LECTURERS' AWARENESS AND UTILIZATION OF ARTIFICIAL INTELLIGENCE AS A PROBLEM-SOLVING TOOL FOR EFFECTIVE SERVICE DELIVERY IN PUBLIC UNIVERSITIES IN BAYELSA STATE

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Abstract

The study investigated lecturers' awareness and utilization of artificial intelligence as a problem-solving tool for effective service delivery in public Universities in Bayelsa State. Three research questions and corresponding hypotheses guided the study. The design used in the study was descriptive survey. The population of the study was all the 1,082 academic staff of selected public Universities in Bayelsa State while 292 staff consisting of 235 males and 57 females were sampled for the study using stratified random sampling technique. The instrument used for data gathering was a 15-item questionnaire named "Lecturers' Awareness and Utilization of Artificial Intelligence as a Problem-Solving Tool for Effective Service Delivery Questionnaire" (LAUAIPSTESDQ) which was face and content validated by three experts in Educational Management at Niger Delta University while the reliability was estimated as 0.84 using Cronbach Alpha statistics. Out of the 292 copies of questionnaire administered, 279 copies from 226 males and 53 females which represented 95.5% were retrieved and used for analysis. The research questions were answered using mean and standard deviation while the hypotheses were tested using z-test at 0.05 level of significance. The result of the study indicated that lecturers demonstrated the highest awareness regarding the use of ChatGPT for generating text related contents. The item indicating high utilization was using AI for the development of lecture notes. The most critical barriers identified were inadequate funding of AI enabled resources and inadequate training on how to maximize the potential of AI. The study recommended lecturers should be trained in responsible use of AI and adequate sensitization should be provided on this as it will contribute to service efficiency.

Keywords: *Artificial Intelligence, Lecturers, Problem-Solving, Service Delivery, Universities*

Introduction

Artificial Intelligence (AI), encompassing technologies like machine learning algorithms and Natural Language Processing (NLP), has rapidly transformed various sectors, with education being a significant focus. The integration of AI into academic settings is increasingly viewed as critical for improving educational outcomes and efficiency (Asirit & Hua, 2023). The fundamental shift AI brings is its capacity to empower educators by offering tools that enhance the quality and personalization of educational experience. Specifically, these technologies facilitate the personalization of learning experiences, the automation of administrative tasks, and the provision of timely feedback to students (Owan et al., 2023), and several other administrative and academic tasks within an educational institution like the University system.

As AI's presence in daily life continues to grow, there is a compelling need to scrutinize its influence on educational practices, particularly within the domain of teaching methodology and service delivery (Asirit & Hua, 2023). Globally, universities have actively started incorporating AI into key educational processes, such as lecture delivery and assessment (Fahimirad & Kotamjani, 2018). A notable example of this global trend is the case of Deakin University in Australia, which integrated IBM's supercomputer Watson (an emergent form of AI) to specifically assist students in problem-solving within their academic studies (Fahimirad & Kotamjani, 2018). This demonstrates that AI is not merely a supplementary tool but a core resource for addressing student difficulties and enhancing learning support.

Based on scholarly perception, AI has the capacity to enhance teaching effectiveness by providing lecturers with deeper insights into student performance and needs. Lin (2022) found that AI technologies are instrumental in assisting lecturers to deliver more precise instruction. This precision is achieved through the systematic analysis of students' activities and performance data, allowing for targeted pedagogical interventions (Lin, 2022). By identifying learning gaps and patterns, AI acts as a sophisticated problem-solving assistant for the instructor, thereby contributing to more effective service delivery.

The landscape of AI tools available to lecturers for enhancing teaching and assessment is broad and continually expanding. Barua (2023) compiled an extensive list of AI-powered resources that can be utilized in academic settings. These tools cover a range of functions, from research support and content generation to grammar checking and plagiarism detection. These tools which includes: SciSpace, Schoarlcy, Jenni AI, ChatGPT, Paperpal, Elicit, Consensus, Search Smart, and Evidence Hunt, Casper, Grammarly, and QuillBot. Mendeley and Turnitin can be used for several tasks such as research and content creation, editing and refinement of text, referencing among others.

