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Librarians' Self-Regulated Learning and Use Of Artificial Intelligence Tools for Service Delivery in Federal Universities in Southwestern Nigeria

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Abstract

This study investigated librarians' self-regulated learning (SRL) and the use of artificial intelligence (AI) tools for service delivery in federal university libraries in Southwestern Nigeria. A descriptive survey research design of the correlational type was employed. The population consisted of professional librarians across the six federal universities located in Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti States, with a total sample of 111 librarians selected through census approach. Data were collected using a validated structured questionnaire titled Self-Regulated Learning and Use of Artificial Intelligence Tools for Library Service Delivery Questionnaire (SRL-AI-LSDQ). Descriptive statistics such as frequency counts, means and standard deviations, as well as inferential statistics including Pearson Product Moment Correlation Coefficient (PPMCC) were used for analysis. Findings of the study revealed a high level of awareness of AI tools ($\bar{x}$ = 3.12) and strong acceptance ($\bar{x}$ = 3.26), though actual application remained moderate ($\bar{x}$ = 2.58). The most frequently applied tools were AI-powered search assistants ($\bar{x}$ = 3.05) and chatbots ($\bar{x}$ = 2.95), while tools like robotic process automation ($\bar{x}$ = 2.09) and natural language processing ($\bar{x}$ = 2.45) had low usage. Librarians demonstrated moderate engagement in self-regulated learning ($\bar{x}$ = 2.74), particularly in goal-setting and awareness dimensions. A significant positive correlation ($r = 0.910$, $p < 0.05$) was found between self-regulated learning and AI tool usage, indicating that librarians with stronger SRL capacities were more likely to apply AI tools effectively. The study concluded that fostering SRL is essential to improving AI adoption and enhancing service delivery. It recommended strategic training and capacity-building initiatives to strengthen SRL practices and technological integration in academic libraries.

Keywords: Self-regulated learning, Artificial intelligence tools, Academic librarians, Service delivery, Nigerian university libraries.

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Introduction

Artificial Intelligence (AI) is revolutionizing many professional areas, including health care, finance, education and, specifically, library and information services. In academic libraries, AI technologies are increasingly applied to automate routine tasks, tailor individual experiences, support decision-making, and improve service delivery. Emerging artificial intelligence technologies such as chatbots, natural language processing (NLP), machine learning algorithms, recommendation systems and predictive analytics have revolutionise the manner in which libraries interact with users and offer information services (Jain, 2013; Kumar & Maheshwari, 2020). These technologies allow libraries to address growing demands for personalised, impactful and timely services within an era of digital transformation.

Academic librarians are now required to move beyond traditional roles in embracing such innovations. The introduction of AI within academic libraries is not merely a question of buying software or computer facilities but involves a paradigm shift within librarians' skills, competencies and learning patterns. To this end, librarians must not only be able to understand and manage AI systems but also be engaged in continuous learning processes that enable them to be able to keep pace with new technologies. This assumption is particularly crucial in the Nigerian scenario under which institutional problems such as irregular training, financial deficiencies and infrastructural deficits are generally typical of formal upskilling practice (Salisu, 2016).

In a bid to bridge these deficiencies, self-regulated learning (SRL) has emerged as a critical habit and thinking approach towards professional development. SRL is thus, the active process of planning learning goals, monitoring progress, reflecting on outcomes and revising strategies in a bid to achieve learning goals (Brenner, 2022). SRL enables librarians to learn by themselves and implement knowledge on AI tools where institutional support frameworks do not exist or are weak. SRL therefore, plays a central facilitator role in effective implementation of AI in library services.

Various studies have pointed to the function of self-regulated learning in boosting innovation and service excellence in the workplace. In academic libraries, librarians who demonstrate self-regulation are more likely to test and embed AI technologies in cataloguing, reference services, metadata creation, and user support systems. Non-SRL capable librarians can be technology acceptance passive users, thus limiting the institution from realizing digital transformation and service excellence (Osisanwo, 2025).

