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DETERMINANTS OF AI TOOL UTILISATION AMONG LECTURERS IN TERTIARY INSTITUTIONS IN SOUTH-SOUTH NIGERIA

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Abstract

The study focused on determinants of AI tool utilisation among lecturers in tertiary institutions in South-South Nigeria. The study adopted both descriptive and correlational research designs. Three specific objectives guided the study. The population of the study included 13,603 lecturers in tertiary institutions in South-South Nigeria. A sample of 276 lecturers was drawn using a multi-stage sampling procedure. Two instruments named the "Social-Personal Determinants Questionnaire" (SPDQ) and the "Artificial Intelligence Tools Utilisation Questionnaire" (AITUQ) were used to collect data for the study. The instruments were validated by three experts in measurement and evaluation. Cronbach's alpha was used to test the reliability of the instruments, which yielded indices of 0.79 and 0.73, respectively. Mean and standard deviation were applied to answer the research questions, while simple regression, an independent t-test and ANOVA were used to test the hypotheses. The result indicated that there was significant influence of gender ($p=0.00<0.05$) and socio-economic status ($p=0.00<0.05$) on artificial intelligence tool utilisation among lecturers in tertiary institutions in Rivers State. On the other hand, digital literacy level ($p=0.009<0.05$) is related significantly to artificial intelligence tool utilisation among lecturers in tertiary institutions in Rivers State. Based on this, it was recommended, among others, that the government should invest in tertiary education by providing the necessary artificial intelligence tools to encourage its utilisation.

Keywords: Gender, socio-economic status, digital literacy level, ai, utilization

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Introduction

The impact of artificial intelligence as an advancement of technology on education cannot be overemphasised. Prior to this time, information processing tools and their organisation had faced a lot of setbacks in terms of efficiency, as they were not designed to bring solutions in the form of ideas or suggestions to the challenges of education. However, as development improved around the world in science and technology, the impact of this development has been felt by all and sundry, especially as it concerns education. By this, the educational sector has received rapid development in terms of efficiency as it regards teaching and learning. Artificial intelligence is the ability of machines to think, learn, and perform tasks that usually require human intelligence, such as understanding language, recognising patterns, solving problems, and making decisions. Artificial Intelligence (AI) has emerged as a transformative force across various sectors, offering innovative solutions to complex problems. In the realm of education, AI holds the potential to revolutionise traditional teaching methods and streamline research processes. This includes a range of technologies, including machine learning, natural language processing, and data analytics.

Artificial Intelligence (AI) tools are specialised software and platforms designed to perform tasks that traditionally require human intelligence. These tasks range from problem-solving and decision-making to understanding natural language and recognising patterns in data. AI tools leverage advanced algorithms, computational power, and large datasets to simulate human cognitive functions, thereby enabling machines to learn from experience, adapt to new inputs, and perform human-like tasks efficiently (Kuleto et al., 2023). AI systems learn from data, adapt to new inputs, and perform tasks independently to imitate human thinking (Kanekar, 2023). AI systems leverage algorithms and data to simulate cognitive functions, enabling machines to analyze information, adapt to changing circumstances, and improve performance over time (Russell & Norvig, 2010). AI as a system is composed of different tools working interdependently to achieve a singular purpose.

Numerous AI-based tools have been developed to cater to the unique needs of teaching and research in the academic setting. These tools harness advanced algorithms and data processing capabilities to streamline tasks, offer personalised learning experiences, and provide valuable insights for research endeavours. Some of these AI-based tools include Intelligent Tutoring Systems (ITS): Intelligent Tutoring Systems utilise AI algorithms to adapt to individual learning needs. These systems provide personalised feedback and guidance to students, aiding in their academic progress. For lecturers, ITS can be a valuable tool for tailoring teaching materials based on individual student requirements (VanLehn, 2011). Plagiarism detection software are AI-powered plagiarism detection tools crucial in maintaining academic integrity. These tools employ advanced algorithms to compare submitted work with

vast databases, identifying instances of plagiarism and ensuring the authenticity of research outputs (Sallam & Hossain, 2018; Anih, 2019). Automated grading systems, driven by AI, can efficiently assess assignments, exams, and coursework. These systems not only save time for lecturers but also provide consistent and unbiased evaluations, fostering fairness in the assessment process (Zafar, Rehman & Amin, 2018). There are a lot of factors that can hinder lecturers from utilising artificial intelligence tools in their teaching and learning process. These factors may include, but are not limited to, gender, socio-economic status, and digital literacy level.

