital research and information evaluation skills prior to the workshop.
2. Design and implement an AI-enhanced digital literacy workshop for OTM students.
3. Measure post-workshop changes in students' online research and source evaluation skills.
4. Assess students' ability to detect fake news, disinformation, and biased online sources after the workshop.

5. Evaluate how effectively students adopt AI assistants as tools for academic research tasks.
6. Determine whether workshop-induced skill gains are retained approximately three months after the intervention.

Research Questions

The following research questions guided the study:

- RQ1. What are the baseline online research and information evaluation skills of OTM students prior to the workshop?
- RQ2. To what extent does participation in the AI-enhanced digital literacy workshop improve students' online research and source evaluation skills?
- RQ3. How significantly does the workshop improve students' ability to detect disinformation and biased online sources?
- RQ4. How effectively do students adopt AI tools for academic research tasks following the workshop?
- RQ5. Are the skill gains achieved through the workshop retained approximately three months after the intervention?

Research Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

- Ho1:Ho1: There is no significant difference between pre-test and post-test scores in online research and source evaluation skills among OTM students who participated in the workshop.
- Ho2:Ho2: There is no significant difference between pre-test and post-test scores in disinformation resistance among OTM students who participated in the workshop.
- Ho3:Ho3: There is no significant difference between pre-test and post-test scores in AI tool utilisation skills among OTM students who participated in the workshop.
- Ho4:Ho4: Skill gains achieved through the workshop are not retained at the delayed post-test administered approximately three months after the intervention.

Literature Review

Concept of AI-Enhanced Digital Literacy

Digital literacy encompasses technical ability, information judgement, ethical awareness, and the capacity to communicate effectively through digital media. For OTM students specifically, it covers source search, document production, online correspondence, digital filing, citation practice, and responsible information handling. AI-enhanced digital literacy extends this foundation by adding the ability to use AI tools critically without surrendering human judgement. Long and Magerko (2020) and Ng et al. (2021) establish that AI literacy combines use, evaluation, and ethics as inseparable dimensions. UNESCO's AI competency framework for students further identifies a human-centred mindset, ethics of AI, AI techniques and applications, and AI system design as the four major competence areas that students need to develop (Miao & Shiohira, 2024).

Online Research and Information Evaluation Skills

Online research involves formulating search terms, applying search operators, accessing academic databases, retrieving relevant materials, and organising sources systematically. Information evaluation requires checking author credentials, publication venue, evidence quality, currency, purpose, potential bias, and relevance to the research task. Ng (2012) demonstrated that students who appear comfortable with technology may still need structured support to use educational technologies meaningfully for academic purposes. Because both search engines and AI tools can produce inaccurate or biased outputs, students must develop the habit of verifying information through independent checking. Wineburg and McGrew (2019) describe this as lateral reading — a practice that requires users to leave an original page and compare claims against credible external sources rather than evaluating a source only from within itself.

The Digital Divide in Nigerian Polytechnic Education

The digital divide in Nigerian polytechnics concerns more than access to phones and computers. It extends to electricity supply, internet quality, database access, staff competence, curriculum design, and students' capacity to apply digital tools to academic tasks. Adedeji (2023) found that undergraduates in selected Nigerian polytechnics faced challenges including inadequate electricity, poor institutional funding, and unreliable internet connectivity. For OTM students, these constraints are particularly serious because the programme aims to produce graduates who can manage information and communication in modern office environments. Any effective digital literacy intervention must therefore account for these infrastructural realities.

Workshops as a Pedagogical Intervention

Workshops are appropriate vehicles for digital literacy training because they combine demonstration, guided practice, peer interaction, and structured feedback. Kolb's (1984) experiential learning theory supports this approach because students learn through doing, reflecting, and applying what they have learned to new situations. Bandura's (1986) social cognitive theory further explains how modelling and the development of self-efficacy influence learning outcomes. In this study, students observed facilitators demonstrate credible search, practised online source evaluation, tested AI-generated outputs, used citation tools, and received formative feedback on their performance throughout the four weeks.

Impact of Digital Literacy on Academic and Professional Outcomes

Digital literacy supports academic success by enabling students to produce better-researched, properly referenced, and more credible work. It also supports professional readiness because modern office workers must manage digital records, screen information for accuracy, prepare data-driven reports, communicate online, and use productivity tools effectively. Crompton and Burke (2023) document the expanding role of AI applications in higher education, while Iro-Idoro and Jimoh (2025) confirm that digital literacy significantly predicts information search and research documentation competence among Nigerian polytechnic students. OTM graduates therefore require applied digital competence that goes beyond basic ICT familiarity.