Federal universities in South-Western Nigeria, some of which include University of Ibadan, Obafemi Awolowo University, University of Lagos and Federal University of Agriculture, Abeokuta, are usually seen as pacesetters when it comes to academic innovation and service. The

extent to which these universities are making use of AI in libraries is very different, though. While others have begun integrating AI in library systems, the majority continue to operate with very minimal use of such technologies due to uneven preparedness among staff members or the lack of self-directed learning among librarians.

Against this backdrop, it is imperative to explore the convergence of artificial intelligence tool use and self-regulated learning for the provision of library services. This is to inform capacity development plans, innovation culture, and ultimately library service quality improvement. Therefore, the topic of this research is to establish how self-regulated learning by librarians influences the use of artificial intelligence tools in library service delivery at federal universities in Southwestern Nigeria.

Statement of the problem

The advancement of digital technology has brought a transformative wave across all knowledge sectors, with artificial intelligence (AI) emerging as a leading driver of innovation. In the academic library system, AI technologies have begun to redefine how library services are delivered by offering automated support, enhanced information retrieval, personalised recommendations and round-the-clock access to library resources. Technologies such as chatbots, natural language processing, recommendation systems and machine learning algorithms now offer the potential to significantly improve library efficiency, user experience and general quality of service. These technologies allow libraries to meet the growing expectations of digital-native library patrons for fast, intuitive and personalized access to information resources.

However, in the midst of AI promises to revolutionize scholarly library operations, its utilization and application remain minimal in the Nigerian context, especially within the context of Southwestern Nigerian federal university libraries. Despite the fact that some institutions have started embracing AI in their incorporation through basic features like automated cataloging and reference service rendered by chatbots, most libraries fall behind in tapping the full potential of AI technologies. This lag is typically blamed on infrastructural problems, inadequate funding and institutional complacency. However, lying under all these institutional issues is a deeper and less explored issue—librarians' capacity for self-regulated learning (SRL).

Self-regulated learning refers to an active method of learning which enables professionals to learn independently, set goals, monitor progress and assess results. Under a condition of limited resources where formal training might be intermittent or insufficient in supply, SRL becomes a critical tool for acquiring skills and innovation. Librarians who exhibit high SRL inclinations will be best positioned to adopt new technologies, troubleshoot technical setbacks, and improve service delivery via initiative. On the other hand, those who lack self-regulated learning

competencies may oppose the transformation and use only top-down training practices and fail to utilize AI tools.

Despite the strategic role librarians' play in AI integration and the critical importance of SRL in professional development, little empirical research exists on how SRL influences the use of AI tools in academic libraries, particularly within the Nigerian context. As academic libraries are expected to lead digital transformation in higher education, understanding this dynamic is essential for improving service quality, fostering innovation and ensuring optimal return on investment in AI infrastructure. It is on this premise that the current study seeks to investigate the relationship between self-regulated learning and the use of artificial intelligence tools for service delivery among librarians in federal universities in Southwestern Nigeria.

Research questions

The following research questions were answered in the study:

1. What is the level of awareness of AI tools among librarians in federal university libraries in Southwestern Nigeria?
2. What is the level of acceptance of AI tools for service delivery among librarians in federal university libraries in Southwestern Nigeria?
3. What is the level of application of AI tools for service delivery by librarians in federal university libraries in Southwestern Nigeria?
4. What is the level of self-regulated learning of librarians to use AI tools in federal university libraries in Southwestern Nigeria?
5. What is the relationship between self-regulated learning and the use of AI tools by librarians in federal universities in Southwestern Nigeria?

Literature review

Academic libraries in the digital era are expected to transform from traditional information repositories into dynamic, user-centred learning environments. In this context, self-regulated learning (SRL) and the use of artificial intelligence (AI) tools have become increasingly vital in redefining how library services are delivered. SRL provides a behavioural and cognitive framework for librarians to independently manage their learning and skill development, while AI tools offer new possibilities for automated, efficient and personalised service delivery.