The utilization of these tools directly addresses common challenges in academic service delivery, such as providing detailed writing assistance, ensuring the originality of student work, and

efficiently locating relevant academic literature for lecture preparation and research. While the potential benefits of AI are widely acknowledged, the actual utilization and adoption of these tools by lecturers are contingent upon several factors, particularly digital competence and the presence of other salient barriers.

The effective utilization of AI tools is intrinsically linked to the digital competency of the user. Okuonghae and Tunmibi (2024) explicitly state that the successful application of AI tools in an educational context requires a foundational level of digital proficiency. This suggests that mere awareness of an AI tool is insufficient; lecturers must possess the skills to integrate the tool effectively and ethically into their teaching and administrative workflows. Furthermore, research indicates a trend towards a moderate use of AI among educators, a pattern that is observed to be heavily based on digital competence (Madu & Musa, 2024). This highlights a critical link between a lecturer's skill level and the frequency and sophistication of their AI tool usage. A low level of digital competence can thus act as a significant inhibitor, even if a lecturer is aware of the tools' existence.

Similarly, there are existing personal and institutional barriers that hinder the adoption of AI and cost of digital technologies, institutional policy, security concerns are major determinants, and these factors are established links between utilization and digital competence (Madu & Musa, 2024; Okuonghae & Tunmibi, 2024). Similarly, the lack of adequate training and low digital literacy also constitutes primary barriers. Other factors such as infrastructural shortages such as poor internet access, institutional resistance to change, concerns over data privacy and ethical implications, and the cost of implementing and maintaining sophisticated AI systems re also unignorably. Understanding these barriers is essential for developing effective strategies to promote wider and more effective adoption of AI in public universities.

There is no doubt that AI technologies offer powerful problem-solving tools for enhancing teaching effectiveness and service delivery in higher education. There is a global trend of universities adopting AI for personalized learning and administrative efficiency (Owan et al., 2023; Fahimirad & Kotamjani, 2018) among others. Furthermore, a diverse range of AI tools for academic purposes exists which are contributing to solving several educational problems (Barua, 2023). However, the level of utilization is significantly mediated by the digital competence of the lecturers among other factors (Madu & Musa, 2024; Okuonghae & Tunmibi, 2024). Addressing this gap is important for optimizing the benefits of AI in the education sector at all levels.

Some studies have been conducted by education scholars to investigate the use of AI in solving education problems. Idika et al., (2024) carried out a study on awareness and utilization of AI tools for effective teaching of research methods in the University of Calabar. Descriptive survey design was adopted for the study while 206 lecturers were sampled. Structured questionnaire (Likert scale, $\alpha=0.77-0.81$) was adopted for data collection and analysis was done using Mean, SD, t-test and

ANOVA. Findings of the study showed that awareness was general, with no significant difference across sexes or disciplines. Utilization was perceived as inadequate. Male lecturers and Science departments had higher mean utilization rate than the other group. Major challenges identified included technical issues, lack of skills/training, restricted access, and cost factor.

Agi et al., (2024) investigated lecturers' level of awareness, utilization, and constraints of AI for teaching and assessment in Universities in Nigeria. Mixed-method approach was adopted in the study while the sample consisted of 4,193 respondents. Questionnaire (α=0.82) and Key Informant Interviews (KII) were used for data gathering which was analyzed using Mean, SD, Pearson correlation and thematic analysis. The result of the study showed that lecturers have moderate awareness of AI applications, but utilization remains low. The primary constraint is inadequate knowledge and training on AI integration in teaching and assessment

On the other hand, Nmadu and Eze (2025) conducted a study on lecturers' perception and uses of AI tools for teaching in the Faculty of Education at Alex Ekwueme Federal University. Case study design as used in the study and the sample consisted of 60 lecturers while data was collected using a 30-item questionnaire (α=0.89 perception, 0.87 usage) which was analyzed using Mean, SD and Levene test. The result of the study showed that lecturers perceive AI tools as vital for teaching. However, AI tools are very scarce at the institution. Implementation problems include lack of time for planning, lack of student awareness/enthusiasm for AI tools.

