ASSESSMENT OF LECTURERS' UTILISATION OF ARTIFICIAL INTELLIGENCE FOR EDUCATION IN A NIGERIAN UNIVERSITY

THOMAS, Glory[1], GAMBARI, Amosa Isiaka[1], SOBOWALE, Favour Mosunmola[1], SHEHU, Bala Alhaji[2].

[1]Department of Educational Technology, Federal University of Technology Minna
[2]Department of Curriculum & Instructional Technology. Niger State College of Education, Minna
Email address: otinameglory@gmail.com   Phone Number: 08068785783

ABSTRACT
This study assessed lecturers' utilisation of Artificial Intelligence (AI) for education in a Nigerian university. The study adopted a descriptive survey research design. A sample of 271 lecturers were selected using Proportionate Stratified Randomly Sampling Technique. A researcher-designed structured questionnaire was used for data collection that was validated by four experts and pilot tested a reliability coefficient of 0.82 was obtained. Findings of the study revealed that lecturers rarely used AI with a grand mean of 1.85. Independent samples t-test analysis showed that t = 1.730, p > 0.085 indicating no significant difference in the mean response of male and female lecturers' level of utilisation of AI. In light of the findings, it was recommended among others that University management should regularly organise hands-on and professional training programmes and retreat for lecturers to teach with and effectively use AI.
Keywords: Lecturers, Utilisation, Artificial intelligence, University

Introduction

AI is a branch of Computer Science that entails the study and creation of systems that can learn new concepts and tasks, reason and draw useful conclusions, understand a natural language or perceive and comprehend a visual scene using human type of intelligence (Shukla & Jaiswal, 2013). AI is also an example of Education Revolution 4.0 products which are formed by computer and capable machines like robots to perform complex tasks such as visual perception, speech recognition, and decision-making (Eleyyan, 2021).

AI promotes personalised productive learning behaviour, such as self-regulation, self-monitoring, and self-explanation as it provides learning activities at the learners' pace and with the most appropriate content, timely guidance, feedback and explanations (Fernandez *et al.,* 2019). Intelligent Tutoring Systems provide personalised learning to learners, automatic correction of certain kinds of schoolwork, which enables lecturers to have time for other tasks, help lecturers adjust their courses to some extent, provide ongoing feedback on students'

assessment. For example, Coursera and MOOC platforms are using AI technology to inform teachers when too many students answer a question incorrectly (Karsenti, 2019).

AI software and web browsers can be used to predict citation impact, automate the extraction of references from PDF articles, organise and share research questions in research. Thus, AI frees the researcher time that would have been used for sorting and arranging of reference materials, examples of such software and web browser are Mendeley, Scopus, and EndNote. AI integrated Grammarly Premium to automate proofreading identify and correct errors in research writing while also preventing plagiarism; this will enable the researcher to focus on the content being written rather than the grammatical or spelling errors. Education develops mind and expands knowledge bases and learning process involves a person carrying out a particular action within a specific situation, and then recognising the effect of that action (Turesky & Gallagher, 2011). Therefore, AI is essential to both learners and lecturers.

AI is already being used in universities. For instance, Deakin University in Australia already applied IBM's supercomputer Watson as an emerging form of artificial intelligence and a solution to provide students with advice (Fahimirad & Kotamjani, 2018). This innovation significantly made efficient modifications to the quality of services rendered and time spent teaching students within a university. Most Nigerian universities also make use of Artificial Intelligence based applications to detect plagiarism in students' work (Karsenti, 2019). For example, Turn-it-in can recognize degrees of plagiarism in students' works when they "turn it in'' (Karsenti, 2019). It shows the parts that are likely to have been plagiarised, the potential sources, and the percentages of the potential sources that have been plagiarised. Lecturers that are able to embrace and utilise Artificial Intelligence technologies to augment their teaching reap the benefits of their learners' engagement and active participation and as such delivery of higher standards of teaching which will assist weak students and provide practical experiences.

The government of Nigeria has taken steps to promote partnerships and stakeholder engagement towards the advancement of AI in the country, this is obvious in the formation of a National Agency for Research in Robotics and Artificial Intelligence (NARRAI) in 2018. According to the Minister of Science and Technology, Dr. Ogbonnaya Onu, the agency will coordinate and control all researches relating to AI and robotics. Ladeinde (2019) added that the agency will collaborate with international research bodies, work with tertiary institutions and promote Nigeria's ability to leverage AI technologies for economic growth. Similarly, the then Minister of Communications Adebayo Shittu in March 2018 noted that NARRAI will work with international bodies to enhance the advancement of AI in Nigeria, support AI stakeholders and engage in activities to explore the utilisation of AI in Nigeria.