Self-regulated learning is a core concept in professional learning and psychology. According to Brenner (2022), SRL is a cyclical process where individuals actively set goals, employ learning strategies, monitor progress and reflect on outcomes. It is a cognitive, metacognitive, motivational and behavioural regulation process. Koutroubas & Deree (2022) social cognitive theory corroborates this in his explanation of self-regulation by the interplay between self-

observation, self-judgment and self-reaction. Sinkkonen & Tapani (2024) also acknowledge SRL as an adaptive process that is influenced by feedback and task engagement. These theoretical foundations have the implication that SRL has an important role to play in workplace learning, especially in knowledge-intensive environments such as academic libraries.

In librarianship, SRL manifests in actions like self-training, goal-setting, reflective learning and adaptive application of emerging technologies. Cognitive regulation allows librarians to set and carry out plans for tasks like integrating AI tools. Metacognitive regulation allows them to assess the usefulness of their plans, while behavioural regulation entails managing time and resources effectively. Emotional and motivational regulations are also important for librarians who must transcend frustration and continue in spite of technological problems. These processes are key to enabling librarians' adoption and optimising use of AI tools, especially in environments with less institutional support.

There is extensive literature demonstrating the relationship between SRL and service delivery. Ibikunle & Ikonne (2023) found that librarians with high self-efficacy, a construct having strong relationship with SRL, demonstrated improved service delivery. Arilesere, et.al., (2020) also found that proactive learning and peer collaboration were important in improving librarians' digital service competencies. In Oyo state, Owate (2024) observed that librarians who reflected on and planned for virtual reference transactions provided more efficient digital services. Hutchinson (2020) emphasized that librarians who learned using self-monitored and feedback-based methods benefited more from institutional capacity-building programs. These investigations show that SRL practices, whether through reflection, strategic learning, or proactive adaptation, enhance the quality and innovation of library services.

The use of artificial intelligence tools in libraries has been a subject of on-going research interest, particularly in developing countries. AI technologies such as chatbots, automated metadata systems, predictive analytics and virtual assistants are being introduced to improve cataloguing, reference services, digital engagement and accessibility. Abba (2024) documented the use of chatbots and robotic systems across 102 African university libraries, revealing improved responsiveness and workflow management. Adeleke, et.al. (2024) noted that while Nigerian librarians are aware of AI tools, actual usage remains minimal due to infrastructural challenges and a lack of training. Yusuf, et al. (2022) confirmed the positive perception of chatbots in Nigerian libraries but identified challenges such as technical deficiencies and low institutional support.

Further supporting evidence comes from Odigie (2024), who revealed that reference librarians in North-Central Nigeria had high awareness of tools like ChatGPT but rarely used them professionally due to structural constraints. Safana & Fari (2024) urged policy guidance and ethical provisions for AI implementation, while Singh & Sandhu (2026) identified high demand

for AI training among librarians with concerns over depersonalization. Orubebe, et.al. (2025); and Zavodna, et al. (2024) studies also identify infrastructural and ethical limitations in AI application, with successful implementation largely depending on the readiness, confidence and self-education of entrepreneurs, likewise librarians.

University library service delivery incorporates traditional services like circulation and reference, and electronic services like institutional repositories, virtual consultation, and e-access. Agada & Tofi (2021), and Ajala & Ayankola (2017) asserted that high-quality service delivery constitutes timely, accurate and user-centered interactions. SERVQUAL model has defined five dimensions for measuring service quality—tangibles, reliability, responsiveness, assurance, and empathy, which have been widely applied in library settings (Okechukwu & Anunobi, 2020). Effective service provision today also depends not only on systems and infrastructure but on the attitudes, behaviours and skills of librarians. In this regard, SRL and AI tool usage are seen as complementary strategies that enable innovation, responsiveness and personalised support.

