

# Assessment of lecturers' awareness of artificial intelligence for education in a Nigerian university

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**Abstract.** Artificial intelligence (AI) plays a significant role in the educational sector, offering lecturers and students innovative ways of teaching and learning, assessment, acquiring skills, communicating, sharing, creating, grading and interacting with learning materials. Unfortunately, Nigerian universities are yet to fully explore AI in their educational activities, which may be due to inadequate awareness, lecturers' attitudes, lack of self-efficacy, opposition to change, and lack of adequate preparedness to utilise AI. Hence, this study assessed lecturers' awareness of artificial intelligence for education in a Nigerian university. The study adopted a descriptive survey research design. A sample of 271 lecturers was selected using a proportionate stratified random sampling technique. The study was guided by two research questions and a corresponding research hypothesis. A researcher-designed structured questionnaire was used for data collection, which four experts validated. The questionnaire was pilot-tested, and the data obtained were subjected to statistical analysis using the Cronbach alpha correlation formula, and a reliability coefficient of 0.87 was obtained. Descriptive statistics of mean and standard deviation were used to answer the research questions. The findings of the study revealed that lecturers are aware of AI, with a grand mean of 2.57. Independent samples t-test analysis showed that  $t = 1.047$ ,  $p > 0.05$ , indicating no significant difference in the mean response of male and female university lecturers' level of awareness of artificial intelligence for education. In light of the findings, it was recommended that conferences, seminars and workshops should be organised for lectures to increase their level of awareness of the numerous opportunities that AI can provide in augmenting their educational activities, enabling an environment with adequate facilities that will enable lecturers to acquire adequate knowledge on the use of AI should be provided by education stakeholders.

**Keywords:** artificial intelligence, awareness, Nigerian university, gender

## 1. Introduction and literature review

The Nigerian government, through the Federal Ministry of Communication and Digital Economy, has integrated the use of information and communications technologies (ICTs) into the

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educational system. ICTs are technological tools, equipment and resources used for communication, which entails the creation, dissemination, storing, and managing of information [7]. Mndzebele [23] identified the importance of ICT, which, when effectively integrated into education, can provide potential and powerful enabling tools and resources for internal efficiency of the educational system, increase learners' interest, strengthen the relevance of education and promote quality education. The advancement of ICTs has set the pace for the fourth educational revolution (Education 4.0). Artificial intelligence is a significant player in the fourth educational revolution.

Artificial intelligence (AI) is a computational system that performs tasks by adapting, synthesising, self-correcting, and using data in a human-like manner [31]. Similarly, Verma [36] defined AI as the process of making computer programs and machines to solve complex problems, the same as humans could solve problems in acting, identifying, recognising and reasoning. Artificial intelligence is the use of software algorithms and techniques to enable computers and machines to replicate human perception and decision-making processes in order to execute jobs successfully [24]. In addition, Karsenti [19] identified examples of AI technologies as computer programs (such as online platforms) and computerised machines (such as robots).

AI can assist instructors in personalising their lessons to meet learners' different learning abilities by creating digital content. For example, with Gooru, instructors can create personalised learning opportunities for students, organise course content into comprehensible units of the study and create assessments with access to immediate feedback [14]. AI tools help to deliver higher standards of teaching as technologies assist the lecturers; less time is spent talking, and more time is spent gaining valuable insights and professional development. This was buttressed by Pokrivcakova [30], who noted that AI-enabled technologies aid in the development of a sophisticated educational environment in which learning can be more personalised, teaching can be more flexible, and administration can be more inclusive. For example, Duolingo, a language-learning programme based on AI and voice recognition, is used by many lecturers to liven up their language classes [19]. A university lecturer is a person who lectures as an occupation in a university. A university is a tertiary institution saddled with the responsibility of training graduates to obtain degree certificates in various disciplines. Lecturers' awareness of AI is paramount for lecturers to use AI.

