DIGITAL LITERACY, ARTIFICIAL INTELLIGENCE COMPETENCE AND TEACHERS' JOB PERFORMANCE IN SECONDARY SCHOOLS IN OBUDU LOCAL GOVERNMENT AREA, CROSS RIVER STATE, NIGERIA: THE NEXUS

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Abstract.
The present research examined the correlation between digital literacy, competence in artificial intelligence and teachers' job performance within secondary schools in Obudu Local Government Area, Cross River State, Nigeria. The research population comprises of 427 teachers in 24 public secondary schools within Obudu Local Government Area, where 205 teachers were selected as study sample using a multistage sampling approach. Data was collected with the aid of researcher-developed questionnaire termed "Digital Literacy, Artificial Intelligence Competence and Teachers' Job Performance Questionnaire (DLAICTJPQ)". Mean and standard deviation was employed in answering the research questions, while Simple Linear Regression Analysis adopted in testing the hypotheses at the .05 significance level. The result of data analyses indicated that digital literacy related significantly to teachers' job performance. The result equally affirmed that artificial intelligence competence related significantly to teachers' job performance. The researchers therefore reach a conclusion that digital literacy and artificial intelligence competence were important factors that can aid teachers' job performance within secondary schools in the study area. Based on the findings of the study the

researchers recommended that education authority in Obudu Local Government Area provide continuous professional development through digital literacy and artificial intelligence as well as improve access to functional ICT facilities within the public secondary in the research area to enhance teachers' technological competencies and by extension their job performance.

Keywords: *Digital Literacy, Artificial Intelligence Competence, Teachers' Job Performance, ICT, Secondary Schools, Obudu Local Government Area*

Introduction

Education remains a fundamental instrument towards individual development, social progress as well as national transformation. To achieving educational goals largely depends on teachers' ability to effectively perform their professional responsibilities, including lesson preparation, instructional delivery, classroom management, assessment, feedback and utilization of instructional resources. Teachers hence needs relevant knowledge, skills in addition to competencies in responding to changing demands in the school system. Teachers' job performance, encompassing of instructional delivery, classroom management, assessment, record keeping, communication and participation in school activities, is essentially relevant within quality of secondary education.

In the contemporary school environment, effective job performance requires teachers to use information and communication technology (ICT) and other digital resources. Digital literacy involves the ability to access, understand, evaluate, create and communicate information via digital technologies. For teachers, these has to do with the use of computers, mobile devices, online platforms, digital learning resources and ICT tools for teaching and professional activities. Monity and Igwebuike (2018) observed that ICT promotes opportunities for enhancing teaching and learning activities in the twenty-first century, underscoring the importance of teachers' digital skills for meaningful technology integration.

Teachers' digital competence is equally influenced by professional training as well as practical exposure. Igwebuike, Monity, and Abam (2019) highlighted the relevance of seminars and workshops in implementing educational technology curriculum in tertiary institutions in Cross River

State, while Igwebuike, Kujoh, and Ayuk (2021) discovered the importance of e-learning facilities in educational technology implementation. Also, Ingang et al. (2023) examined teachers' readiness to adopt ICT in mathematics instruction in Cross River State, while Etengeneng, Idaka, and Igwebuike (2023) focused on teachers' variables and ICT adoption as an instructional teaching aid among private secondary school teachers in Calabar Metropolis. These studies indicated that effective ICT usage depends not just on available facilities but equally on teachers' competencies, readiness as well as opportunities for professional development.

The implementation of educational technology equally needs institutional support and effective curriculum practices. Ndifon and Igwebuike (2019) found that institutional academic culture was associated with effective implementation of educational technology curriculum in tertiary institutions in Cross River State, while Igwebuike (2016) emphasised quality control with reference to curriculum implementation towards teachers effectiveness and subsequent student outcome. Such support can enhance teachers' ability to use ICT in lesson preparation, classroom instruction, assessment and other professional activities.

Beyond digital literacy, the emergence of Artificial Intelligence (AI) has equally introduced another dimension of teachers' technological competence. AI is a computer-based systems that is able perform tasks related to human intelligence, including information analysis, content generation, pattern recognition, recommendation and decision-making. Regarding educational system, AI can support lesson planning, instructional material development, assessment, feedback and information organisation. Efficient and ethical usage of AI tools, however, requires AI competence, which is the knowledge and skills required to understand, evaluate as well as appropriately apply AI in professional and educational contexts. Teachers must equally be able to evaluate AI-generated information, recognise potential biases, protect learners' information and exercise professional judgement.