The theoretical models underpinning this study further reinforce the importance of these constructs. Zimmerman's Self-Regulated Learning Theory explains how professionals plan, execute and reflect on learning tasks, particularly in dynamic and technology-driven contexts. Davis's Technology Acceptance Model (TAM) outlines how perceived usefulness and perceived ease of use influence technology adoption, two beliefs that can be enhanced through self-regulated behaviours. The SERVQUAL model offers a user-centric framework for evaluating how such adoption translates into improved service delivery outcomes.

Empirical gaps remain in the literature. Although there is growing research on digital transformation and AI in libraries, few studies specifically examine how SRL supports AI adoption and service delivery simultaneously. Most existing studies treat these variables independently. Furthermore, much of the evidence comes from cross-sectional surveys, with limited use of longitudinal or mixed-method approaches. There is also a lack of research that quantifies the direct impact of SRL on AI-mediated services, especially in Nigerian academic libraries. While constructs such as digital literacy and self-efficacy are discussed, they are often used as proxies for SRL without fully capturing the behavioural processes involved.

Existing literature suggests that self-regulated librarians are more likely to adopt AI tools and contribute meaningfully to modern library services. However, there remains a significant gap in understanding how these constructs interact and influence one another in real-world, resource-constrained contexts like Nigeria. This study addresses this gap by investigating how SRL affects the use of AI tools for service delivery in federal university libraries in Southwestern Nigeria.

Methodology

The study adopted a descriptive survey research design of the correlational type, which is suitable for establishing relationships between variables in a natural setting. This method was selected because it allows the researcher to examine the relationship between librarians' self-regulated learning and their use of artificial intelligence (AI) tools without manipulating the study environment. The use of a questionnaire for data collection aligns with established practices in library and information science research, particularly for studies examining attitudes, behaviours and practices.

The population of the study comprised all professional librarians working in federal university libraries across the six states in Southwestern Nigeria: Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti. The universities include: University of Lagos, Federal University of Agriculture, Abeokuta, University of Ibadan, Obafemi Awolowo University, Federal University of Technology, Akure and Federal University of Oye-Ekiti. These institutions were purposively selected due to their federal status and relatively advanced infrastructure for digital service delivery.

A census was adopted to select the sample. In the first stage, all six federal universities in the Southwestern region were included. At the second stage, simple random sampling was used to select professional librarians from each university's library. A total of 111 librarians participated in the study, serving as the sample size.

Table 1: Sample Distribution of the Study

University	**Sample Size**
1. University of Lagos	19
2. University of Ibadan	22
3. Federal University of Agriculture, Abeokuta	17
4. Obafemi Awolowo University, Ile-Ife	19
5. Federal University of Technology, Akure	18
6. Federal University, Oye-Ekiti	16
Total	**111**

The instrument used for data collection was a structured and validated questionnaire titled *"Self-Regulated Learning and Use of Artificial Intelligence Tools for Library Service Delivery Questionnaire (SRL-AI-LSDQ)"*. The questionnaire was divided into four sections:

- Section A: Demographic Information
- Section B: Awareness and Use of AI Tools

- Section C: Self-Regulated Learning Practices
- Section D: AI Tools and Service Delivery

The reliability of the instrument was established using Cronbach's Alpha, while the content and face validity were established through expert review by three senior library and information science lecturers. The self-regulated learning scale (6 items) recorded an alpha value of 0.768, while the AI tools usage scale (14 items) had an alpha value of 0.812, indicating good internal consistency and reliability. Data collected were analysed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics such as frequency counts, percentages, means and standard deviations were used to answer the research questions. Pearson Product-Moment Correlation Coefficient (PPMCC) was employed to test the null hypothesis at a 0.05 level of significance. Tables and figures were used for clarity in data presentation.

Results and discussion

Research Question 1: What is the level of awareness of AI tools among librarians in federal university libraries in Southwestern Nigeria?

The level of awareness of AI tools among librarians in federal university libraries in Southwestern Nigeria is answered in research question one.