Awareness refers to a lecturer's ability to understand the available AI technologies and resources, as well as how they can be used to perform academic tasks [1]. For lecturers to optimally use AI, they need to be aware of its utilisation and impact on their academic activities and be proficient in its use. The knowledge of lecturers on the utilisation of AI for education is fundamental to enabling lecturers to utilise it successfully for their academic activities. This was emphasised by Agyapong, Barfi and Kwafoa [3], who stated that users were unable to realise the potential of information resources to suit their information demands due to their lack of awareness of them. Results that emanated from Kwafo [22] study revealed that most of the students are aware of AI through seminars, journals, and media. However, studies have shown a contradicting conclusion in terms of university lecturers' awareness of modern technologies in education. Studies have shown that lecturers' awareness of modern technologies is low [4, 13, 18, 28, 32, 33]. While studies by Abba and Adamu [1], Basiru and Okwilagwe [5], Bindu [6], and Fakomogbon, Olanrewaju and Soetan [10] showed that lecturers have moderate knowledge of modern technology. On the contrary, research evidence has shown that the

majority of the lecturers are fully aware of modern technologies in education [9, 11, 26, 29].

Gender is ascribed to the sociocultural behaviours, features, duties and parts which are attributed to being females and males in the society, community and environment [25]. Studies have shown that men were more aware of technologies than their female counterparts [6, 16, 18, 26, 28]. However, research evidence revealed that there was no significant difference between male and female awareness of technologies for education [16, 27, 28].

## 2. Statement of the research problem

In this digital age, artificial intelligence plays a significant role in the educational success of lecturers and learners by offering them new innovative ways of teaching and learning, assessment, acquiring skills, communicating, sharing, creating, grading, analysing and interacting with learning materials. Artificial intelligence, when effectively integrated and used optimally in the teaching and learning process, will enhance the development of digital literacy and informed citizenship in the digital age. The work of a lecturer is demanding, especially in Nigerian institutions with insufficient technologies and large class sizes with learners of different learning abilities. AI devices, applications and software can be used by lecturers as very effective supporting tools [30].

Despite the numerous benefits associated with the utilisation of AI in education, lecturers in Nigerian universities have yet to fully explore AI in their educational activities, which may be due to inadequate awareness of the intelligent devices, applications (apps) and software systems available in education. Lecturers' attitudes, lack of self-efficacy, lack of sufficient technical know-how, opposition to change, and lack of adequate preparedness to utilise AI in education, among others. Therefore, there is a need to assess lecturers' awareness of artificial intelligence in education at Nigerian universities.

Furthermore, studies have been conducted on teachers' and lecturers' awareness of ICT technologies, e-learning, electronic resources, electronic information resources, instructional media, virtual learning, turn-it-in software, machine learning, mobile learning, nanotechnology, Internet services and resources. However, none of the studies were conducted on lecturers' awareness of artificial intelligence in education. Hence, this study is intended to fill this research gap by assessing university lecturers' level of awareness of artificial intelligence for education in a Nigerian university.

## 3. Research questions

The following research questions were raised and answered in this study:

RQ1: To what extent are university lecturers aware of artificial intelligence for education?

RQ2: What is the difference between male and female university lecturers' level of awareness of artificial intelligence for education?

## 4. Research hypothesis

One research hypothesis was formulated and tested at a 0.05 level of significance:

$H_{01}$ : There is no significant difference in the mean response of male and female university lecturers' level of awareness of artificial intelligence for education.

## 5. Research methodology

The research design adopted for this study is a descriptive survey research design. The Nigerian university selected for this study is the Federal University of Technology (FUT) Minna. The population of this study comprised all the 903 lecturers across the nine schools in FUT Minna, Niger State. A proportionate stratified random sampling technique was used to select 30% of lecturers across the nine schools of FUT, Minna. The sample distribution of lecturers in the Federal University of Technology, Minna, across the nine schools is presented in table 1.

**Table 1**

Proportional sample size of lecturers from each school in FUT, Minna.