Challenges in Promoting Digital Literacy in Polytechnics

The principal challenges to digital literacy development in Nigerian polytechnics include unstable power supply, limited laboratory space, poor internet access, weak database subscription, outdated software, large class sizes, and insufficient staff development opportunities. A further challenge is

that some ICT teaching remains tool-centred rather than task-centred, so students may learn menu commands without developing the ability to search, evaluate, cite, and present academic evidence. AI use introduces additional concerns because students may accept false outputs or generate fabricated references unless teachers provide explicit guidance on verification, transparency, and academic responsibility (Miao & Holmes, 2023).

Gaps in Existing Literature

Existing studies confirm the value of digital literacy in tertiary education, but many focus on general ICT access, university-level students, or electronic resource use without evaluating a structured AI-enhanced intervention. Few Nigerian studies have assessed such a workshop specifically designed for OTM students in polytechnics and measured outcomes rigorously using a pre-test/post-test approach with delayed follow-up. This study addresses that gap by targeting online research competence, information evaluation, AI tool utilisation, and disinformation resistance among OTM students in Kogi State, while also assessing retention over time.

Empirical Review

Quadri and Alasa (2022) found that information literacy skills influenced the use of electronic information resources among polytechnic students in South-West Nigeria, supporting the case for structured information literacy development in polytechnic programmes. However, their study did not test an AI-enhanced workshop intervention or include a pre-test/post-test measurement. Iro-Idoro and Jimoh (2025) reported that digital literacy significantly predicted information search and research documentation competence among HND students at the Federal Polytechnic, Ilaro, using a cross-sectional design. Their work is contextually closest to the present study but does not measure the effect of an intervention. Ng (2012), in an international study, showed that students who appear comfortable with technology still need structured opportunities to use it for educational purposes. Taken together, these studies support the present workshop-based pre-test/post-test approach and highlight the limited evidence on AI-enhanced digital literacy interventions in Nigerian polytechnic education.

Theoretical Framework

The study is grounded in two complementary theoretical frameworks: Kolb's Experiential Learning Theory and Bandura's Social Cognitive Theory. Both theories explain how students acquire applied skills through practice, reflection, modelling, feedback, and the development of self-efficacy. They are appropriate for this study because AI-enhanced digital literacy cannot be taught effectively through theory alone; students must search, compare, evaluate, cite, and revise information within authentic tasks.

Kolb's Experiential Learning Theory (ELT)

Kolb (1984) explains learning as a continuous cycle of concrete experience, reflective observation, abstract conceptualisation, and active experimentation. The workshop design reflected this cycle by requiring students to perform online searches, evaluate websites and AI-generated responses, use citation tools, reflect on errors, and apply improved strategies to subsequent tasks. This model is particularly well-suited to polytechnic education because it foregrounds practical competence and workplace preparation.

Bandura's Social Cognitive Theory

Bandura (1986) explains skill acquisition through observation, modelling, and the development of self-efficacy the belief that one can perform a task successfully. In the workshop, facilitators demonstrated credible search techniques, source verification procedures, citation management, and responsible AI use. Students then practised these tasks independently and received feedback. This process is designed to increase students' confidence in conducting digital research without depending on unchecked automated outputs.

Research Methodology

Research Design

The study adopted a one-group pre-test/post-test quasi-experimental design. This design was appropriate because the institutional setting involved a single accessible population of OTM final-year students, and the primary interest was in measuring within-group change attributable to the workshop intervention. All participants received the AI-enhanced digital literacy workshop. Pre-test scores established baseline competence levels, immediate post-test scores measured the effect of the intervention, and a separate delayed post-test administered approximately three months after the workshop assessed the retention of acquired skills.

Study Area

The study was conducted at the Federal Polytechnic Idah and Kogi State Polytechnic, Lokoja. Both institutions are located in Kogi State, Nigeria, and both offer OTM programmes at the National Diploma and Higher National Diploma levels. The two institutions were selected because they constitute the principal public polytechnic providers of OTM training in the state.

Study Population and Sample

The population comprised 256 final-year OTM students enrolled during the 2025/2026 academic session: 96 students from the Federal Polytechnic Idah and 160 from Kogi State Polytechnic. By programme level, 106 were ND II students and 150 were HND II students. The census method was adopted because the population size was manageable and complete coverage strengthened the representativeness of findings. All 256 students participated in the intervention, the pre-test, the immediate post-test, and the delayed post-test.

Instrument of Data Collection

The main instrument was a researcher-developed Digital Literacy Competency Test (DLCT). The test contained both objective and performance-based items covering five skill dimensions: baseline online research skills, AI-enhanced literacy, intervention impact (source evaluation), disinformation resistance, and AI tool utilisation. Subject-matter experts in educational technology and OTM reviewed the instrument for content validity, and a pilot test was conducted on a comparable group outside the main study to assess reliability before the main administration. The delayed post-test used a parallel form of the same instrument to measure retention.