Table 2: Awareness of AI tools

Key: SA: Strongly Agree; A: Agree; D: Disagree; SD: Strongly Disagree.

Statement	SA (%)	A (%)	D (%)	SD (%)	Mean	SD
1. I am aware that AI is vital in modern academic libraries.	58 (52.3%)	39 (35.1%)	9 (8.1%)	5 (4.5%)	3.35	0.81
2. I know that AI can enhance cataloguing and classification processes.	51 (45.9%)	44 (39.6%)	11 (9.9%)	5 (4.5%)	3.27	0.81
3. I understand that AI tools can improve user experience.	54 (48.6%)	42 (37.8%)	10 (9.0%)	5 (4.5%)	3.31	0.80
4. I am aware of AI for automation and operations.	47 (42.3%)	46 (41.4%)	13 (11.7%)	5 (4.5%)	3.22	0.81
5. I am aware of AI tools for decision-making support.	49 (44.1%)	41 (36.9%)	16 (14.4%)	5 (4.5%)	3.20	0.81

The data reveal a generally high level of awareness among librarians regarding AI use in library services. For instance, awareness that *AI is vital in modern libraries* recorded the highest mean

(3.35), with 87.4% of respondents agreeing or strongly agreeing. Similarly, librarians showed strong awareness (85.6%) that AI can enhance cataloguing and classification, which had a mean of 3.27. Perception of AI's impact on user experience also scored high (mean = 3.31; 86.5% agreement), showing widespread acknowledgement of AI's role in improving access to resources.

Awareness was slightly lower in more technical areas. While 83.8% of librarians were aware of AI's role in automation and 81.0% recognised its potential in decision-making, their mean scores were comparatively lower (3.22 and 3.20, respectively), with higher standard deviations (0.81–0.83), suggesting more varied opinions in these domains. Overall, the findings demonstrate strong baseline awareness of AI among librarians, particularly for front-facing applications, but they also reveal opportunities for deeper awareness building in advanced and strategic uses of AI in library systems.

Research Question 2: What is the level of acceptance of AI tools for service delivery among librarians in federal university libraries in Southwestern Nigeria?

Table 3: Level of acceptance of AI tools for service delivery

Key: SA: Strongly Agree; A: Agree; D: Disagree; SD: Strongly Disagree

Statement	**SA (%)**	**A (%)**	**D (%)**	**SD (%)**	**Mean**	**SD**
1. I am willing to use AI in my duties as a librarian.	53 (47.7%)	45 (40.5%)	9 (8.1%)	4 (3.6%)	3.32	0.77
2. I am comfortable integrating AI into routine library services.	47 (42.3%)	46 (41.4%)	12 (10.8%)	6 (5.4%)	3.21	0.83
3. I support the adoption of AI technologies in my library.	50 (45.0%)	44 (39.6%)	11 (9.9%)	6 (5.4%)	3.24	0.83

N = 111

The analysis of librarians' acceptance of artificial intelligence (AI) reveals a highly positive disposition across all three items, with mean scores above 3.20 and over 83% agreement in each case. The strongest acceptance was for the statement *"I am willing to use AI in my duties as a librarian"*, which had the highest mean score (3.32) and the lowest standard deviation (0.77), indicating a high level of consensus and confidence in AI as part of professional practice. A large majority (88.3%) either strongly agreed or agreed, while only 11.7% expressed disagreement.
For *"I am comfortable integrating AI into routine library services"*, 83.8% indicated positive acceptance, though it had the lowest mean (3.21) and a slightly higher standard deviation (0.83), suggesting slightly more variability in comfort levels. The 18 respondents (16.2%) who

disagreed or strongly disagreed may reflect those with limited exposure or training. The item *"I support the adoption of AI technologies in my library"* also received strong backing (84.7% agreement) with a mean of 3.24 and a standard deviation of 0.83, affirming organisational readiness alongside individual interest. In summary, librarians in federal universities exhibit a high level of acceptance and support for AI, though some variation in comfort and readiness points to the need for targeted training and gradual implementation strategies.