The impact of gender in determining artificial intelligence tool utilisation among lecturers cannot be overemphasised. Thomas et al. (2024), in their 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 was selected using the proportionate stratified random sampling technique. A researcher-designed structured questionnaire was used for data collection that was validated by four experts and pilot tested, and 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 retreats for lecturers to teach with and effectively use artificial intelligence.

Okafor and Anyanwu (2025) carried out a study that ascertained teachers' awareness and utilisation of artificial intelligence (AI) tools for curriculum implementation in secondary schools in Anambra State, Nigeria. Five research questions guided the study, while five hypotheses were tested at 0.05 level of significance. A descriptive survey research design was employed for the study. The population of the study comprised all the 6145 secondary school teachers in the 266 public secondary schools in Anambra State. The sample for the study comprised 600 secondary school teachers drawn from the population of the study using the simple random sampling technique. The instrument for data collection was a questionnaire titled "Teachers' Awareness and Utilisation of Artificial Intelligence for Curriculum Implementation (TAUAICI)". The questionnaire was validated by three experts in the Faculty of Education at Nnamdi Azikiwe University, Awka. The questionnaires were trial-tested using 20 secondary school teachers in public secondary schools in Asaba, Delta State, which were subjected to reliability testing using Cronbach's alpha statistics. This yielded a reliability coefficient of 0.73. Frequency, percentage, mean and standard deviation were used to answer research questions, while a t-test was used to test the hypotheses at 0.05 level of significance. The findings of the

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study revealed that while there is exposure to a few globally recognised AI tools, the majority of AI resources remain unknown in secondary education in Anambra State. The study further revealed that AI tools serve as reference materials for the students, and AI tools being used to enhance instructional delivery are the topmost benefits associated with the use of AI tools for curriculum implementation in secondary schools. On the other hand, epileptic power and poor education funding are the topmost challenges associated with the use of AI tools for curriculum implementation in secondary schools. The study further revealed that increasing fund allocation to secondary schools and equipping the school with artificial intelligence tools for curriculum implementation are the topmost strategies for enhancing teachers' utilisation of AI tools for curriculum implementation in secondary schools. The test of hypotheses showed no significant difference between the mean ratings of male and female teachers except in the utilisation of AI tools they are aware of. Based on the findings of the study, it was recommended, among others, that Anambra State should increase funding for secondary schools, specifically targeting the purchase and maintenance of AI tools and technology infrastructure. Efforts should be made to ensure consistent power supply in schools, facilitating the reliable use of AI tools for educational purposes.

The utilisation of AI in education depends on the availability and accessibility of the AI technologies, enabling environments, 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. Emiri et al. (2024) also carried out a study that examined digital literacy among lecturers in the age of artificial intelligence at the Federal University of Petroleum Resources Effurun (FUPRE) and the Nigeria Maritime University (NMU). Employing a descriptive survey design, the research targeted a population of 545 lecturers and drew a sample of 231 using Yamane's formula. Data were collected via a structured questionnaire validated and found reliable ($r = 0.84$). It was analysed using descriptive statistics (frequencies, percentages, and weighted means). Findings indicate that while lecturers' digital literacy concerning AI is slightly above moderate, their actual use of AI tools remains low. Common applications include research and writing, plagiarism detection, data analysis, presentations, content creation, and idea generation. Key barriers comprise inadequate internet services, limited management support, difficulties integrating AI into traditional pedagogy, time constraints, and high software costs. The study recommended targeted training programs and enhanced institutional support, improved internet access and AI tool subscriptions to strengthen teaching and research. The insights inform capacity-building strategies in specialised Nigerian universities.

Despite the growing importance of artificial intelligence (AI) tools in enhancing teaching, learning, and research in tertiary institutions, there is a dearth of understanding of the

socio-personal determinants influencing the utilisation of these tools among lecturers in South-South Nigeria. The lack of integration of AI tools in teaching and research is consequential by limiting the improved educational outcomes; however, it is unclear how factors such as gender, socio-economic status, and digital literacy level may shape lecturers' decisions to utilise AI tools. Hence, this study aimed to investigate the socio-personal determinants of AI tool utilisation among lecturers in tertiary institutions in South-South Nigeria.

The aim of the study was to investigate determinants of AI tool utilisation among lecturers in tertiary institutions in South-South Nigeria. Specifically, the objectives are:

1. To find out the influence of gender on artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South, Nigeria.
2. To find out the influence of socio-economic status on artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South Nigeria.
3. To find out the relationship between digital literacy level and artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South, Nigeria.