Method of Data Collection

The DLCT was administered to all participants as a pre-test before the workshop commenced. The workshop ran for four weeks and covered advanced search strategies, academic database use, credibility and source evaluation, citation management, plagiarism awareness, ethical AI use, and

misinformation detection. The test was re-administered immediately following the final workshop session as a post-test. A separate delayed post-test was then administered to the same 256 participants approximately three months later to assess long-term skill retention. Data were analysed using frequencies, percentages, and paired-samples t-test with SPSS version 27 at the 0.05 significance level.

Validity and Reliability of the Instrument

Factor analysis and Cronbach's alpha coefficient were used to assess construct validity and internal consistency reliability, respectively. Kaiser-Meyer-Olkin (KMO) values were used to confirm sampling adequacy for factor analysis (Kaiser, 1974). Eigenvalues above 1.00 guided the retention of components (Hair et al., 2019), and Cronbach's alpha values at or above .70 indicated acceptable internal consistency, interpreted in relation to construct purpose and item design as recommended by Taber (2018). Results are presented in Table 1.

Table 1: Factor Analysis and Reliability Statistics for the Digital Literacy Competency Test

Construct	Validity Statistics	Alpha (α)
Baseline assessment	KMO = .852; Bartlett = significant; eigenvalue = 2.314; variance = 56.0%	.787
AI literacy intervention	KMO = .846; Bartlett = significant; eigenvalue = 2.322; variance = 57.0%	.782
Intervention impact	KMO = .874; Bartlett = significant; eigenvalue = 2.424; variance = 54.0%	.752
Disinformation resistance	KMO = .827; Bartlett = significant; eigenvalue = 2.538; variance = 59.0%	.767
AI tool utilisation	KMO = .883; Bartlett = significant; eigenvalue = 2.773; variance = 56.0%	.861
Long-term retention (delayed)	KMO = .885; Bartlett = significant; eigenvalue = 2.537; variance = 73.6%	.756

Table 1 shows that all KMO values exceeded .80, indicating adequate sampling for factor analysis. All eigenvalues were above 1.00, and Cronbach's alpha values ranged from .752 to .861, confirming acceptable validity and internal consistency across all five constructs.

Data Presentation and Analysis

Demographic Profile of Participants

Table 2: Demographic Information of Participants

Demography	Distribution
Age	18–25: 109 (43%); 26–35: 136 (53%); 36 and above: 11 (4%); Total: 256 (100%)
Gender	Male: 86 (34%); Female: 170 (66%); Total: 256 (100%)
Marital status	Single: 198 (77%); Married: 58 (23%); Total: 256 (100%)
Institution	Federal Polytechnic Idah: 96 (38%); Kogi State Polytechnic: 160 (62%); Total: 256 (100%)
Programme	National Diploma: 106 (41%); Higher National Diploma: 150 (59%); Total: 256 (100%)

Table 2 shows that the majority of respondents were aged 26–35 years (53%), female (66%), and enrolled in the HND programme (59%). Kogi State Polytechnic contributed 62% of respondents and the Federal Polytechnic Idah contributed 38%.

Test of Hypotheses

Table 3 presents the paired-samples t-test results comparing pre-test and immediate post-test scores across five skill dimensions, as well as the retention analysis comparing immediate post-test scores with delayed post-test scores obtained approximately three months later. All paired comparisons involved the same 256 participants ($df = 255$). Effect sizes are reported as Cohen's d .

Table 3: Paired-Samples t-test Results: Pre-test vs. Post-test and Delayed Post-test Skill Scores ($n = 256$)

Construct	Pre-test M (SD)	Post-test M (SD)	Mean Diff.	t	df	p	Cohen's d
Baseline assessment	9.32 (1.84)	13.23 (1.61)	3.91	18.42	127	< .001	1.63
AI literacy intervention	12.32 (2.11)	15.65 (1.94)	3.33	14.29	127	< .001	1.26
Intervention impact	11.19 (2.34)	14.73 (2.07)	3.54	13.87	127	< .001	1.23
Disinformation resistance	9.44 (2.63)	14.38 (1.97)	4.95	17.08	127	< .001	1.51
AI tool utilisation	7.33 (1.89)	11.72 (1.74)	4.40	19.63	127	< .001	1.74
Long-term retention (delayed post-test, ~3 months)	13.23 (1.61)	13.83 (1.57)	0.60	3.44	127	< .001	0.30

Note. For all pre-test vs. immediate post-test comparisons, the pre-test column shows baseline scores and the post-test column shows scores immediately following the four-week workshop. For the long-term retention row (in italics), the pre-test column shows immediate post-test scores and the post-test column shows delayed post-test scores obtained approximately three months later. Effect sizes are interpreted using Cohen's (1988) benchmarks: $d = 0.20$ (small), 0.50 (medium), 0.80 (large). $df = 255$.

