

# Artificial Intelligence (AI) Literacy, An Investment for Enhancing Educators' Skills in AI Powered Primary Schools in Nigeria

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DOI: <https://dx.doi.org/10.47772/IJRISS.2024.804093>

Received: 30 March 2024; Revised: 05 April 2024; Accepted: 09 April 2024; Published: 09 May 2024

## ABSTRACT

A descriptive survey was conducted to investigate whether an investment in artificial intelligence (AI) literacy predicts the enhancement of educators' skills for them to be effective in an AI powered environment in state primary schools in Nigeria. Three research questions and null hypotheses were formulated at .05 level of significance for the study. 1000 teachers were recruited from across five schools located in five geopolitical zones of the country using cluster sampling. Artificial intelligence literacy and educators' skills enhancement questionnaire (AILESEQ) was deployed to generate data. Based on the human capital development theory, data was analysed via the simple linear regression. Findings suggest that knowledge of AI, use of AI devices and understanding the ethical issues about AI technologies significantly predict the enhancement of educators' skills in AI powered primary schools in Nigeria. It is recommended that government should organise training workshops on AI literacy for educators in schools; the policy on education needs review to produce a framework for the introduction of AI in education (AIIE) to benefit the teachers; the curriculum of teacher education has to be revised to feature AIIE; AI literacy should be a requirement for recruiting new teachers; schools have to produce guidelines for the application of AI devices; government can create a demonstration school to trial the AI initiative; government can commit one percent of value added tax to fund AIIE; awareness campaigns should be organised regularly via various media to educate relevant stakeholders about the benefits of AIIE.

**Keywords:** AI literacy, educators, skill enhancement, primary school, Nigeria.

## INTRODUCTION

Artificial intelligence (AI) literacy is an initiative that is pushing the frontiers of education forward regarding the utilisation of smart technologies by educators (or teachers) to deliver optimal services in AI assisted primary schools worldwide. Since the first use of the terminology by Burgsteiner, Kandlhofer & Stenbauer (2016), substantial research, including the present one, is being conducted to delve further into the subject, gain deeper understanding about the term and to entrench it in education. AI is an engineered intelligent device that can perform cognitive tasks and solve problems in education in ways that mimic human intelligence (Ng, Leung, Chu & Qiao, 2021; Wang, 2019; McCarthy, Minsky, Rochester & Shannon, 2006) such as reasoning, thinking, learning, evaluation, and inference. In a general term, AI is a machine with some extent of human intelligence (Amudha, 2022) and/or the intelligence of other life forms. It is a creation from human intelligence (HI). Whereas AI is a product of cutting-edge engineering by man, HI on the other hand, is varying degrees of innate capabilities to understand and produce solutions to complex problems. From inception AI is based on system automation, which enables the device/machine to perform, not only to imitate human behaviour or other living organisms, but more importantly, to make life activities comfortable, faster, and easier.

It is fast becoming a practice that presents a futuristic mode for making the job of the educator inclined to high-tech. The concept is fascinating and is also gaining more attention in research e.g., Eke, Wakunuma & Akintoye (2023), leading to a rise in literacy about it in Nigeria. AI literacy in education implies creation of opportunities for educators to learn about AI systems, theories, principles, and develop the skills to apply AI gadgets to benefit the school, also taking ethical issues into account (Zhao, Wu & Luo, 2022). In the view of Ng et al. (2021), it suggests the involvement of teacher knowledge, understanding, use and ethical issues of AI. The age AI of in a fast-paced education of today occasion advancements in the ways primary school tutors engage with their jobs by rejigging educators' skills to reflect latest circumstances. As an aspect of AI, literacy about AI is an emerging field that brings with it a novel set of skills necessary for educators, to be able to meet the expectations of education in the digital era. The overall issue under examination is being looked at from the standpoint of human capital development as documented in the Organization for Economic Co-operation and Development (OECD) (2001). That is necessary because an educator is inevitable in the implementation of the curriculum, and no education can rise above the quality of the teacher (Federal Government of Nigeria, 2013).

