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**TEACHERS' ARTIFICIAL INTELLIGENCE (AI) LITERACY FOR THE IMPLEMENTATION OF
REMOTE TEACHING IN UNIVERSITIES IN RIVERS STATE**

ELIPHALETPHEBE C. AMAEWHULE

Department of Educational Management,
Faculty of Education,
Rivers State University,
Port Harcourt, Rivers State, Nigeria
<https://orcid.org/0009-0003-3157-2415>

PRECIOUS C. ADERIYE

Department of Educational Management,
Faculty of Education,
University of Port Harcourt,
Port Harcourt, Rivers State, Nigeria
<https://orcid.org/0009-0008-5743-9002>

ABSTRACT

The study investigated teachers' Artificial Intelligence (AI) literacy for the implementation of remote teaching in Universities in Rivers State. Three research questions were raised and three hypotheses tested in the study. Descriptive survey design was adopted in the study. The population of the study was all the lecturers in the three public private Universities in Rivers State out of which 384 lecturers were sampled for the study using the Cochran formula while selection of respondents was through convenience sampling technique. The instrument used for data gathering was a 15 items questionnaire named "Teachers' Artificial Literacy for Remote Teaching Questionnaire" (TAILRTQ) which was face and content validated by three experts. There were 384 copies of questionnaire administered but only 351 copies representing 91.4% were retrieved and used for analysis. Research questions raised were answered using mean and standard deviation while the hypotheses were tested at 0.05 level of significance using z-test statistics. The result of the study revealed a low level of AI literacy among the teachers. However, it was indicated that the teachers identified that AI has potential benefits such as enriching online teaching experience and promoting critical thinking. The challenges identified included lack of technical know-how and insufficient technological infrastructure among others. The study recommended adequate sensitization of lecturers on the adoption of AI for all educational activities.

KEYWORDS

Teachers, Artificial Intelligence, Literacy, Remote Teaching, Universities

INTRODUCTION

Background

Technological advancement and global emergencies have continued to disrupt old ways of delivering services and the educational sector is not left behind. Technology today plays a lot of relevance in and outside the classroom including its use as a gaming instrument for teaching and learning (Amaewhule et al., 2020). The emergence of the COVID-19 pandemic which disrupted educational services across all levels forced most schools to shut down and the Universities were not left out. However, while some Universities, particularly the private ones were able to switch to other modes of instruction such as remote teaching and learning, the public ones found it difficult to cope as a result of insufficient technological capability and competence. This is not surprising as Lerias et al., (2024) asserted that acquiring and developing digital skills and competence is important for facilitating lifelong learning which most public Universities failed to achieve.

In this era of Artificial Intelligence, there is no doubt that lecturers in Universities particularly the public ones need to be adequately prepared to explore this development as a way of providing seamless remote teaching when the need arises. Conceptually, Artificial Intelligence (AI) refers to the ability of computers to carry out intelligent or human-like activities. In a related manner, Kaplan and Haenlein (2019) stated that AI is a system which has the ability to interpret data by using them flexibly to achieve specific goals and carry out specific tasks. AI literacy is therefore the ability of lecturers to show expertise on how to manage this technology to achieve outlined educational tasks.

Furthermore, Sperling et al., (2024) stated that AI literacy is the process of acquiring knowledge on AI, understanding its societal consequences in order to make more informed use of this technology. There is no doubt that Artificial intelligence (AI) holds transformative potential for education, promising personalized instruction, heightened student engagement, and improved educational efficiency (Ding *et al.*, 2024). However, it is only those who are literate in its usage that can maximize its usefulness including its deployment as a tool for remote teaching. Similarly, Long and Magerko (2020:598) stated that when we talk of AI literacy, we are referring to “a set of competencies that enables individuals to evaluate AI technologies critically; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace”. This description makes this technology a useful tool for remote teaching.

The relevance of AI to remote teaching requires proper understanding for it to be professionally deployed. According to Ng *et al.*, (2021), there are four-dimensions of AI literacy that every user must be familiar with and this includes knowing and understanding AI, applying AI applications, creating and evaluating AI applications, and considering ethical issues. Adequate knowledge of users in this dimension is important for it to be successfully integrated for remote teaching when the need arises. Teachers can therefore deploy this tool

whether in the time of emergencies or convenience so as to ensure that teaching and learning can go on seamlessly irrespective of the location of the teacher and/or students at any given period of time.