Research Question 3: What is the level of application of AI tools for service delivery by librarians in federal university libraries in Southwestern Nigeria?

Table 4: Level of application of AI tools for service delivery

AI Tool/Application	FU (%)	SU (%)	RU (%)	NU (%)	Mean	SD
1. Chatbots for handling user queries and providing real-time assistance.	34 (30.6%)	47 (42.3%)	21 (18.9%)	9 (8.1%)	2.95	0.90
2. Machine learning for automating cataloguing/classification.	22 (19.8%)	38 (34.2%)	30 (27.0%)	21 (18.9%)	2.56	1.02
3. NLP for indexing and retrieving information.	18 (16.2%)	35 (31.5%)	28 (25.2%)	30 (27.0%)	2.45	1.04
4. Visual simulation tools for virtual tours and orientations.	14 (12.6%)	32 (28.8%)	29 (26.1%)	36 (32.4%)	2.35	1.03
5. AI-powered search tools for faster catalogue searches.	41 (36.9%)	44 (39.6%)	16 (14.4%)	10 (9.0%)	3.05	0.92
6. Robotic process automation (RPA) for streamlining repetitive tasks.	12 (10.8%)	27 (24.3%)	33 (29.7%)	39 (35.1%)	2.09	1.00

The application of AI tools in library service delivery varies significantly across different technologies. Among the tools evaluated, AI-powered search tools recorded the highest usage, with 76.6% of librarians indicating frequent or occasional use. It also had the highest mean score (3.05) and a relatively low standard deviation (0.92), showing general agreement on its usefulness and routine application. Chatbots for real-time user interaction followed closely, with 73.0% of respondents reporting they use the tool frequently or sometimes (mean = 2.95). This reflects growing confidence in AI-powered interfaces to support patron services.

On the other hand, machine learning tools for automating cataloguing had moderate usage (54.1% FU/SU), with a mean of 2.56 and a standard deviation of 1.02, indicating more diverse experience or uncertainty among respondents. The application of natural language processing (NLP) and visual simulation tools was notably lower, with only 47.7% and 41.4% of

respondents, respectively, using them frequently or sometimes. Their mean scores (2.45 and 2.35) and relatively high standard deviations (both around 1.03–1.04) suggest inconsistent exposure or understanding of these tools across libraries.

Robotic process automation (RPA) recorded the lowest usage levels, with only 35.1% reporting any usage and a mean of 2.09. The high proportion of respondents selecting "rarely used" or "not used at all" (64.9%) shows that RPA remains largely untapped in library operations. In summary, AI adoption is strongest in user-facing and retrieval-enhancing tools, while backend automation technologies like RPA and NLP require greater awareness, training and system support to be effectively utilised.

Research Question 4: What is the level of self-regulated learning of librarians to use AI tools in federal university libraries in Southwestern Nigeria?

Table 5: Level of self-regulated learning of librarians to use AI

Statement	SA (%)	A (%)	D (%)	SD (%)	Mean	SD
1. I am aware of how the AI tools in use in this library work prior to their adoption.	41 (36.9%)	39 (35.1%)	20 (18.0%)	11 (9.9%)	2.90	0.99
2. I have planned and carried out self-observation of how the AI tools work prior to their adoption.	33 (29.7%)	38 (34.2%)	24 (21.6%)	16 (14.4%)	2.77	1.04
3. I have learned to troubleshoot AI-related problems without involving IT staff.	28 (25.2%)	34 (30.6%)	28 (25.2%)	21 (18.9%)	2.59	1.09
4. I have learned to use the HELP feature in AI tools to solve problems rather than relying on tech staff.	30 (27.0%)	36 (32.4%)	26 (23.4%)	19 (17.1%)	2.66	1.06
5. Self-regulated learning helps me solve most problems associated with AI tools.	35 (31.5%)	37 (33.3%)	27 (24.3%)	12 (10.8%)	2.80	0.98