## **THEORETICAL BACKGROUND**

The human capital development theory (Brown, 2000; Becker, 1993) provides further insights in relation to how AI literacy facilitates improvements in educators' skills. OECD (2001, p.18) defined the notion of human capital development as "the knowledge, skills, competencies, and attributes embodied in individuals that facilitate the creation of personal, and social well-being". It is a formulation that highlights human functionality and productivity via skill development. It is exactly what AI literacy is about, to ensure that educators can refine and readjust their skills for better performance on the job and to sustain competitive advantage in the field of teaching.

There is a strong connection between AI literacy and improvements in educators' abilities. Achieving AI literacy has significant impact on teacher performance especially in the dispensation where education is powered by AI. It is consistent with the classical work of Becker (1993) on the subject. In his view, human capital broadly has to do with the expertise a person accumulates through education and training in areas of value, including computer and AI. A human being is the most valuable of all capital. AI is created through human ingenuity and this is evidence of human value. Also, the usefulness of AI in education can only happen by human facilitation. The investment in human development is an essential exercise. Making such investments therefore for educators to achieve AI literacy is important for them to upgrade their skills to be able to function effectively in an AI powered school environment.

## **LITERATURE REVIEW**

The rise in interest in AI literacy in Nigeria indicates that the age of the use of high-tech devices in education has come (Eke et al., 2023). Getting involved in AI projects the educator into the future where the deployment of smart technologies during instruction and school management forms a significant aspect of his or her professional responsibilities. AI literacy is becoming popular in parts of Africa as a critical part of the fourth industrial revolution leading to fundamental changes in the way educators in the region live, work, and interacts with one another (Eke et al., 2023). Nigeria's government tends to be collaborating with relevant stakeholders to integrate AI into education. From latest research conducted by of Aina, Gbenga-Epebinu, Olofinbiyi, Ogidan, & Ayedun (2023) and (Okunade, 2024) on AI, there is evidence suggesting that government is making efforts in that direction to introduce adaptive learning systems (ALS), virtual laboratories, instructional content powered by artificial intelligence and intelligent tutoring systems (ITS). Its adaptation in the educational setting has the propensity to expose teachers to machine learning in the new age, and smart manipulations during instructional delivery, and enables the application of age-appropriate hardware and software by the educators to ease teacher work at school.

Consequently, developments in education in Nigeria today tend to be tilting towards the adoption of AI as an approach for tutors to be able to offer more effective services in schools. That has also sparked a growth in research in a bid to participate in the exploration regarding the potentials of AI literacy for educators in the digital era. Such attention given to the subject occasions a change in the way teachers work and literacy in the realm of AI is consequently becoming a vital skill for educators in primary schools in the present day – even in the future. It is implicit that educators who lack the skills to work with AI devices are likely to be left behind in a digital education. Consistent with the work of Aina et al. (2023) and Okunade (2024), earlier recent research by Su and Yang (2022) and Chen, Xie, Zou & Hwang (2020) found how that the application of AI is capable to ease the work of the teacher in schools, including teaching automation and evaluation, teacher administration, keeping learner attendance, intelligent teaching systems for special education and recommending useful materials for pupils. Further to that, AI technologies also perform social roles in education. For instance, AI assisted devices enable educators to interact with smart machines in ways that inspire both educator and children to explore more spaces for enhancing teaching and learning experiences. One of such patterns of learning is the individualised method. Espousing this argument, Pedro, Subosa, Rivas & Valverde (2019) stated that AI powered education supports a reform that aims to create a tutor system that can transform learning to a personalised activity.