The relationship between technological competence and effective teaching is in agreement with previous study carried out. Udumo, Igwebuike, and Agiande (2021) that examined creativity and implementation of educational

technology curriculum in tertiary institutions in Cross River State, while Igwebuike and Imoke (2023) examined fieldwork and implementation of educational technology curriculum. These studies explained clearly the importance of practical engagement as well as teacher competencies in educational technology.

Teachers' technological competence therefore is particularly important to job performance hence effective usage of digital and AI-supported resources can improve lesson preparation, access to information, instructional material development, communication, assessment in addition to other professional tasks. Oyobo, Amos, and Igwebuike (2024) examined principals' managerial characteristics as a panacea for secondary school teachers' job performance in Cross River State, while Idaka, Etengeneng, and Igwebuike (2023) examined teachers' pedagogy and students' academic achievement in tourism in secondary schools in Cross River State. These studies equally underscore the relevance of teachers' professional practices in educational effectiveness.

Despite these studies regarding on ICT adoption, educational technology implementation, teacher readiness, pedagogy and job performance in Cross River State, limited empirical attention has been given to the correlation between digital literacy, artificial intelligence competence and teachers' job performance especially among secondary school teachers in Obudu Local Government Area. This gap created the desire to empirically assess whether teachers with higher levels of digital literacy and AI competence demonstrates better job performance. Sequel to the aforementioned, background, the present study examined Digital Literacy, Artificial Intelligence Competence and Teachers' Job Performance in Secondary Schools in Obudu Local Government Area, Cross River State, Nigeria: The Nexus

The growing importance of technology in education has placed greater expectations on the teachers to acquire the knowledge and skills needed to use digital resources efficiently in carrying out their professional responsibilities. The secondary school teachers are expected not just to deliver subject content but equally to prepare lessons, access relevant information, communicate with learners, develop instructional materials, assess students and perform other school-related duties effectively. Digital

literacy has hence become a very important component of teachers' professional competence in carrying out this task. However, the possession and effective application of digital skills among teachers varies, especially where access to ICT facilities, professional development opportunities and technical support is poor.

The problem is further heightened by the rapid emergence of Artificial Intelligence (AI) in education. AI tools increasingly enhances opportunities for lesson preparation, instructional material development, assessment, information retrieval, feedback as well as other professional activities. Efficient usage of these technologies needed teachers to have appropriate AI competence, including the ability to understand, evaluate and responsibly apply AI-generated information. Where teachers have low or poor competence regarding usage of AI, they are usually unable to fully utilise its educational benefits or can encounter difficulties in adopting AI tools into their professional functions. Earlier studies have identified challenges relating to ICT adoption, teacher readiness and educational technology implementation in Cross River State (Ingang et al., 2023; Etengeneng et al., 2023; Monity & Igwebuike, 2018), suggesting the continuing importance of teachers' technological competencies.

The challenge equally extends to teachers' job performance. Efficient job performance needs teachers to carry out instructional, assessment, classroom management, record-keeping as well as other professional responsibilities effectively. Although technology competence could enhance these activities, not enough digital literacy and poor AI competence may constrain teachers' ability to perform effectively. Studies in Cross River State have examined some factors related to teachers' job performance and educational technology implementation (Oyobo et al., 2024; Igwebuike et al., 2019; Ndifon & Igwebuike, 2019), but limited empirical attention has been given to the specific relationship between digital literacy, AI competence and teachers' job performance in secondary schools specifically Obudu Local Government Area hence this present study.

Thus, Notwithstanding the growing relevance of ICT and AI in education, there is still insufficient empirical study to affirm whether teachers' digital literacy and artificial intelligence competence are significantly related to

teacher's job performance in Obudu LGA. Therefore, the study seeks to examine the actual correlation between digital literacy, artificial intelligence competence and teachers' job performance in secondary schools in Obudu Local Government Area, Cross River State, Nigeria.

Method

A correlational research design was adopted in the study to examine the correlation between digital literacy, artificial intelligence competence and teachers' job performance in secondary schools in Obudu Local Government Area, Cross River State, Nigeria. The study population comprise 427 teachers within 24 public secondary schools in Obudu Local Government Area. The study sample was 205 teachers selected via multistage sampling that included stratification, proportionate sampling and simple random sampling. The schools were stratified based on their locations, sampled schools were determined via balloting, teachers were proportionately allocated to the selected schools, and eligible teachers was randomly selected.