N <sup>o</sup>	Schools	Male	Female	Sample size
1	School of Agriculture and Agricultural Technology	34	9	43
2	School of Electrical Engineering and Technology	24	2	26
3	School of Environmental Technology	36	5	41
4	School of Information and Communication Technology	19	7	26
5	School of Life Sciences	15	10	25
6	School of Physical Sciences	34	6	40
7	School of Science and Technology Education	14	4	18
8	School of Infrastructure, Process Engineering and Technology	36	4	40
9	School of Entrepreneurship and Management Technology	9	3	12
<b>Total</b>		<b>221</b>	<b>50</b>	<b>271</b>

A structured questionnaire developed by the researcher titled Lecturers' Awareness of Artificial Intelligence for Education (LAAIE) consists of 30 items, structured on a four-point rating scale of FA (Fully Aware = 4), A (Aware = 3), NFA (Not Fully Aware = 2) and NA (Not Aware = 1) was used for data collection. To ascertain the appropriateness of the questionnaire, it was validated by four experts, two senior lecturers from the Department of Educational Technology, a lecturer from the Department of Science Education Department and a Guidance Counselor all in the Federal University of Technology Minna. All the corrections, suggestions and modifications made were effected.

To determine the internal consistency of the questionnaire, a one-shot pilot test was conducted at the University of Abuja on 45 lecturers. The data were subjected to statistical analysis using Cronbach's alpha correlation formula, and a reliability coefficient of 0.87 was obtained. Cronbach's alpha scores greater than 0.70 are considered indicative of acceptable reliability [34]. Hence, the instrument was considered reliable to collect the needed data.

## 6. Results

### 6.1. RQ1: To what extent are university lecturers aware of artificial intelligence for education?

Mean and standard deviation were used to answer research question one as shown in table 2.

**Table 2**

Mean and standard deviation on the extent of university lecturers' awareness of artificial intelligence for education.

N <sup>o</sup>	Items	N	Mean	SD	Decision
	<i>Extent of awareness of:</i>				
1	AI writing assistants, such as Grammarly, to improve my student's writing skills.	271	2.95	0.90	Aware
2	Smartboard to promote class discussions and improve students' experiences and presentation skills.	271	3.10	0.78	Aware
3	AI learning platforms such as Google Classroom can be used to enhance lecturers' and learners' interaction.	271	3.09	0.86	Aware
4	AI learning platforms like Netex learning to create customised student learning materials and incorporate interactive elements such as audio, video and self-assessment into the learning material.	271	2.44	0.91	Not Fully Aware
5	Gooru, an AI learning platform to find, remix and share collections of web resources with my students.	271	2.21	0.87	Not Fully Aware
6	Intelligent tutoring system can be used to provide personalised learning to student based on their learning style.	271	2.56	0.88	Aware
7	Presentation translator to present learning content visually to students in different languages.	271	2.53	1.01	Aware
8	Embibe to provide customised materials and personalised feedback to my students.	271	2.13	0.90	Not Fully Aware
9	Padlet to enhance collaborative learning and gauge my student's understanding of a topic or concept.	271	2.15	0.96	Not Fully Aware
10	Khan Academy to identify gaps in my student's understanding of a concept and tailor instruction to meet the needs of every student.	271	2.03	0.92	Not Fully Aware
11	Blendspace to create digital lessons or use free lessons and activities created by other educators and assess my students' performance.	271	2.06	0.91	Not Fully Aware
12	Brainly to connect students with their peers to address subject-specific questions and answers, which are verified by over a thousand moderators who recommend a peer who can offer hints to get the correct answer.	271	2.20	0.96	Not Fully Aware