Personalisation in education describes a practice in which the individual teacher gets variable opportunities to choose and engage in activities that boost sustainable professional development and services. Current teaching practices require educators to always perform manual and routine tasks that often exhaust teacher energy. Many teachers are used to this method. It has become a comfort zone for educators, a cover for concealing their reluctance and opposition to change, and as such they may not feel bothered by exhaustion. Resistance to change in favour of digital education probably arises from educator fear of the deskilling effect of implementing AI powered education. The benefits of AI literacy are, however, such that can address the apprehensions among educators. An AI based system creates a dual teacher situation, enabling the existence of a human tutor and a smart teaching machine simultaneously in a classroom setting. For example, the educator can deploy simple smart devices as Chat GPT, Nerd AI, Ask AI etc to generate ideas, solve problems, develop a lesson plan and share ideas with learners and colleagues in a few seconds (Smith, 2024). Apart from its pedagogical value, the development of AI in software forms also helps to clear the misconceptions that AI is mainly connected to robots.

However, given the tremendous work which educators perform, Pedro et al. (2019, p.13) pointed that the collaboration between ‘the teacher and a virtual teaching assistant frees up teacher time’ so that the person can attend to other critical matters that concern the school, such as guidance services and managerial engagements. AI is a breakthrough in education; the other being the computer, promoting the digitisation of education that involves bringing AI powered devices to enhance education technology to mitigate the challenges of teaching. The use of AI devices aligns with the activity-based approach of conducting classroom lessons. A common challenge nevertheless of teaching, particularly in parts of sub-Saharan Africa, including Nigeria, is that many educators are unfamiliar with activity related teaching methods, for example, the Froebelian play way method (Priya, 2016), or rather cannot apply such a strategy which emphasises activities and/or games. For this reason, some of them often dodge using this method during instruction in primary schools. The inclusion of games in the AI devices nevertheless provides competencies and possibilities for the educators to engage the play way in executing classroom lessons in an age-appropriate manner.

Unfortunately, public primary schools in Nigeria suffer persistent neglect by government, including relevant agencies in terms of equipment. Not much attention and value are accorded to this level of education. Evidence of this is the limited budgetary allocation and resourcing of primary education – and the general educational sector – by national government. Perceptions among a significant portion of the public suggest that primary education is simplistic, contributing little to national development, and do not deserve huge public funding and equipment. Such disregard explains for why virtually nothing is being provisioned in

relation to information and communication technology (ICT) infrastructure for educators to use in state primary schools (*cf.* Okunade, 2024). Consequently, many teachers are oblivious of the concept of AI because, in the first instance, they do not have access to such knowledge, talk less of the device. Without knowledge it is impossible for an educator to have the interest and capability to use AI resources to be able to deliver on the job. Misunderstanding could also provoke apprehensions and resistance from parents, school administrators, community leaders and even children against the implementation of AI programmes in schools. Except a proper and adequate orientation about the prospects of AIIE is being disseminated, it is likely that measures taken to enact AI in school would face challenges from (some of) these stakeholders.

Regardless of the possible inhibitions, AI literacy initiative, nevertheless, has advantages. Teachers who can use the AI are likely to be more effective even in the years ahead. The adoption of the AI in education has no intention to make virtual teachers to replace the humans in school. Similar fear was widely expressed at the advent of computers. What happened was nonetheless to the contrary. Computers did not actually make educators lose their jobs. Also, smart technologies cannot replace a man who himself is a supercomputer; they rather augment the functions of a man based on the way they devices are being programmed to function. As such, AI helps to enhance educators' skills, thus enabling the teachers to meet the expectations of the contemporary times in the profession. In much the same way, performing a skill upgrade to be able to use the AI in school is vital for today's primary school teachers. It is an adjustment that has the tendency to take the educator a step further by producing a re-modernised teacher to match the age of high-tech in education.

By performing such adjustment also demonstrates that the teacher is flexible and amenable to change. It is a change that fosters the advancement of human competencies from conventional teaching mode to the intelligent tutoring systems (ITS) (Okunade, 2024). ITS is a technological facilitation, and by using it teachers can offer individualised and interactive instruction by adjusting learner speed and preferences, deploying natural language processing to ease interactive experience, and customising subjects using diagnostic tests to meet personal needs (Okunade, 2024). And in the view of Adeyemi (2020), the application of ITS, which is an aspect of AI, helps to increase learner engagement in learning and addresses deficiencies in learner knowledge.