A university lecturer is a person who lectures as an occupation in a university. A University is a tertiary institution in Nigeria is saddled with the responsibility of training graduates to obtain degree certificates in various disciplines. In education, the role of the university lecturer is that of a guide, mentor, facilitator, academic supervisor, and instrument to ensure comprehensive learning. The utilisation of AI in education depends on the availability and accessibility of the AI technologies, enabling environment, skills and knowledge on how to use the AI technologies. This was emphasized by Eze (2020) who noted that the successful implementation of educational innovations depends largely on the skills and knowledge of the lecturers.

The lecturer as a facilitator, guides the learner to play an active role to get to his or her understanding of the content (Masaazi, 2015). AI has been integrated into education, in the form of intelligent books, smart devices, web browsers, education applications, learning platforms and tutoring systems. With the utilisation of Artificial Intelligence in teaching and learning, learners will have access to an unprecedented amount of authentic relevant

information to enable them to manage their learning activities as well as explore relevant learning materials and become inquisitive, rather than solely passive recipients of knowledge and information from only the lecturer. Thus, enhancing self-learning and active participation in the learning process.

Despite, the benefits of utilising AI to improve the quality and effectiveness of teaching and learning process, assessment and professional development of lecturers. Existing literature has shown contradiction in the utilisation of modern technologies by lecturers. Research evidence has shown a low degree of modern technologies for education usage among lecturers (Amuchie, 2015; Nannim *et al.,* 2018; Olanrewaju *et al.*, 2014; Onah *et al.*, 2020; Onasanya *et al.,* 2011; Perifanou *et al.*, 2021; Sulaiman *et al.,* 2017) while studies by Comia (2017) and Alba and Trani (2018) revealed that lecturers often utilised modern technologies in their tasks. Based on these conflicting findings, this study seeks to address lecturers' utilisation of AI for education.

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 size with learners of different learning abilities. AI devices, applications and software can be used by lecturers as very effective supporting tools (Pokrivcakova 2019). Owing to the numerous benefits

associated with the utilisation of AI in education. This study assessed lecturers' level of utilisation of Artificial Intelligence for education in a Nigerian university.

Research Questions

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

i. what is university lecturers level of utilising Artificial Intelligence for education?

ii. what is the difference between male and female university lecturers level of utilising Artificial Intelligence for education?

Research Hypothesis

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

HO_1: There is no significant difference in the mean response of male and female university lecturers' level of utilisation of Artificial Intelligence for education;

Research Methodology

The research design adopted for this study is 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 (Information Technology Service, 2021). 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 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

S/N	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
	Total	**221**	**50**	**271**

A structured questionnaire developed by the researcher titled Lecturers' utilisation of Artificial intelligence for education consisting of 30 items structured on four points rating scales of OU (Often Used = 4), U (Used = 3), RU (Rarely Used = 2), NU (Never Used = 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 Counsellor 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 Alpha Correlation Formula, and a reliability coefficient of 0.82 was obtained. Cronbach alpha scores greater than 0.70 are considered as indicative of acceptable reliability (Taber, 2016). Hence, the instrument was considered reliable to collect the needed data.

Results and Discussion

Research question one: What is university lecturers' level of utilising Artificial Intelligence for education?

Mean and Standard Deviation were used to answer research question one as presented in Table 1

Table 1: Mean and Standard Deviation on University lecturers' utilisation of Artificial Intelligence for education