The study by Fasola (2024) focused on awareness, perception, and use of AI tools by Library & Information Science educators in Nigerian Higher institutions. Survey design was used in the study while questionnaire was used for data gathering and analyzed using Pearson Product Moment Correlation (PPMC). The result of the study showed high degree of awareness and positive perception towards AI tools. Commonly used tools include ChatGPT, Socrative, ChatPDF, Turnitin, and Gamma. Actual usage remains limited due to challenges like rapid technological advancement, lack of infrastructure, and resistance to change. All hypotheses were rejected, showing a significant relationship between awareness, perception, and use. These studies point to the fact that the use of AI in solving educational problems is still evolving even at higher levels of education.

The main objective of the study was to investigate lecturers' awareness and utilization of artificial intelligence as a problem-solving tool for effective service delivery in public Universities in Bayelsa State. The specific objectives were to:

3. ascertain the extent of lecturers' awareness of AI problem solving tools in Public Universities in Bayelsa State

4. find out the level of utilization of AI problem solving tools among lecturers for effective service delivery in public Universities in Bayelsa State

5.   examine the barriers to the adoption of AI problem solving tools for effective service delivery in public Universities in Bayelsa State

The following research questions were raised to guide the study:

3. What is the extent of lecturers' awareness of AI problem solving tools in Public Universities in Bayelsa State?

4. What is the level of utilization of AI problem solving tools among lecturers for effective service delivery in public Universities in Bayelsa State?

5. What are the barriers to the adoption of AI problem solving tools for effective service delivery in public Universities in Bayelsa State?

The following hypotheses were tested at 5% level of significance:

20. There is no significant difference between the mean ratings of male and female academics on the extent of lecturers' awareness of AI problem solving tools in Public Universities in Bayelsa State

21. There is no significant difference between the mean ratings of male and female academics on the level of utilization of AI problem solving tools among lecturers for effective service delivery in public Universities in Bayelsa State

22. There is no significant difference between the mean ratings of male and female academics on the barriers to the adoption of AI problem solving tools for effective service delivery in public Universities in Bayelsa State

Methodology

The design adopted for the study was descriptive survey. The population of the study was all the 1,082 academic staff of the two selected public Universities in Bayelsa State (Federal University Otuoke and Niger Delta University, Wilberforce Island). The sample size of the study was 292 staff consisting of 235 males and 57 females and this number was estimated using the Taro Yamane minimum size determination formula. The selection of respondents was done using stratified random sampling technique. The instrument used for data gathering was a 15-item questionnaire named "Lecturers' Awareness and Utilization of Artificial Intelligence as a Problem-Solving Tool for Effective Service Delivery Questionnaire" (LAUAIPSTESDQ). The questionnaire had two sections which were A and B, for the collection of demographic data of the respondents and the second section contained the questionnaire items. The questionnaire was responded to using the four point modified Likert scale format of Strongly Agee/Very High Extent/Very High Level (SA/VHE/VHL) having a score of 4, Agee/High Extent/High Level (A/HE/HL) having a score of

3, Disagree/Low Extent/Low Level (D/LE/LL), having a score of 2 and Strongly Disagree/Very Low Extent/Very Low Level (SD/VLE/VLL) having a score of 1. These scores were summed up, and the average was 2.50 which was the criterion mean score used for decision making. The questionnaire was face and content validated by three experts in Educational Management at Niger Delta University while the reliability was estimated as 0.84 using Cronbach Alpha statistics. Out of the 292 copies of questionnaire administered, 279 copies from 226 males and 53 females which represented 95.5% were retrieved and used for analysis. The research questions were answered using mean and standard deviation while the hypotheses were tested using z-test at 0.05 level of significance.

Results

Answer to Research Questions

RQ₁: What is the extent of lecturers' awareness of AI problem solving tools in Public Universities in Bayelsa State?