There is no sector that is not benefitting from the development in AI and its application has been useful in industry, banking, insurance, health, and defense sectors (Ganascia, 2018) and as such, its application in the Universities is not in doubt as long as lecturers are literate enough to understand how it can be utilized. This is required so as to attract the benefits that comes with the use of this technology which Celik *et al.*, (2022) indicated could include alleviating the pressures faced by teachers and streamlining their workload. Lecturers and students therefore have a lot that they can benefit when these technology is put to the right use based on understanding.

The deployment of AI as a tool for remote teaching in Universities no doubt comes with its fair of challenges ranging from the fact that the human and physical resources needed to make this happen are rarely available. Additionally, there is also the attitudinal bias from AI users within and outside the University. Scholars such as Chan and Tsi (2023) have lent their voice that AI does not replace the human touch in the teaching process where the teacher must guide the learner through their academic journey and this explanation is important to limit the phobia among some users about the use of AI in the classroom. Walter (2024) alluded to the fact that AI enriches educational experiences and promotes critical thinking but the fact remains that the lack of technological policies which sets the limit to its adoption also remains a challenge making the maximization of this technology difficult whether or not there is an emergency.

Lee *et al.*, (2024) carried out a study on Korean in-service teachers' perceptions of implementing Artificial Intelligence (AI) education for teaching in schools and their AI teacher training programs. Twenty respondents were given a questionnaire, and four focus group discussions were held. The results of the interviews revealed that although there was a clear demand for a AI driven curriculum that is more practice-oriented, the teachers indicated satisfaction when this is done. Many theory-centric courses, according to the respondents, did not provide useful skills or knowledge for classroom environments that are more like real ones.

Zhao *et al.*, (2022) carried out a study on developing AI literacy for primary and middle school teachers in China. Utilizing structural equation modeling, the data gathered from 1013 educators was examined. AI was found to be important for AI Ethics (AIE), Applying AI (AAI), Evaluating AI Application (EAIA), and Knowing and Understanding AI (KUIA). Hollands and Breazeal (2024) conducted another study on establishing AI literacy before adopting AI. Data from 265 instructors was gathered using an online questionnaire, and the teachers reported feeling more confident about their abilities to contribute to the future of AI, having a better understanding of AI ideas, and being more optimistic about the potential benefits of AI to society.

Ayanwale *et al.*, (2024) also carried out a related study on examining artificial intelligence literacy among pre-service teachers for future classrooms. In a quantitative study, 529 pre-service teachers at a university in Nigeria provided data, which was then evaluated using structural equation modeling (SEM). It has been demonstrated that having a solid understanding of AI greatly increases the likelihood of success in AI creation, use,

ethics, and problem-solving. Nevertheless, neither the idea that active AI use improves AI detection skills nor the relationship between emotion control and AI knowledge are true. The study highlights the ethical issues entwined with the persuasive and emotive aspects of AI use, identifying a trade-off between AI creation and use.

Lerias et al., (2024) investigated literacy in artificial intelligence as a challenge for teaching in higher education at Portalegre Polytechnic University. Data was gathered from 75 university lecturers using a questionnaire. On a Likert scale of 1 to 5, the study's average level of AI literacy was 3.28, and it was noted that 62.4% of the responses fell between levels 3 and 4. Also, the results showed that AI literacy was important to the lecturers. These studies establish the fact that different educational stakeholders still look forward to exploring further use of AI tools for achieving a variety of educational goals and objectives.

Aim and Objectives of the Study

The aim of the study was to investigate teachers' Artificial Intelligence (AI) literacy for the implementation of remote teaching in Universities in Rivers State. The specific objectives of the study included to:

- find out the level of teachers' Artificial Intelligence (AI) literacy in Universities in Rivers State
- determine the benefits of teachers' Artificial Intelligence (AI) literacy on the implementation of remote teaching in Universities in Rivers State
- examine the challenges of adopting Artificial Intelligence (AI) for the implementation of remote teaching in Universities in Rivers State

Research Questions

The following research questions were raised to guide the study:

1. What is the level of teachers' Artificial Intelligence (AI) literacy in Universities in Rivers State?
2. What are the benefits of teachers' Artificial Intelligence (AI) literacy on the implementation of remote teaching in Universities in Rivers State?
3. What are the challenges of adopting Artificial Intelligence (AI) for the implementation of remote teaching in Universities in Rivers State?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant difference between the mean ratings of male and female respondents on the level of teachers' Artificial Intelligence (AI) literacy in Universities in Rivers State
2. There is no significant difference between the mean ratings of male and female respondents on the benefits of teachers' Artificial Intelligence (AI) literacy on the implantation of remote teaching in Universities in Rivers State

- There is no significant difference between the mean ratings of male and female respondents on the challenges to the adoption of Artificial Intelligence (AI) to remote teaching in Universities in Rivers State