Research Questions

1. To what extent does gender influence artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South, Nigeria?
2. To what extent does socio-economic status influence artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South, Nigeria?
3. To what extent does digital literacy level relate to artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South, Nigeria?

Hypotheses

1. There is no significant influence of gender on artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South Nigeria.
2. There is no significant influence of socio-economic status on artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South Nigeria.
3. There is no significant relationship between digital literacy level and artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South Nigeria.

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Method

Participant: The population of the study comprises 13,603 lecturers in the federal, state and private universities in South-South Nigeria.

Design: The study adopted both descriptive and correlational research designs in the study.

Sample/Sampling Technique: A sample of 276 lecturers was drawn using a multi-stage sampling procedure. First, all six states were involved in the study; a simple random sampling technique was adopted for selecting one university per state, which means six universities were selected for the study. This was followed by purposeful sampling to select lecturers from the Faculty of Education from each university, after which a non-proportionate random sampling was used to select 50 lecturers from each university, making a total of 300 lecturers involved in the study.

Materials:

The instruments used in this study were the "Social-Personal Determinants Questionnaire" (SPDQ) and "Artificial Intelligence Utilisation Questionnaire" (AIUQ). The SPDQ was made of two sections, A & B. Section A contained instruction on how to go about the instrument and also measured two sub-variables of the independent variable (gender and socio-economic status). Section B, on the other hand, contained 10 items that measured digital literacy level. The second questionnaire (AIUQ) contained 20 items that measured artificial intelligence utilisation of the lecturers. The instruments were structured on a four-point Likert scale of strongly agree (SA), agree (A), disagree (D) and strongly disagree (SD) and were weighted 4 points, 3 points, 2 points and 1 point, respectively, for positive items and vice versa for negative items. The instruments were validated by three experts in measurement and evaluation. Cronbach's alpha was used to test the reliability of the instruments, which yielded indices of 0.79 and 0.73.

Data Analysis: Mean and standard deviation statistics were used in answering the research questions, while simple regression, independent-sample t-tests and analysis of variance were used in testing the hypotheses.

Results

Out of the three hundred copies of both questionnaires that were administered to lecturers on the socio-personal determinants of artificial intelligence tools utilisation, twenty-four (24) of them were not properly responded to or had incomplete responses, leading to instrumental mortality. Hence, the analysis was done with two hundred and seventy-six (276) instruments, representing 92% of total instruments administered.

Research Question One: To what extent does gender influence artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South, Nigeria?

Hypothesis One: There is no significant influence of gender on artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South Nigeria.

Table 1

independent Sample t-test Analysis of the Influence of Gender on Artificial Intelligence Tool Utilization Among Lecturers in Tertiary Institutions in South-South, Nigeria

Gender	N	Mean	Std. D	t	Df	Sig.	Result
Male	152	29.41	11.454				
				-16.511	274	.000	Significant
Female	124	51.36	10.389				

Table 1 shows that the male lecturers had a mean value of 29.41 and a standard deviation of 11.45, while the female counterparts had a mean value of 51.36 and a standard deviation of 10.39. These mean values show that female lecturers utilised artificial intelligence tools more when compared to male lecturers in tertiary institutions in South-South, Nigeria. The calculated t value was -16.511, while the sig value was 0.000. Hence, the null hypothesis is rejected, meaning that there is a significant influence of gender on artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South, Nigeria.

Research Question Two: To what extent does socio-economic influence artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South Nigeria?

Hypothesis Two: There is no significant influence of socio-economic status on artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South Nigeria.

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Table 2

ANOVA of the Influence of Socio-economic Status on Artificial Intelligence Tool Utilization Among Lecturers in Tertiary Institutions in South-South, Nigeria

Socio-economic status		N		Mean	Std. Deviation	
Low		56		21.16	7.208	
Middle		107		36.71	12.598	
High		113		50.67	10.591	
	Sum of Sq.	**Df**	**Mean Sq.**	**F**	**Sig.**	**Result**
Between Groups	33758.162	2	16879.092	142.908	.000	Significant
Within Groups	32244.457	273	118.112			
Total	66002.620	275				

Table 2 above shows that mean values for lecturers who are of low, middle, and high socio-economic status were 21.16, 36.71, and 50.67, respectively. Their standard deviation values were 7.21, 12.59, and 10.59, respectively. From the mean values, it is seen that high socio-economic status has more influence on artificial intelligence tool utilisation among lecturers in tertiary institutions, followed by middle socio-economic status and lastly low socio-economic status. The calculated F value is 142.908, while the sig value is 0.00. Hence, since sig ($P=0.00<0.05$) was less than 0.05 alpha, the null hypothesis was rejected, meaning that artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South Nigeria.