Table 1: Mean and standard deviation scores on the extent of lecturers' awareness of AI problem solving tools in Public Universities in Bayelsa State

S/No	Items	Male n=226		Female n=53		Mean Set	
		Mean $\overline{X}_1$	SD	Mean $\overline{X}_2$	SD	X $\overline{X}$	Decision
1	Ability of Turnitin to detect plagiarism in documents	2.78	0.76	2.72	0.74	2.75	High Extent
2	Use of ChatGPT for generating text related contents	2.91	0.79	2.85	0.71	2.88	High Extent
3	Ability of AI to carry out data analysis functions	2.74	0.75	2.59	0.78	2.67	High Extent
4	Ability of AI to execute presentation functions	2.49	0.82	2.46	0.87	2.48	Low Extent

5	Use of Grammarly as a writing assistant	2.80	0.73	2.77	0.73	2.79	High Extent
	Average					**2.71**	**High**
		2.74	**0.77**	**2.68**	**0.77**		**Extent**

Table 1 indicated that there was a high extent in respect to the overall extent of lecturers' awareness of AI problem-solving tools with an average mean score of 2.71. Lecturers demonstrated the highest awareness regarding the use of ChatGPT for generating text related contents with a mean value of 2.88, and this was closely followed by the use of Grammarly as a writing assistant with a mean score of 2.79 and then the ability of Turnitin to detect plagiarism with a score of 2.75. However, their awareness was notably lower and categorized as low extent concerning the ability of AI to execute presentation functions which had the least mean score of 2.48.

RQ2: What is the level of utilization of AI problem solving tools among lecturers for effective service delivery in public Universities in Bayelsa State?

Table 2: Mean and standard deviation scores on the level of utilization of AI problem solving tools among lecturers for effective service delivery in public Universities in Bayelsa State

S/No	Items	Male n=226		Female n=53		Mean Set	
		Mean $\overline{X}_1$	SD	Mean $\overline{X}_2$	SD	$X \overline{X}$	Decision
6	AI is used for the development of lecture notes	2.75	0.78	2.72	0.73	2.74	High Level
7	AI is used for reviewing academic articles before publication	2.47	0.83	2.45	0.86	2.46	Low Level
8	AI is used for preparing assessment exercises for students	2.41	0.85	2.42	0.88	2.42	Low Level
9	AI is used for responding to students' academic needs	2.46	0.86	2.41	0.92	2.44	Low Level

10	AI is used for analyzing research data	2.40	0.87	2.34	0.94	2.37	Low Level
	Average	**2.50**	**0.84**	**2.47**	**0.87**	**2.48**	**Low Level**

Table 2 shows that the overall level of utilization of AI problem-solving tools among lecturers is generally to a low level which is evidenced by an overall average mean score of 2.48 which is below the criterion mean score of 2.50 used for decision making. The only item indicating high utilization is using AI for the development of lecture notes with a mean value of 2.74. All other activities, including using AI for reviewing academic articles, preparing assessment exercises, responding to student needs, and analyzing research data, showed a low level of utilization, with the lowest score for analyzing research data having a mean score of 2.37.

RQ3: What are the barriers to the adoption of AI problem solving tools for effective service delivery in public Universities in Bayelsa State?

Table 3: Mean and standard deviation scores on the barriers to the adoption of AI problem solving tools for effective service delivery in public Universities in Bayelsa State

S/No	Items	Male n=226		Female n=53		Mean Set	
		Mean $\bar{X}_1$	SD	Mean $\bar{X}_2$	SD	X $\bar{X}$	Decision
11	Inadequate funding of AI enabled resources	2.95	0.74	2.97	0.78	2.96	Agree
12	Lack of stable internet connectivity	2.82	0.78	2.88	0.81	2.85	Agree
13	Data privacy concern among AI users	2.79	0.79	2.90	0.80	2.85	Agree
14	Bias in AI generated outputs	2.45	0.94	2.46	0.96	2.46	Disagree