METHODOLOGY

This study employed the descriptive survey design as it focused on investigating a phenomenon that currently exists. The population of the study was all the lecturers in the three public private Universities in Rivers State out of which 384 lecturers were sampled for the study. The sample size was determined using the Cochran formula for unknown population while the respondents were selected using convenience sampling technique consisting of 192 males and 192 females across the different institutions. The instrument used for data gathering was a 15 items questionnaire titled “Teachers’ Artificial Literacy for Remote Teaching Questionnaire” (TAILRTQ) and was responded to on a four point modified rating scale of Very High Level (VHL), High Level (HL), Low Level (LL) and Very Low Level (VLL) for research question one and Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) with weighted values of 4, 3, 2 and 1 which was aggregated to 10 and divided by 4 to arrive at 2.50 which was the criterion mean score of agreeing or disagreeing with the items raised. The questionnaire was face and content validated by three experts (two in Educational Management at Rivers State University and one in Measurement and Evaluation at University of Port Harcourt). There were 384 questionnaire administered but only 351 copies representing 91.4% from 169 males and 182 females were retrieved and used for analysis. The research questions raised were answered using mean and standard deviation while the hypotheses were tested at 0.05 level of significance using z-test statistics.

RESULTS AND DISCUSSION

1. What is the level of teachers’ Artificial Intelligence (AI) literacy in Universities in Rivers State?

Table 1. Mean and standard deviation scores on the Level of Teachers’ Artificial Intelligence (AI) Literacy in Universities in Rivers State

S/No	Items	Male Respondents n=169		Female Respondents n=182		Average Mean	Decision
		Mean \bar{X}_1	SD	Mean \bar{X}_2	SD		
1	Abreast with the different concepts related to the use of AI	2.51	0.86	2.43	0.93	2.47	Low Level
2	Ever used AI to carry out any educational activity in the past	2.62	0.82	2.50	0.90	2.56	High Level
3	Adopted AI for an assessing	2.47	0.88	2.40	0.94	2.44	Low Level

	educational activity in the past							
4	Have an understanding of how AI works	2.42	0.91	2.38	0.96	2.40	Low Level	
5	Familiarization with the ethical guidelines for using AI	2.43	0.90	2.42	0.95	2.43	Low Level	
	Grand Mean and Standard Deviation	2.49	0.87	2.43	0.94	2.46	Low Level	

Table 1 showed that there was a low level of teachers' Artificial Intelligence (AI) literacy in Universities in Rivers State since the average mean score of 2.46 was less than the criterion mean score of 2.50 used for decision making. Similarly, the level of literacy was low among the male and female teachers with mean values of 2.49 and 2.43 respectively. Specifically, while the teachers were literate in the use of AI, only the male teachers were literate in terms of being abreast with AI concepts but they were all not familiar with AI concept, adopted AI for assessment of educational activities nor have understanding of how AI works accounting for their low level of AI literacy.

2. What are the benefits of teachers' Artificial Intelligence (AI) literacy on the implementation of remote teaching in Universities in Rivers State?

Table 2. Mean and standard deviation scores on the Benefits of Teachers' Artificial Intelligence (AI) Literacy on the Implementation of Remote Teaching in Universities in Rivers State

S/No	Items	Male Respondents n=169		Female Respondents n=182		Average Mean	Decision
		Mean \bar{X}_1	SD	Mean \bar{X}_2	SD		
6	Provides a platform for critical thinking during teaching	2.82	0.78	2.70	0.80	2.76	Agreed
7	Enriches the teaching process with variety of teaching resources	2.90	0.75	2.77	0.78	2.84	Agreed
8	Automation of teaching activities for timely completion of scheduled activities	2.79	0.83	2.53	0.89	2.66	Agreed
9	Provides for personalized learning experience	2.92	0.73	2.81	0.76	2.87	Agreed
10	Promotes collaboration in the teaching process	2.85	0.77	2.68	0.81	2.77	Agreed
	Grand Mean and Standard Deviation	2.86	0.77	2.70	0.81	2.78	Agreed

Table 2 indicated that the teachers agreed on the benefits of AI in the implementation of remote teaching and an average mean score of 2.78 which was more than the criterion mean score of 2.50 used for decision making. The respondents agreed that AI provides a platform for critical thinking, enriches teaching, helps in automation of teaching, personalized learning and promotes collaboration and this was because the mean score of each of these items were above the criterion mean score of 2.50 used for decision making.

3. What are the challenges of adopting Artificial Intelligence (AI) for the implementation of remote teaching in Universities in Rivers State?