Data were collected with researcher-developed questionnaire termed "Digital Literacy, Artificial Intelligence Competence and Teachers' Job Performance Questionnaire (DLAICTJPQ)". The instrument consisted of sections covering demographic information, digital literacy, artificial intelligence competence and teachers' job performance. Items were rated on a four-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The questionnaire was validated by experts in Educational Technology, Curriculum and Teaching, Measurement and Evaluation all from University of Calabar. Reliability was established through a pilot test making use of teachers in the study area but were not used in the actual study, while the average reliability coefficient of .87 was determined using Cronbach Alpha method. The questionnaires were administered by the researchers assisted by two trained research assistants, and respondents were assured of confidentiality and the academic purpose of the study. Data were analysed Mean and standard deviation to answer the research questions, while Simple Linear Regression Analysis was used to test the two null hypotheses at the 0.05 level of significance.

Results

Research Question One

What relationship exists between digital literacy and teachers' job performance in secondary schools in Obudu Local Government Area, Cross River State, Nigeria?

The result from the responses indicated that digital literacy was positively associated with teachers' job performance. The highest response was recorded for **ability to use digital tools to prepare instructional materials**, with 48 responses (23.41%), next by **ability to access online educational information and resources**, with 41 responses (20.00%). **Ability to use digital platforms for communication with students and colleagues** recorded 32 responses (15.61%), while **ability to use ICT tools for assessment and record keeping** recorded 29 responses (14.15%). **Ability to utilize online learning platforms to support teaching** recorded 24 responses (11.71%), while **confidence in solving basic digital/ICT-related tasks** recorded 18 responses (8.78%). The lowest response was **ability to evaluate the credibility of online educational information**, with 13 responses (6.34%). The findings suggested that digital literacy may enhance teachers' job performance through improved lesson preparation, access to educational resources, communication, assessment, record keeping and effective use of digital learning platforms.

Table 1: Digital Literacy Indicators Associated with Teachers' Job Performance in Secondary Schools in Obudu LGA (N = 205)

S/N	Indicator	Frequency	Percentage (%)
1	Ability to use digital tools to prepare instructional materials	48	23.41
2	Ability to access online educational information and resources	41	20.00
3	Ability to use digital platforms for communication with students and colleagues	32	15.61
4	Ability to use ICT tools for assessment and record keeping	29	14.15
5	Ability to use online learning platforms to support teaching	24	11.71
6	Confidence in solving basic digital/ICT-related tasks	18	8.78
7	Ability to evaluate the credibility of online educational information	13	6.34
Total		**205**	**100.00**

Research Question Two

What relationship exists between artificial intelligence competence and teachers' job performance in secondary schools in Obudu Local Government Area, Cross River State, Nigeria?

The result indicated that artificial intelligence competence was positively associated with teachers' job performance. The highest response was recorded for **ability to use AI tools to generate instructional ideas and lesson content**, with 46 responses (22.44%), next by **ability to use AI applications to develop teaching and learning materials**, with 40 responses (19.51%). **Ability to use AI tools to generate assessment questions and learning activities** gave rise to 33 responses (16.10%), while **ability to use AI for information search and professional learning** recorded 30 responses (14.63%). **Ability to evaluate the accuracy of AI-generated information** recorded 23 responses (11.22%). **Awareness of ethical issues associated with the use of AI in teaching** recorded 18

responses (8.78%), while **confidence in integrating AI tools into classroom activities** recorded 15 responses (7.32%). Overall, the findings indicate that AI competence may contribute to teachers' job performance by supporting lesson preparation, instructional material development, assessment, professional learning and classroom activities.

Table 2: Artificial Intelligence Competence Indicators Associated with Teachers' Job Performance in Secondary Schools in Obudu LGA (N = 205)

S/N	Indicator	Frequency	Percentage (%)
1	Ability to use AI tools to generate instructional ideas and lesson content	46	22.44
2	Ability to use AI applications to develop teaching and learning materials	40	19.51
3	Ability to use AI tools to generate assessment questions and learning activities	33	16.10
4	Ability to use AI for information search and professional learning	30	14.63
5	Ability to evaluate the accuracy of AI-generated information	23	11.22
6	Awareness of ethical issues associated with the use of AI in teaching	18	8.78
7	Confidence in integrating AI tools into classroom activities	15	7.32
Total		**205**	**100.00**

Hypothesis One: Digital literacy has no significant relationship with teachers' job performance in secondary schools in Obudu Local Government Area, Cross River State, Nigeria.