However, the use of AI raises ethical concerns regarding the confidentiality, integrity, safety and privacy of data and the user as well as identity configuration and data ownership (Nguyen, Ngo, Hong, Dang & Nguyen, 2022). On that note, AI principles of governance have been enacted to address ethical issues associated with the application of the smart device. These embody the guidelines for 'establishing and implementing policies, procedures, and standards for the appropriate development, use and management of the infosphere' (Floridi, 2018, p.3). Even at that, it is likely that users of AI may abuse the purpose of the technology in education by utilising it to engage in malpractices. Against this backdrop, ethics of AI help to ensure transparency and accountability in the use of AI by educators in education. According to Data Curation Centre (2020), the transparency aspect has to do with the data itself, where it is generated, what it shows, what happens to it, and how it is used. The accountability measure underscores the readiness of the user to acknowledge and take responsibility for the user's action (s) in relation to teacher decision making. Ethics of AI in education is about clarity of ethical guidelines and proper application of ethical principles on AI in teaching and learning.

## **STATEMENT OF THE PROBLEM**

AI powered education has emerged to upscale educator literacy in the era of digitisation. It is a progressivist initiative of which aim is to further enhance and shape the skills of the primary school tutor to be able to effectively apply smart technologies in teaching. The use of AI thus allows for a hybrid kind of practice to affect instruction and school management. When a high-tech gadget is involved, the human teacher is made to work with the aid of a virtual teaching assistant in school, enabling a better, faster, and swifter job. While

this serves as a futuristic mode of performing professional duties in primary schools, the reality in Nigeria, however, raises concerns among stakeholders about whether AI literacy among educators is achievable.

For example, ICT infrastructure is acutely in short supply in public primary schools in Nigeria. Some schools do not have such infrastructure at all. Consequently, that is affecting educator access to ICT equipment during lessons and other official duties, teacher knowledge and competence in the use of AI are also in question. Also, local cultures in respect to data generation, sharing, security, and integrity, and teacher accountability raise ethical issues involving the adoption of AI in primary schools. Although government and some related agencies seem to be developing measures that can generate response/s in that direction, such efforts, nonetheless, appear to be propositions. These stakeholders are yet to be clear about the approach to adopt in order to emphasise the digitisation of education to foster AI literacy among educators. Given these challenges, in this new age where the use of AI technologies is gradually taking a place in education, educators and state primary schools in Nigeria face the risk of being left behind in the race for AI assisted education in the world.

### **Purpose of the Study**

This study investigated whether an investment in AI literacy predicts the enhancement of educators' skills in AI assisted environment in public primary schools in Nigeria. It specifically examined whether:

1. Knowledge of AI predicts the enhancement of educators' skills in AI powered primary school
2. The use of AI devices predicts the enhancement of educators' skills in AI powered primary schools.
3. The understanding of the ethical issues about AI technologies predicts the enhancement of educators' skills in AI powered primary schools.

### **Research Questions**

These questions were posed for the research:

1. Does the knowledge of AI predict the enhancement of educators' skills in in AI powered primary schools?
2. Does the use of AI devices predict the enhancement of educators' skills in AI powered primary schools?
3. Does the understanding of ethical issues about AI technologies predict the enhancement of educators' skills in AI powered primary schools?

### **Research Hypotheses**

These null hypotheses were formulated at 0.05 level of significance to guide the study:

1. The knowledge of AI does not significantly predict the enhancement of educators' skills in AI powered primary schools.
2. The use of AI devices does not significantly predict the enhancement of educators' skills in AI powered primary schools.
3. The understanding of the ethical issues about AI technologies does not significantly predict the enhancement of educators' skills in AI powered primary schools.

## **THE METHODOLOGY**

Quantitative research methodology (Mertler and Charles, 2014; Creswell, 2003) is being adopted herein as the general principle to guide access to and analysis of data. It is an approach that is appropriate as it can

facilitate the measurement of variables in quantifiable terms by relying on the generation and analysis of numerical data to explain, describe, predict or control variable or phenomena of interest (Mertler and Charles, 2014; Gay, Mills & Airasian, 2009). Therefore, the qualitative research strand, with all its properties, is hereby ditched as it is nonaligned with the direction of the present research and intentions of the researcher.