Table 3. Mean and standard deviation scores on the Challenges of Adopting Artificial Intelligence (AI) for the Implementation of Remote Teaching in Universities in Rivers State

S/No	Items	Male Respondents n=169		Female Respondents n=182		Average Mean	Decision
		Mean \bar{X}_1	SD	Mean \bar{X}_2	SD		
11	Inadequate technical know-how for AI adoption	2.94	0.72	2.86	0.74	2.90	Agreed
12	Shortage of technological infrastructure for AI usage	2.90	0.75	2.92	0.71	2.91	Agreed
13	Uncertainty around quality of data and information being used	2.83	0.78	2.80	0.76	2.82	Agreed
14	Capital intensive nature of AI adoption in teaching	2.72	0.85	2.70	0.80	2.71	Agreed
15	Problem of privacy in the use of AI	2.73	0.85	2.55	0.88	2.64	Agreed
Grand Mean and Standard Deviation		2.82	0.79	2.77	0.78	2.80	Agreed

Table 3 established that with mean scores of 2.94, 2.90, 2.83, 2.72 and 2.73 from the male teachers and 2.86, 2.92, 2.80, 2.70 and 2.55 from the female teachers, they both agreed that inadequate technical know-how, shortage of technological infrastructure, uncertainty about data quality, capital intensive nature of AI and problem of privacy were challenges to the adoption of AI for remote teaching in the Universities. The grand mean values of 2.82 and 2.77 from the male and female teachers as well as the average mean score of 2.80 showed that the respondents agreed with the items listed as the challenges of adopting Artificial Intelligence (AI) for the implementation of remote teaching in Universities in Rivers State.

Test of Hypotheses

Hypothesis One: There is no significant difference between the mean ratings of male and female respondents on the level of teachers' Artificial Intelligence (AI) literacy in Universities in Rivers State

Table 4. Summary of z-test analysis on the difference between the mean ratings of male and female respondents on the level of teachers' Artificial Intelligence (AI) literacy in Universities in Rivers State

Variable	n	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Male Respondents	169	2.49	0.87	349	0.62	1.96	0.05	Not rejected
Female Respondents	182	2.43	0.94					

Table 4 helps us to understand that the null hypothesis was not rejected and this was because the critical value of t which was 1.96 at 0.05 level of significance and 349 degrees of freedom was more than the estimated value of t-cal. Of 0.62 and this implied that there was no significant difference between the mean ratings of male and female respondents on the level of teachers' Artificial Intelligence (AI) literacy in Universities in Rivers State.

Hypothesis Two: There is no significant difference between the mean ratings of male and female respondents on the benefits of teachers' Artificial Intelligence (AI) literacy on the implantation of remote teaching in Universities in Rivers State

Table 5. Summary of z-test analysis on the difference between the mean ratings of male and female respondents on the benefits of teachers' Artificial Intelligence (AI) literacy on the implantation of remote teaching in Universities in Rivers State

Variable	n	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Male Respondents	169	2.86	0.77	349	1.90	1.96	0.05	Not rejected
Female Respondents	182	2.70	0.81					

Table 5 was able to show that the null hypothesis was not rejected and this was because the critical value of t which was 1.96 at 0.05 level of significance and 349 degrees of freedom was more than the estimated value of t-cal. Of 1.90 and this implied that there was significant difference between the mean ratings of male and female respondents on the benefits of teachers' Artificial Intelligence (AI) literacy on the implantation of remote teaching in Universities in Rivers State.

Hypothesis Three: There is no significant difference between the mean ratings of male and female respondents on the challenges to the adoption of Artificial Intelligence (AI) to remote teaching in Universities in Rivers State

Table 6. Summary of z-test analysis on the difference between the mean ratings of male and female respondents on the challenges to the adoption of Artificial Intelligence (AI) to remote teaching in Universities in Rivers State

Variable	n	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Male Respondents	169	2.82	0.79	349	0.60	1.96	0.05	Not rejected
Female Respondents	182	2.77	0.78					

Table 6 clarified that the null hypothesis was not rejected and this was because the critical value of t which was 1.96 at 0.05 level of significance and 349 degrees of freedom was more than the estimated value of t-cal. Of 0.62 and this implied that there was no significant difference between the mean ratings of male and female respondents on the challenges to the adoption of Artificial Intelligence (AI) to remote teaching in Universities in Rivers State.