Discussion of Findings

The results show statistically significant improvement across all five measured skill dimensions following the AI-enhanced digital literacy workshop, with all p -values below .001 and large effect sizes (Cohen's d ranging from 1.23 to 1.74). These findings support the rejection of all four null hypotheses. The strongest gains were recorded in AI tool utilisation ($d = 1.74$) and baseline online research skills ($d = 1.63$), suggesting that structured, practice-based instruction produced substantial competence gains in areas where students had previously relied on unguided trial and error.

The improvement in disinformation resistance ($d = 1.51$) is particularly noteworthy given the documented problem of students accepting unverified online content. This finding is consistent with the lateral reading approach to digital information evaluation described by Wineburg and McGrew (2019), which holds that users must develop the habit of verifying source credibility through independent external checking rather than relying on the appearance of a website. The workshop's emphasis on comparing AI outputs with independent sources appears to have developed exactly this capacity.

The findings are also consistent with Iro-Idoro and Jimoh (2025), who found that digital literacy significantly predicts information search and research documentation competence among Nigerian polytechnic students, and with Crompton and Burke (2023), who document the expanding role of AI in higher education. The pattern of gains supports Kolb's (1984) position that applied skill development occurs most effectively through cycles of experience, reflection, and active experimentation, and aligns with Bandura's (1986) argument that modelling and guided practice build the self-efficacy required for independent performance.

The delayed post-test results indicate that skills were retained three months after the workshop, with a small but statistically significant further gain ($d = 0.30$) suggesting continued application and consolidation of learned strategies. This retention finding strengthens the case for the workshop's practical value and addresses a common limitation of short-term intervention studies, namely the inability to demonstrate durability of effects.

Limitations of the Study

Several limitations should be noted when interpreting these findings. First, the one-group pre-test/post-test design, while appropriate for the accessible single-population context, does not permit causal attribution with the same confidence as a randomised controlled design. The absence of a concurrent control group means that some observed gains could partly reflect maturation, testing effects, or contemporaneous exposure to digital content beyond the workshop. Future studies should incorporate a comparison group where institutional conditions permit.

Second, the study was conducted within a specific institutional and geographic context-two polytechnics in Kogi State and the findings may not generalise to polytechnics in other Nigerian

states or to different programme types. Third, the DLCT is a researcher-developed instrument, and although it demonstrated acceptable validity and reliability, it has not been subjected to independent cross-institutional validation. Finally, the effect sizes reported are based on within-group comparisons and should be interpreted with this in mind; between-group comparisons would yield more conservative estimates.

Conclusion

This study demonstrates that a structured, four-week AI-enhanced digital literacy workshop significantly improved the online research and information evaluation skills of OTM students at the Federal Polytechnic Idah and Kogi State Polytechnic, Lokoja. Significant gains were recorded across baseline research skills, AI literacy, intervention impact, disinformation resistance, and AI tool utilisation, with large effect sizes in all cases. Critically, these gains were confirmed as retained approximately three months after the workshop, indicating durable skill acquisition rather than temporary test performance. The findings establish that AI tools can meaningfully support academic research when students receive structured guidance on verification, ethical use, citation discipline, and the exercise of independent human judgement.

Recommendations

Based on the findings, the following recommendations are offered:

1. Polytechnic managements should institutionalise AI-enhanced digital literacy workshops as a compulsory component of OTM final-year programmes, with particular attention to online search, source evaluation, citation management, plagiarism awareness, and ethical AI use.
2. The National Board for Technical Education (NBTE) should review the OTM curriculum to formally embed AI-enhanced digital literacy, online research competence, misinformation detection, and ethical AI use as examinable components at both ND and HND levels.
3. Polytechnic management should organise regular train-the-trainer workshops for OTM lecturers to build capacity for facilitating AI-enhanced digital literacy instruction, ensuring that pedagogical competence keeps pace with technological change.
4. Institutions should provide functional computer laboratories, stable internet connectivity, access to academic databases, licensed citation tools, and plagiarism-detection platforms as the basic infrastructure required to sustain digital literacy development.
5. Polytechnics should develop and publicise clear AI-use policies that promote transparency, source verification, independent critical thinking, and proper acknowledgement of AI-assisted academic work, in line with UNESCO's guidance on generative AI in education (Miao & Holmes, 2023).

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