Research Question Three: To what extent does digital literacy level relate to artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South Nigeria?

Hypothesis Three: There is no significant relationship between digital literacy level and artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South Nigeria.

Table 3

Simple Regression Analysis of the Relationship Between Digital Level Literacy and Artificial Intelligence Tool Utilization Among Lecturers in Tertiary Institutions in South-South, Nigeria

Model	**R**	**R Square**		**Adjusted R Square**		
1	.158	.025		.021		
Model	**Sum of Sq.**	**Df**	**Mean Sq.**	**F**	**Sig.**	**Result**
Regression	1640.630	1	1640.630	6.984	.009	Significant
Residual	64361.990	273	234.898			
Total	66002.620	274				

Table 3 above showed that the calculated R is 0.158. The R^2 value is 0.025, while the adjusted R value is 0.021. This means that digital literacy level relates positively to artificial intelligence tool utilisation among lecturers in tertiary institutions. The R^2 value indicates that digital literacy level accounts for 2.5% (0.025×100) of the total contribution to artificial intelligence tool utilisation among lecturers. In testing the hypothesis, the associated ANOVA revealed a calculated F value of 6.984, while the Sig value is 0.009. Hence, since the sig value ($p=0.009<0.05$) is less than the alpha value of 0.05, the null hypothesis is rejected, meaning that there is a significant relationship between digital literacy level and artificial intelligence tool utilisation among lecturers in tertiary institutions in South-South, Nigeria.

Discussion

The finding of this study revealed that there is a significant influence of gender on artificial intelligence tool utilisation among lecturers. This finding means that gender plays a crucial role in determining the usage of artificial intelligence tools among lecturers. In other words, being male or female affects lecturers' responses in respect to artificial intelligence tool usage. This finding may come because of the beliefs associated with gender and its roles. The finding of the study is in disparity with the one reported earlier by Thomas et al. (2024), who reported no significant difference in the mean response of male and female lecturers' levels of utilisation of AI.

The result of the study also shows that there is a significant influence of socio-economic status on artificial intelligence tool utilisation among lecturers. The finding means that the availability of funds plays a definite role in determining the usage of artificial intelligence tools among lecturers. In other words, the amount of resources available for the utilisation of artificial intelligence tools determines the level of its usage. The finding of the study is in

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disparity with the one reported earlier by Okafor and Anyanwu (2025), who reported that poor ability to provide power and education funding by lecturers is one of the topmost challenges associated with the use of AI tools for curriculum implementation in secondary schools.

The finding also reveals that there is a significant relationship between digital literacy level and artificial intelligence tool utilisation among lecturers. This means that how literate a lecturer is in artificial intelligence tool usage determines to a large extent the usage of these tools by the lecturers. This finding could come as a result of a negative belief system in respect to technological advancement, thus hindering them from learning and relearning about artificial intelligence tools and their usage. The finding is surprising to the researchers because it is expected that lecturers who are possibly seen as role models in the academic world ought to be adaptive to current trends in technology. However, the current finding disagrees with that reported by Emiri et al. (2024), who reported that while lecturers' digital literacy concerning AI is slightly above moderate, their actual use of AI tools remains low.

Conclusion

The relationship between socio-personal factors (gender, socio-economic status, and digital literacy level) and artificial intelligence tool utilisation among lecturers is complex and multifaceted. While gender and socio-economic status have a significant influence on artificial intelligence tool utilisation, digital literacy level has a significant relationship with artificial intelligence tool utilisation among lecturers. This suggests that interventions should focus on addressing irrational beliefs in respect to gender, increased governmental investment, and some lecturers' personalised digital literacy level development.

Despite these findings, the current study may have some limitations, which may include a small sample size as well as the total reliance on self-reported data as responded to by the respondents. Hence, future researchers should sample more respondents and also expand the area of study from south-south to the entire country.

Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. Lecturers should eradicate irrational beliefs in respect to gender and its roles as it concerns innovation in the educational sector.
2. Government should adequately fund higher institutions by building required structures as well as providing the required artificial intelligence tools for utilisation in education, which can serve as a buffer for low economic status lecturers.

3. Lecturers should give themselves to personal development, especially in respect to technological development, as every aspect of life (including education) is tilting towards artificial intelligence.

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