Discussion of Findings

Responses from the teachers sampled for the study revealed that there was a low level of AI literacy among them and there was no significant difference in the response of the male and female teachers in this regard. This implies that the male and female teachers both agreed that there was a low level of AI literacy among them which calls for more enlightenment and empowerment in order to make these lecturers more AI literate. This may explain why the study by Lee et al., (2024) found that there was a clear demand for a AI driven curriculum that is more practice-oriented among teachers and the teachers indicated satisfaction when this is done implying that they looked forward to more integration of AI into school activities. In their responses, it was revealed that the lecturers have reasonably used AI in their teaching activities which is one of the important aspects of AI literacy. However, while the male teachers showed that they were better informed about basic AI concepts, the case of the female teachers was low. This means that the male teachers were more abreast with AI concepts than the female teachers. On the other hand, both the male and female lecturers indicated a low level to which AI is used for evaluation implying that they do not usually use this technology for assessment which is one of the essential needs of remote teaching. One of the major challenges of remote teaching is how to conduct evaluation which is one area where AI can be of assistance but the teachers are sadly not accustomed to this. Similarly, there was a low level to which the teachers understand how AI works in terms of its input, output and processes and they also indicated that they are not familiar with ethics in AI adoption. It can therefore be deduced that these

lecturers need to be further encouraged to embrace AI in all of their educational activities because of the enormous advantages that it has and not just in the area of remote teaching alone.

According to the responses of the teachers, there are several benefits that come with the use of AI in the implementation of remote teaching and the teachers agreed that one of these benefits is that it provides a platform for critical thinking. Supporting this assertion, the study by Lérias et al., (2024) indicated that on a Likert scale of 1 to 5, teachers average level of AI literacy was 3.28, and it was noted that 62.4% of the responses fell between levels 3 and 4 which showed that AI literacy was important to the lecturers. Similarly, the respondents agreed that this technology enriches the teaching process and this may be based on the variety of educational resource that AI offers making it a useful tool in the remote teaching process. With this technology, teachers and students are able to have an almost real life interactive experience as well as access useful products and services that can make teaching more meaningful to the learners. Other benefits that the respondents agreed to are the ability to automate instruction and teaching activities which means that the teacher does not need to be physically present to carry out his or her educational activities. There is also the benefit of personalized learning for the students and the promotion of collaboration. This means that group of teachers can come together and deliver instruction to their students irrespective of their location which means that students with learning challenges can be collectively assisted while the teachers collaborate which means that greater educational outcomes can be achieved while teaching remotely. In fact, Zhao et al., (2022) indicated in their study that teachers reported feeling more confident about their abilities to contribute to the future of AI, having a better understanding of AI ideas, and being more optimistic about the potential benefits of AI to society thereby corroborating the findings of this study that the teachers believe that they can achieve more through the adoption of AI in teaching whether remotely or otherwise.

The teachers agreed on the items listed as challenges to the adoption of AI for remote teaching and there was no difference in the opinion of the male and female teachers in this regard. In terms of challenges, the respondents agreed that some of the challenges to the adoption of AI for remote teaching includes the lack of technical know-how which means that the teachers may not be skilled enough in the use of this technology. Similarly, the shortage of critical technological infrastructure which makes AI operational such as efficiency internet and computer devices were also said to be in short supply and this can hinder the operation of AI for remote teaching. Other factors such as the problem of data quality, data privacy and capital intensive nature of AI adoption were identified as possible challenges. This position aligns with that of Ayanwale et al., (2024) which indicated that users still feel that there are ethical issues which limited their use of AI which is an issue that needs to be given attention to by experts in this area. This finding therefore suggests that there is need for collaboration among all educational stakeholders for teachers to be AI literate and adopt this technology for seamless remote teaching particularly during emergencies in the Universities.

CONCLUSION

It was concluded from the findings of the study that the male and female teachers showed no significant difference in their response about the level of teachers AI literacy, benefits of teachers' literacy and the challenges in the adoption of AI. The AI literacy of the teachers was to a low level but they had an understanding of the possible benefits of AI literacy to remote teaching but were faced with challenges around lack of technical know-how, infrastructure, data quality among others and this hinders the use of this technology for remote teaching in these Universities.

RECOMMENDATIONS

The following recommendations were made based on the findings of the study:

1. Lecturers in Universities need to be adequately sensitized and trained on how to use artificial intelligence in their various areas of responsibility particularly teaching as well as research and community development. This will help to improve the quality of service delivered by the teachers at low cost.
2. The integration of AI should be enforced as a matter of policy by the government and University administrators as this will assist lecturers to maximize the benefits that comes with its use for improving educational goals and objectives in their various institutions.
3. University management should provide institutional support to lecturers for the use of AI in teaching such as regular training, provision of subsidized tools, as well as access to critical infrastructure that will enable these lecturers to use this emerging technology appropriately and regularly as this will help promote their work efficiency across all levels.

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