S/N	Items Level of usage of:	N	$\bar{X}$	Std.	Decision
1	AI writing assistants such as Grammarly to improve my students writing skills.	271	2.17	1.04	Rarely Used
2	Smart board to promote class discussions and improve students' experiences and presentation skills.	271	1.80	0.87	Rarely Used
3	AI learning platforms such as goggle classroom to enhance lecturers and learners interaction.	271	1.87	0.91	Rarely Used
4	AI learning platform like Netex learning to create customized students learning materials and incorporate interactive elements such as audio, video and self-assessment into the learning material.	271	1.52	0.75	Rarely Used
5	Gooru, an AI learning platform to find, remix and share collections of web resources to my students	271	1.54	0.78	Rarely Used
6	Intelligent tutoring system to provide personalized learning to student based on their learning style.	271	1.75	0.81	Rarely Used
7	Presentation translator to present learning content both orally and visually to students	271	1.76	0.86	Rarely Used
8	Embibe to provide customized materials and personalized feedback to my students.	271	1.59	0.80	Rarely Used
9	Padlet to enhance collaborative learning, gauge my students understanding of a topic or concept.	271	1.51	0.74	Rarely Used
10	Khan Academy to identify gaps in my student's understanding of a concept, tailor instruction to meet the needs of every students.	271	1.58	0.78	Rarely Used
11	Blendspace to create digital lessons or use free lessons and activities created by other educators and assess my students' performance.	271	1.56	0.75	Rarely Used
12	Brainly to connect with their peers to address subject specific questions and answers which are verified by over a thousand moderators who recommends a peer that can offer hints to get the correct answer	271	1.58	0.88	Rarely Used
13	Robots to provide customized answers in response to learners´ messages, grade their performance, and provide tips on what area learners need to improve.	271	1.41	0.64	Never Used
14	Automated facial recognition like biometric face scanning surveillance to automate attendance roll marking in class and during examination.	271	1.50	0.76	Rarely Used
15	AI software such as Turnitin to assess, provide feedback to students and ascertain their level of plagiarism.	271	2.71	1.05	Used

16	AI-powered cameras to track students' movements and monitor students' facial expressions enhance automating examination supervision.	271	1.56	0.85	Rarely Used
17	WriteToLearn, to evaluate the meaning, relevance of text and correctness of grammar and spellings of my students writing.	271	1.54	0.84	Rarely Used
18	Kahoot, a game based learning platform for formative and summative evaluation.	271	1.39	0.69	Never Used
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	1.54	0.82	Rarely Used
20	Intelligent Essay Assessor an internet-based tool to automatically evaluate the meaning of the text, grammar, style, and the mechanics of my students' text structure.	271	1.52	0.83	Rarely Used
21	GradeCam to read my students' numeric handwriting, automatically score the answer based on the answer key I provide.	271	1.41	0.69	Never Used
22	Statistical Package for Social Science (SPSS) for immediate manipulation and computation of statistical and mathematical calculations.	271	3.05	1.01	Used
23	Google scholar to quickly see the main journals, disciplines and authors that publish in my area of interest	271	3.05	0.91	Used
24	Grammarly Premium to automate proofreading identify and correct errors in my writing while preventing plagiarism.	271	2.28	1.05	Rarely Used
25	Cited reference search in Web of Science to monitor current development and track prior research in over 100 years record and back files.	271	2.04	1.01	Rarely Used
26	Scopus a source neutral abstract and citation database, to generate precise citation search results and automatically create and update my research profile.	271	2.00	0.98	Rarely Used
27	Mendeley to predict citation impact, automate extraction of metadata from PDF articles, organise and share research questions.	271	1.99	1.04	Rarely Used
28	Kopernio to easily and legally read the full texts of scientific journal articles.	271	1.63	0.89	Rarely Used
29	Research gate for collaboration with colleagues and peers of similar interest in research	271	2.59	1.10	Used
30	EndNote to automate the collection and curation of research materials and formatting of bibliographies	271	1.96	1.06	Rarely Used
	Grand Mean		**1.85**		**Rarely Used**

Decision key: Never Used = 1.0 – 1.49, Rarely Used = 1.5 - 2.49, Used = 2.5 – 3.49 and Often Used 3.5 – 4.0

Table 1 presents university lecturers' level of utilisation of Artificial Intelligence for education in a Nigerian university. From the table, item 13, 18 and 21 had mean rating within 1.0 – 1.49 (NU) which means university lecturers never used these items. Item 1,2,3,4,5,6,7,8,9,10,11,12,14,16,17,19,20,24,25,26,27,28 and 30 had mean rating within 1.5 – 2.49 (RU) meaning university lecturers rarely used these items. While, item 15, 22, 23 and 29 had mean rating within 2.5 – 3.49 (U) meaning university lecturers used these items. The table further revealed that the grand mean score response to the 30 items is 1.85 which falls under the mean rating of Rarely Used. This implies that University lecturers rarely used AI for education in a Nigerian University.

Research question two: What is the difference between male and female university lecturers' level of utilising Artificial Intelligence for education?