The analysis of librarians' self-regulated learning (SRL) behaviours reveals moderate engagement with independent learning and problem-solving when using artificial intelligence (AI) tools. For the first item, *"I am aware how the AI tools in use in this library work prior to their adoption,"* a strong majority (72.1%) indicated agreement, with a mean score of 2.90 and a standard deviation of 0.99. This suggests a relatively high level of proactive awareness among librarians before AI implementation. The second item, on *self-observation of AI functionality*

prior to adoption, was affirmed by 63.1% of respondents (mean = 2.77, SD = 1.04), indicating that while a majority engage in independent exploration, a substantial number do not, possibly due to lack of access, time, or motivation.

When it comes to *troubleshooting AI-related issues without the IT department*, only 55.9% agreed (mean = 2.59), with a larger spread in responses (SD = 1.09). This may reflect differing levels of technical confidence among librarians. The item on using the *HELP features within AI tools* instead of seeking external assistance yielded similar results: 59.5% agreement and a mean of 2.66. This shows moderate reliance on built-in support tools, though over 40% still depend on technical staff.

Finally, the general perception that *self-regulated learning helps in solving AI-related problems* received a mean score of 2.80 and the second-highest agreement rate (64.9%), suggesting that most librarians see value in SRL but still face practical barriers in implementation. Summary: While many librarians exhibit self-regulated learning behaviours, the overall scores reflect moderate self-efficacy, with opportunities for improvement through structured digital skill-building programs and targeted support for independent technology learning.

Research Question 5: What is the relationship between self-regulated learning and the use of AI tools by librarians in federal universities in Southwestern Nigeria?

Table 6: Relationship between self-regulated learning and the use of AI tools by librarians

Variables	Mean	Std. Dev.	N	r	p-value	Remark
Self-Regulated Learning	2.74	0.99	111	0.910	0.000	Sig.
Application of AI Tools	2.58	0.87				

Table 6 presents the result of the analysis examining the relationship between librarians' self-regulated learning and the application of AI tools in library service delivery. The findings reveal a very strong, positive correlation between the two variables (r = 0.910) with a p-value of 0.000. Since the p-value is less than the 0.05 significance level, the null hypothesis stating that there is no significant relationship between self-regulated learning and AI tool usage is rejected. This result implies that librarians who engage in higher levels of self-regulated learning, through goal-setting, self-observation, independent problem-solving and use of help tools, are significantly more likely to apply AI technologies effectively in their service delivery. The strong correlation suggests that self-regulated learning plays a crucial role in AI adoption among librarians in federal university libraries.

Discussion of Findings

Findings from the study revealed that there is a high level of awareness of artificial intelligence (AI) tools among librarians in federal university libraries in Southwestern Nigeria. The librarians were aware of the relevance of AI in enhancing user services, especially in cataloguing, information retrieval and improving user experience. This finding aligns with the study of Abba (2024), who reported wide awareness of AI tools such as chatbots and robotic systems in over 100 African university libraries. Similarly, Odigie (2024) found that Nigerian reference librarians were aware of AI platforms like ChatGPT, although actual usage remained low. The existing research again confirms that awareness alone is not the primary issue, but rather converting awareness into action by way of on-going training and infrastructure.

The findings of the study also showed a great acceptance of AI tools among librarians. The participants were mostly at ease and willing to adapt AI in their provision of services. This conforms to the study by Adeleke, et.al., (2024), wherein they found that librarians in Nigeria had high acceptance of AI technologies even amidst institutional limitations. Singh & Sandhu (2026) also noted librarians' keen interest in the use of AI tools, attributing their readiness for change. An acceptance rate as high as this is a positive development whereby, with the right help, AI adoption can be achieved in federal university libraries.

But the study found the degree to which AI tools are used for service delivery itself is low to moderate. While chatbots and search provided by AI are already implemented, more advanced tools like RPA, virtual simulation and NLP are utilized much less. This finding is in tandem with that of Yusuf, et al. (2022), which showed positive attitudes but low application of AI tools due to technical limitations and poor institutional integration. This also aligns with findings by Zavodna, et al. (2024) and Akinola (2024), which showed low usage of AI in Nigerian libraries due to technical support and strategic utilization.