*Continued on next page*

Table 2 – continued from previous page

N <sup>o</sup>	Items	N	Mean	SD	Decision
	<i>Extent of awareness of:</i>				
13	Robots to provide customised answers in response to learners' messages, grade their performance, and provide tips on what areas learners need to improve.	271	2.88	0.86	Aware
14	Automated facial recognition, such as biometric face scanning surveillance, to automate attendance roll marking in class and during examinations.	271	2.70	0.94	Aware
15	AI software such as Turnitin to assess, provide feedback to students and ascertain their level of plagiarism.	271	3.31	0.74	Aware
16	AI-powered cameras to track students' movements and monitor their facial expressions to enhance automating examination supervision.	271	2.78	0.94	Aware
17	WriteToLearn, an automatically scored web-based personalised tool to evaluate the meaning, relevance of text and correctness of grammar and spelling of my students' writings.	271	2.34	0.85	Not Fully Aware
18	Kahoot, a game-based learning platform for formative and summative evaluation.	271	2.06	0.88	Not Fully Aware
19	Gradescope to assess word length, spelling errors, and the ratio of upper case to lower case letters, which offer students immediate grades and feedback on their submitted work.	271	2.07	0.83	Not Fully Aware
20	Intelligent Essay Assessor is an internet-based tool that automatically evaluates the meaning of the text, grammar, style, and the mechanics of my students' text structure.	271	2.22	0.78	Not Fully Aware
21	GradeCam to read my students' numeric handwriting and automatically score the answer based on the answer key provided.	271	2.13	0.86	Not Fully Aware
22	Statistical Package for Social Science (SPSS) for immediate manipulation and computation of statistical and mathematical calculations.	271	3.41	0.77	Aware
23	Google Scholar to quickly see the main journals, disciplines and authors that are published in my area of interest.	271	3.34	0.75	Aware
24	Grammarly Premium automates proofreading and identifies and corrects errors in my writing while preventing plagiarism.	271	2.96	0.97	Aware
25	Cited reference search in Web of Science can be used to monitor current development and track prior research in over 100 years of record and back files.	271	2.66	0.90	Aware
26	Scopus, a source-neutral abstract and citation database, generate precise citation search results and automatically creates and updates my research profile.	271	2.60	0.92	Aware

*Continued on next page*

**Table 2 – continued from previous page**

N <sup>o</sup>	Items	N	Mean	SD	Decision
<i>Extent of awareness of:</i>					
27	Mendeley to predict citation impact, automate the extraction of metadata from PDF articles and organise and share research questions.	271	2.62	0.98	Aware
28	Kopernio to easily and legally read the full texts of scientific journal articles.	271	2.07	0.91	Not Fully Aware
29	ResearchGate for collaboration with colleagues and peers of similar interest in research.	271	3.18	0.91	Aware
30	EndNote automates the collection and curation of research materials and formatting of bibliographies.	271	2.45	1.01	Not Fully Aware
<b>Grand mean</b>			<b>2.57</b>		<b>Aware</b>

Decision key: Not Aware = 1.0 – 1.49, Not Fully Aware = 1.5 - 2.49, Aware = 2.5 – 3.49 and Fully Aware 3.5 – 4.0

Table 2 presents the extent of university lecturers’ awareness of artificial intelligence for education. From the table, items 4, 5, 8, 9, 10, 11, 12, 17, 18, 19, 20, 21, 28 and 30 had a mean rating within the range of 1.5 – 2.49 (NFA) which means university lecturers are not fully aware of the items. While items 2, 3, 6, 7, 13, 14, 15, 16, 22, 23, 24, 25, 26, 27 and 29 had mean ratings within the range of 2.5 – 3.49 (A), which means that university lecturers are aware of the items. The table further revealed that the grand mean score response to the 30 items is 2.57, which falls under the mean Aware rating. This implies that lecturers are aware of AI for education in a Nigerian university.

**6.2. RQ2: What is the difference between male and female university lecturers’ level of awareness of artificial intelligence for education?**

Mean and standard deviation were used to answer research question two as shown in table 3.

**Table 3**

Mean and standard deviation of male and female university lecturers’ level of awareness of artificial intelligence for education.

Gender	N	Mean	Standard deviation	Mean difference
Male	221	64.00	12.52	2.08
Female	50	66.08	12.02	

Table 3 shows the mean and standard deviation of male and female university lecturers’ level of awareness of AI for education in a Nigerian university. From the result, the mean with standard deviation of male lecturers is  $\bar{X} = 64.00$  and  $\sigma = 12.52$ . In contrast, the mean with a standard deviation of female lecturers is  $\bar{X} = 66.08$  and  $\sigma = 12.02$ , with a mean difference of 2.08 in favour of the female lecturers. This shows that female lecturers had higher mean ratings than their male counterparts on the extent of awareness of AI in a Nigerian university.

### 6.3. H<sub>01</sub>: There is no significant difference in the mean response of male and female university lecturers' level of awareness of artificial intelligence for education

The data used for hypothesis H<sub>01</sub> was converted from ordinal scale to interval scale on Excel and then tested using independent samples t-test as presented in table 4.