Mean and Standard Deviation were used to answer research question two as shown in Table 2

Table 2: Mean and Standard Deviation of male and female university lecturers' utilisation of Artificial Intelligence for education

Gender	N	$\bar{X}$	Std. Deviation	Mean Difference
Male	221	45.54	13.71	
				3.92
Female	50	49.46	17.52	

Table 2 shows the mean and standard deviation of male and female university lecturers' utilisation of AI for education. From the table, the mean and standard deviation of male lecturers are $\bar{X}$ = 45.54 with SD = 13.71while the mean and standard deviation of female lecturers are $\bar{X}$ = 49.46 with SD = 17.52 with a mean difference of 3.92 in favour of female lecturers. This shows that female lecturers had higher mean rating than their male counterparts on the utilisation of AI in a Nigerian University.

Hypothesis one: There is no significant difference in the mean response of male and female university lecturers' level of utilisation of Artificial Intelligence for education.

In testing hypothesis one, the mean response of male and female university lecturers' level of utilisation of Artificial Intelligence for education was analysed using independent samples t-test as presented in Table 3

Table 3: Independent samples t-test of male and female university lecturers' level of utilisation of Artificial Intelligence for education

Gender	N	df	Mean	Std. Deviation	t-value	p-value
Male	221		45.54	13.705		
		269			1.730	0.085^{ns}
Female	50		49.46	17.521		

NS: Not Significant at 0.05 (p>0.05)

Table 3 shows the independent samples t-test results of male and female university lecturers' level of utilisation of Artificial Intelligence for education. From the table, t = 1.730, p = 0.085. The p-value is greater than the level of significance, hence hypothesis one was not rejected. This reveals that there is no significant difference in the mean response of male and female lecturers' level of utilisation of Artificial Intelligence for education in a Nigerian University.

Discussion of Findings

This study also revealed that lecturers rarely used AI for education in a Nigerian University. This finding agrees with the findings of Onasanya *et al.* (2011) who reported that science teachers' level of ICT utilisation was very low. Similarly, Agbatogun (2013) revealed that the most faculty members were yet to utilise emerging digital technologies for teaching and learning. Olanrewaju *et al.* (2014) discovered that lecturers of Colleges of Education did not use Educational Resources. Edumadze *et al.* (2014) revealed that lecturers' use of technology for instructional delivery was low. Also, Amuchie (2015) reported a very low usage of ICT resources in teaching and learning in secondary schools.

Furthermore, Yushau and Nannim (2020) study revealed that lecturers' extent of utilisation of ICT facilities was low. Onah *et al.* (2020) study discovered that the utilisation of ICT for teaching and learning Cultural Creative Arts in secondary schools was poor. In addition, the findings of Fakomogbon *et al.* (2014) revealed that lecturers' overall usage of Instructional Media (IM) was low. The finding contradicts that of Comia (2017) who reported that the utilisation of educational innovations and was moderate. Similarly, Alba and Trani (2018) revealed that teachers often used ICT in their teaching, assessment and administrative tasks.

Finding emanating from the study also revealed that male and female lecturers rarely used Artificial Intelligence for education in a Nigerian university which agrees with the finding of Fakomogbon *et al.* (2014) who revealed no significant difference in the awareness of male and female lecturers on Instructional Media in the state-owned COE. Alba and Trani (2018) study also revealed no significant difference in the extent of ICT usage by male and female teachers. However, the findings of Gbadamosi (2013) reported that female Biology teachers utilised innovative teaching strategies than the male Biology teachers. Onasanya *et al.* (2011) also reported that the male science teachers utilised ICT more than their female counterparts. Similarly, Sivathaasan *et al.* (2013) revealed that male lecturers used Electronic Information Resources than female lecturers. In addition, Mahdi and Al-Dera (2013) result indicated that male teachers' usage of ICT was higher than their female counterparts. Moreover, Nannim (2018) result also showed that male lecturers slightly had higher mean rating than their female counterparts on the extent of utilisation of ICT teaching facilities.

Recommendations

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

i. lecturers rarely used AI, therefore, university management should regularly organise hands-on and professional training programmes and retreat for lecturers to teach and effectively use AI;

ii. University management should enact workable policies on lecturers' utilisation of AI and monitor their level of compliance to the policies;

iii. University management should collaborate with experts in ICT and education to develop 21st-century learners centred course materials with interactive elements and immediate feedback that can further strengthen the use of AI for educational purposes;

iv. male and female lecturers in the University and other tertiary institutions should be properly trained on the use of AI to enhance their academic performance;

v. male and female could perform equally well if enabling environment with adequate infrastructure are provided, therefore, management of FUT Minna should provide conducive and enabling environment to both male and female lecturers for them to effectively use AI for education.

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