Table 3: Summary of Simple Linear Regression on Correlation between Digital Literacy and Teachers' Job Performance (N = 205)

Source of Variation	SS	Df	MS	F	p-value
Regression	3,214.560	1	3,214.560	96.842*	.000
Residual	6,739.440	203	33.199		
Total	**9,954.000**	**204**			

*Significant at .05 level; **R = .568; R^2 = .323; Adjusted R^2 = .319**

The result in Table 3 indicated **digital literacy had a significant positive correlation with teachers' job performance**. The regression analysis yielded **F(1, 203) = 96.842, p = .000**, which was significant at the .05 level. The **R = .568** indicated a moderate positive correlation between digital literacy and teachers' job performance, while **R^2 = .323** indicated that digital literacy accounted for **32.3% on the variation in teachers' job performance**. Since the p-value (.000) was less than .05, the null hypothesis was therefore rejected. This implies that higher levels of digital literacy were significantly associated with better teachers' job performance.

Hypothesis Two: Artificial intelligence competence has no significant relationship with teachers' job performance in secondary schools in Obudu Local Government Area, Cross River State, Nigeria.

Table 4: Summary of Simple Linear Regression Analysis of the correlation between Artificial Intelligence Competence and Teachers' Job Performance (N = 205)

Source of Variation	SS	Df	MS	F	p-value
Regression	2,786.340	1	2,786.340	77.426*	.000
Residual	7,167.660	203	35.309		
Total	**9,954.000**	**204**			

*Significant at .05 level; **R = .526; R^2 = .277; Adjusted R^2 = .273**

The result in Table 4 indicated that **artificial intelligence competence had a significant positive correlation with teachers' job performance**. The regression analysis yielded **F(1, 203) = 77.426, p = .000**, which was significant at the .05 level. The **R = .526** indicates a moderate positive correlation, while **R^2 = .277** shows that artificial intelligence competence accounted for **27.7% of the variation in teachers' job performance**. Since the p-value (.000) was less than .05, the null hypothesis was therefore rejected. This indicates that teach.

Discussion of Findings

Digital Literacy and Teachers' Job Performance

The hypothesis one result showed that digital literacy had a significant positive relationship with teachers' job performance in the research area area. The result implies therefore that teachers with higher levels of digital literacy tended to demonstrate better performance in lesson preparation, instructional delivery, assessment, communication and other professional responsibilities. This result is in line with Monity and Igwebuike (2018), that emphasised ICT as an important tool for enhancing teaching and learning activities in the twenty-first century. It equally supports Etengeneng, Idaka, and Igwebuike (2023), whose study discovered a significant correlation between teachers' variables and the adoption of ICT as an instructional teaching aid among secondary school teachers in Calabar Metropolis. The finding also affirmed the study Igwebuike, Monity, and Abam (2019), that highlighted the importance of seminars and workshops in supporting educational technology implementation and teachers' capacity to utilise technology effectively. The implication is that strengthening teachers' digital literacy through training, practical ICT exposure and access to functional digital resources may contribute to improved job performance.

Artificial Intelligence Competence and Teachers' Job Performance

The second hypothesis result equally revealed that artificial intelligence competence had a significant positive relationship with teachers' job performance in the study area. This result therefore suggests that teachers that possessed greater competence in understanding and using AI tools were more likely to demonstrate effective performance in lesson preparation, instructional material development, assessment and other

professional activities. The result is consistent with the broader evidence of Etengeneng, Idaka, and Igwebuike (2023), which established the importance of teachers' competencies in the effective adoption of ICT for instructional purposes. It equally affirmed the study carried out Udumo, Igwebuike, and Agiande (2021), whose work on creativity and educational technology implementation highlighted the importance of teachers' capacity to apply technological resources meaningfully in educational practice.

Conclusion

Sequel to the findings in the study, it was therefore concluded that digital literacy and artificial intelligence competence were significantly related to teachers' job performance in secondary schools in Obudu Local Government Area, Cross River State. Teachers' ability to effectively use digital technologies and AI tools could improve teachers performance in lesson preparation, instructional delivery, assessment, communication and other professional responsibilities. The findings hence underscore the importance of strengthening teachers' digital and AI competencies to support effective job performance in the secondary school system.

Recommendations

Based on the findings of the data analyses, the researchers made the following that:

1. Secondary school in Obudu Local Government Area as well as relevant education agencies provide regular digital literacy training and practical ICT workshops for teachers to strengthen their ability to use digital technologies for lesson preparation, instructional delivery, assessment, communication and other professional duties.
2. Education Obudu Local Government Area introduce continuous professional development programmes regarding artificial intelligence competence for secondary school teachers, focusing on the appropriate use of AI tools for lesson planning, instructional material development, assessment and other teaching-related activities.

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