**Table 4**

Independent samples t-test of male and female university lecturers' level of awareness of artificial intelligence for education.

Gender	N	Degrees of freedom	Mean	Standard deviation	t-value	p-value
Male	221	269	64.00	12.52	1.067	0.287*
Female	50		66.08	12.02		

\* - not significant at 0.05 ( $p > 0.05$ ).

Table 4 shows the independent samples t-test results of male and female university lecturers' level of awareness of artificial intelligence for education. From the table, the t-value is 1.067,  $p = 0.287$ . The p-value is greater than the level of significance. Hence, the hypothesis was not rejected. This indicates that there is no significant difference in the mean response of male and female university lecturers' level of awareness of artificial intelligence for education, implying that male and female lecturers are aware of artificial intelligence for education in Nigerian university.

## 7. Discussion

The findings of this study revealed that lecturers were aware of AI for education in a Nigerian university. This agrees with the findings of Kwafo [22], who reported that students and faculty members are aware of AI in Finland. It also agrees with the Bindu [6] study, which revealed that teachers' level of ICT awareness in classrooms was at an average level. Similarly, Basiru and Okwilagwe [5] revealed that lecturers' awareness level of electronic databases was at an average level. In addition, the findings of Abba and Adamu [1] revealed that the level of university lecturers' awareness of Internet Resource Service for academic activities was moderate. Also, Chigbu et al. [8] revealed that teachers were moderately aware of the use of technology in the teaching and learning of the English language. The finding disagrees with that of Garba [13], which reported a low level of awareness of the existence of turn-it-in software in detecting plagiarism. Similarly, a study by Ipsos MORI [18] revealed that the public awareness of ML was low. Also, Adamu [2] study found out that lecturers' level of awareness of edutainment was low.

In addition, a study by Rathi [32] discovered that the awareness level of students on AI and its related fields was low. Likewise, Guanah [15] reported that the awareness level of the respondents about AI was low. However, the findings contradict those of Yusuf et al. [37], who revealed that lecturers' awareness of the use of podcasts for teaching is high. Similarly, Falode et al. [11] revealed that lecturers' awareness of open educational resources (OER) for teaching in tertiary institutions was high.

The findings emanating from this study also revealed that male and female lecturers are aware of artificial intelligence in education at Nigerian university. This finding agrees with the finding of Farhan [12], who reported no significant difference in the awareness of male and female teachers on mobile learning in Saudi Arabia. Also, Upadhyay [35] study revealed no significant difference in the awareness of male and female primary school teachers towards Educational Technology in India. However, the finding contradicts the report of Khan [20], whose result revealed that female teachers were more aware of the uses of ICT in their daily teaching and learning process than their male counterparts.

Similarly, Khurshid and Zahur [21] study revealed that male teachers' awareness of innovative teaching strategies is higher than that of their female counterparts. Ipsos MORI [18] study revealed that male was more aware of Machine Learning than their female counterpart. A study by Bindu [6] showed that male teachers were more aware of ICT in classrooms than their female counterparts. Similarly, a study by Falode et al. [11] revealed that the level of awareness of male lecturers was higher than that of the female lecturers on the use of OER. Moreover, İpek et al. [17] study revealed that there was a significant difference between male and female awareness of nanoscience and nanotechnology in favour of male teachers.

## 8. Conclusion

Artificial intelligence, one of the major technologies in the fourth educational revolution, has been integrated into education. The study concluded that most lecturers in Nigerian university are aware of artificial intelligence for education. Gender equality is a factor to be considered in every aspect of human endeavour. It is clear from the study that male and female university lecturers were aware of artificial intelligence for education.

## 9. Recommendations

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

- 1) lecturers are aware of AI; therefore, conferences, seminars and workshops should be organised for them to increase their level of awareness of the numerous opportunities that AI can provide in augmenting their educational activities;
- 2) lecturers should be encouraged to use AI to ease their demanding work and tasks; therefore, an enabling environment with adequate facilities that will enable them to acquire adequate knowledge on the use of AI should be provided by education stakeholders.

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