15	Inadequate training on how to maximize the potentials of AI	2.93	0.75	2.99	0.75	2.96	Agree
	Average	**2.79**	**0.80**	**2.84**	**0.82**	**2.81**	**Agree**

Table 3 indicated that lecturers generally agree that the listed factors constitute significant barriers to the adoption of AI tools, with an overall average mean of 2.81 which was above the criterion mean score of 2.50 used for decision making. The most critical barriers identified are the inadequate funding of AI enabled resources and inadequate training on how to maximize the potentials of AI, both receiving the highest mean score of 2.96. Other key barriers included the lack of stable internet connectivity and data privacy concern among AI users with mean scores of 2.85, while bias in AI generated outputs was the only factor lecturers disagreed with as a barrier with a mean value of 2.46.

Test of Hypotheses

HO₁: There is no significant difference between the mean ratings of male and female academics on the extent of lecturers' awareness of AI problem solving tools in Public Universities in Bayelsa State

Table 4: z-test analysis of no significant difference between the mean ratings of male and female academics on the extent of lecturers' awareness of AI problem solving tools in Public Universities in Bayelsa State

Variable	n	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Male	226	2.74	0.77					
				277	0.51	1.96	0.05	H₀ Not Rejected
Female	53	2.68	0.77					

Table 4 showed that the value of z-cal. of 0.51 was less than the value of z-crit. of 1.96, and as such, the decision was that the null hypothesis will not be rejected and this implied that there was no significant difference between the mean ratings of male and female academics on the extent of lecturers' awareness of AI problem solving tools in Public Universities in Bayelsa State.

HO2: There is no significant difference between the mean ratings of male and female academics on the level of utilization of AI problem solving tools among lecturers for effective service delivery in public Universities in Bayelsa State

Table 5: z-test analysis of no significant difference between the mean ratings of male and female academics on the level of utilization of AI problem solving tools among lecturers for effective service delivery in public Universities in Bayelsa State

Variable	n	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Male	226	2.50	0.84					
				277	0.23	1.96	0.05	H$_0$ Not Rejected
Female	53	2.47	0.87					

Table 5 indicated that the value of z-cal. of 0.23 was less than the value of z-crit. of 1.96, and as such, the decision was that the null hypothesis will not be rejected and this implied that there was no significant difference between the mean ratings of male and female academics on the level of utilization of AI problem solving tools among lecturers for effective service delivery in public Universities in Bayelsa State.

HO3: There is no significant difference between the mean ratings of male and female academics on the barriers to the adoption of AI problem solving tools for effective service delivery in public Universities in Bayelsa State

Table 6: z-test analysis of no significant difference between the mean ratings of male and female academics on the barriers to the adoption of AI problem solving tools for effective service delivery in public Universities in Bayelsa State

Variable	n	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Male	226	2.79	0.80					
				277	0.40	1.96	0.05	H$_0$ Not Rejected
Female	53	2.84	0.82					

Table 6 revealed that the value of z-cal. of 0.40 was less than the value of z-crit. of 1.96, and as such, the decision was that the null hypothesis will not be rejected and this implied that there was no significant difference between the mean ratings of male and female academics on the barriers to the adoption of AI problem solving tools for effective service delivery in public Universities in Bayelsa State.

Discussion of Findings

The findings from the study indicate that awareness of Artificial Intelligence (AI) problem-solving tools among lecturers is generally widespread. Supporting this, the overall extent of lecturers' awareness of AI problem-solving tools was found to be high extent. Specifically, awareness was shown to be highest regarding the use of ChatGPT for generating text related contents, and this was closely followed by the use of Grammarly as a writing assistant and the ability of Turnitin to detect plagiarism. Conversely, the empirical information showed a notably lower awareness, categorized as low extent, concerning the ability of AI to execute presentation functions.