With regard to self-regulated learning (SRL), it was found from the research that librarians engage in SRL to some degree. The majority of them reported experiencing previous awareness and autonomous learning strategies but were unable to trouble-shoot and deeper technical problem-solving without institution aid. The finding is in agreement with Hutchinson (2020), who reported that librarians engaging in self-directed learning are likely to benefit from formal training programs. Owate (2024) also observed that reflective and proactive learning practices improved service quality in Oyo State University libraries.

Crucially, the study established a significant positive correlation between self-regulated learning and use of AI tools ($r = 0.910$; $p = 0.000$). This means that librarians who actively engage in goal-setting, monitoring and reflective learning are more likely to apply AI tools effectively. This supports Brenner's (2022) theory of self-regulated learning and also confirms findings by Ibikunle & Ikonne (2023), who emphasized the role of self-efficacy and motivation in improving

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digital service capabilities. The strength of the correlation in this study is notable and surpasses those reported in similar studies such as Arilesere, et al. (2020), which found a moderate positive relationship between proactive learning and digital library use.

However, the findings diverge from those of Orubebe, et.al. (2025), who found no significant link between self-directed learning and AI tool use, possibly due to contextual differences in library infrastructure and institutional support across Nigerian regions. The present study offers more optimistic evidence for the role of SRL in driving technological innovation in libraries.

Generally, while awareness and adoption of AI tools are high among Southwestern Nigerian federal university librarians, utilisation is low. Self-directed learning plays a critical role in bridging the gap and encouraging it will help significantly increase adoption and library service provision.

Conclusion

This study has been successful in establishing a significant link between librarians' self-learning and the utilization of artificial intelligence (AI) tools in service delivery in federal university libraries in Southwestern Nigeria. The study findings revealed high rates of knowledge and adoption of AI tools among librarians but the practice is minimal. Most librarians' utilized AI-powered tools like search assistants and chatbots, but advanced AI tools like robotic process automation (RPA) and natural language processing (NLP) were not commonly used. Moderate use of self-directed learning practices was also seen, with more goal setting and consciousness but less independent troubleshooting.

Importantly, the study found a strong, positive and statistically significant relationship between self-regulated learning and AI tool usage. This indicates that librarians who actively engage in planning, monitoring and reflecting on their learning are more likely to adopt and apply AI technologies in their professional tasks. The findings suggest that improving self-regulated learning skills among librarians can drive innovation and improve the overall quality of library service delivery.

In essence, the study contributes to librarianship by empirically linking self-regulated learning with AI mediated service delivery, thereby extending SRL theory into emerging digital library environments in developing contexts.

While infrastructural and institutional challenges still exist, the results underscore the role of individual learning behaviour in bridging gaps in technological adoption. Strengthening the culture of independent and proactive learning among librarians, therefore, holds substantial promise for enhancing library operations in the AI era.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are made:

1. Library management in federal universities should implement regular and targeted training programmes that encourage and build librarians' self-regulated learning capacities, especially in AI-related competencies.
2. University libraries should invest in AI infrastructure, including chatbots, NLP tools and automated cataloguing systems, and ensure their functionalities are integrated into daily library services.
3. Librarians should be encouraged to engage in continuous professional development through self-paced online courses, webinars and certifications focusing on emerging technologies in librarianship.
4. Institutions should provide technical support and mentorship frameworks that assist librarians in troubleshooting AI-related challenges, thereby reinforcing autonomous learning and innovation.
6. Policymakers should develop a strategic framework to guide AI adoption in academic libraries, including ethical guidelines, funding models and capacity-building initiatives, while university administrators should foster a culture of innovation by rewarding librarians who successfully integrate AI tools into their workflow and demonstrate strong self-directed learning behaviours.

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