This finding is congruent with that of Fasola (2024), which reported a high degree of awareness and a positive perception towards AI tools among academics. Similarly, the study by Idika et al., (2024) observed that awareness was general, with no significant difference across sexes or disciplines. Supporting this trend, Fasola (2024) provided empirical evidence that commonly used tools include ChatGPT, Socrative, ChatPDF, Turnitin, and Gamma, corroborating the current study's specific findings on high awareness of ChatGPT and Grammarly. However, the empirical information from Agi et al., (2024) somewhat negates this, as their study showed that lecturers have moderate awareness of AI applications, rather than a high extent. Despite the slight variation, the empirical information generally points to a recognized understanding of AI tools for text generation and plagiarism detection.

The result shows a concerning trend regarding the actual use of AI tools, as the overall level of utilization of AI problem-solving tools among lecturers is generally to a low level. Specifically, the finding showed that the only item indicating high utilization is using AI for the development of lecture notes. Conversely, the empirical information revealed a low level of utilization across almost all other academic activities, including using AI for reviewing academic articles, preparing assessment exercises, responding to student needs, and analyzing research data. The lowest reported score was specifically for analyzing research data.

This low utilization rate, despite high awareness, is strongly supported by external empirical evidence. The study by Fasola (2024) specifically concluded that actual usage remains limited. Negating the overall low utilization, the empirical information from Idika et al., (2024) suggested that Male lecturers and Science departments had higher utilization rates than other groups but still concluded that overall utilization was perceived as inadequate. Furthermore, the empirical

information from Agi et al., (2024) directly supports the low utilization finding, stating that utilization remains low, even with moderate awareness. The discrepancy between high awareness/positive perception (Fasola, 2024; Nmadu and Eze, 2025) and low utilization underscores a significant gap between knowledge and practice in tertiary institutions.

The study indicated that significant barriers constitute challenges to the adoption of AI tools, as lecturers generally agree that the listed factors hinder implementation. The findings showed that the two most critical barriers identified are the inadequate funding of AI enabled resources and inadequate training on how to maximize the potential of AI, both receiving the highest scores. Following these, the empirical information highlighted the lack of stable internet connectivity and data privacy concern among AI users as other key barriers. Conversely, the only factor lecturers disagreed with as a barrier was bias in AI generated outputs.

These findings are strongly supported by external empirical evidence. Specifically, the finding that inadequate training is a major challenge is corroborated by Agi et al., (2024), who reported that the primary constraint is inadequate knowledge and training on AI integration in teaching and assessment. Further supporting the identified barriers, the empirical information from Idika et al., (2024) cited major challenges including technical issues, lack of skills/training, restricted access, and cost factor, which aligns with the current study's findings on inadequate funding (cost) and inadequate training (lack of skills). Moreover, the empirical information from Fasola (2024) also supports this, noting challenges like rapid technological advancement, lack of infrastructure, and resistance to change. The study by Nmadu and Eze (2025) further negates the implementation by stating that AI tools are very scarce and listing implementation problems such as lack of time for planning and lack of student awareness/enthusiasm for AI tools. Collectively, the empirical information confirms that resource limitations (funding, connectivity, infrastructure) and skill deficiencies (training) are the primary obstacles preventing the transition from AI awareness to full-scale utilization in tertiary education.

Conclusion

The study concluded that the lecturers are aware of existing AI problem solving tools, but there is a low level at which they put these tools to use. However, the low usage seems to be attributed to the challenges they encounter such as the lack of expertise and non-existence of AI policy to guide the usage of these tools and these experiences cut across both the male and female lecturers in the Universities.

Recommendations

The following recommendations were made in line with the findings of the study:

- There is need for universities to develop and implement AI guidelines that will regulate how lecturers perceive and use AI in their academic and administrative functions.

- Lecturers should be trained in the responsible use of AI and adequate sensitization should be provided on this, as it will contribute to service efficiency for the lecturers as well as aid the attainment of university goals and objectives.

- The government should give more function to the adoption of technology in the University system as this will make access to digital technologies and services easy for lecturers to carry out their responsibilities more responsibly in this digital age.

- Faculties and departments should provide access to problem solving AI tools which should be available for all staff to use for the discharge of their responsibilities.

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