### **Research Design**

Descriptive survey (Mertler and Charles, 2014) was deployed to match the quantitative trajectory of the study. It allows for the description of the variables and characteristics of the sample. Also, it enables the utilisation of questionnaires to collect numerical data from participants.

### **Research Location**

The study was based in five states in Nigeria, including Kaduna, Benue, Ebonyi, Ogun and Cross River. These states represent five geopolitical zones in the country. One zone, the northeast, however, was excluded due to insecurity.

### **Study Population**

6220 teachers, including 4100 males and 2120 females, were on the nominal roll of public primary schools across these five states (National Bureau of Statistics, 2021). These educators included veterans and beginners. These teachers were aged between 27 and 50 years of age and have spent between 5 to 25 years in service in the different schools. Educators of this category have gained sufficient experience in the field and are able to share their knowledge to support the study. Besides, they are adults and can self-consent to participate in research. Their younger and older colleagues were excluded because the former had very limited experience on the job while the latter were very limited in number.

### **The Sample**

1000 educators, comprising 500 men and 500 women, representing about 16 per cent of the entire population, took part in the research. The sample was drawn in this manner to produce a significant representation of the population.

### **Sampling Method**

Cluster sampling (Mertler and Charles, 2014; Muijs, 2004; Creswell, 2003) was adopted to select participants for the study. The researcher worked with staff of State Universal Basic Education Board – the office charged with the responsibility of managing public primary schools in the state – to identify five state primary schools in each of the five states. Teachers in each school were clustered into males and females. From each of these two categories, 100 participants were recruited via balloting to produce a total of 200 teachers per school. In conducting the balloting system, the words ‘Yes’ and ‘No’ were written on two different papers, folded, and mixed in a container for teachers to pick. Teachers who picked ‘Yes’ were selected; those that chose ‘No’ were excluded.

### **Data Collection Tool**

The artificial intelligence literacy and educators’ skills enhancement questionnaire (AILESEQ) was adopted to generate data. Teachers in the area are familiar with the questionnaire and can complete it. AILESEQ is a modified version of other questions that were used to collect data on almost similar studies. The amendments were made to produce AILESEQ so that can be used to generate data to address stated research

hypotheses. This is designed to have two sections: demographics and scaling part. The demographic parts included the gender, age, and service year of the respondent. The scaling section has 15 questions placed under four Likert scale, and having such scales as strongly agree (SA), agree (A), disagree (D) and strongly disagree (SD) to help the respondent indicate the extent to which he or she agrees with each of the 15 questions. Five questions were posed for each hypothesis. The questions were worded in simple, declarative, and clear sentences to make the instrument easy for the respondents to complete.

### **Establishing Trustworthiness**

The positivist principles of validity, reliability and generalisability (Mertler and Charles, 2014; Muijs, 2004) were applied to evaluate this study and to ensure trustworthiness. The AILESEQ was constructed by the researcher who is research active and has the skills to do so. Other measures such as scrutiny by psychometric experts and member checks were also being followed. Thereafter, the instrument was trialed using 60 teachers, including 30 males and 30 females, in one state primary school in the research site. Data arising from the pilot study was subjected to analysis via Cronbach Alpha. The result of data analysis is .84, and this suggests that the data tool is reliable and suitable for use in the main study. Findings from the primary research were generalised to the entire study population. 1000 participants were consequently drawn from the population to enhance generalisability of findings.

## **ETHICAL CONSIDERATIONS**

Approval was received from the officials of the Universal Basic Education Boards, school heads and teachers for this study. Educators gave also consent to participate. Data collection was done during school hour to be able to meet the teachers. They were advised to complete the questionnaire in their convenient time. Respondents had the opportunity to withdraw participation from the study without giving a reason. A contingency arrangement was made in the event of unforeseen circumstances that could delay data collection or make the research to discontinue. In each state, a contingency school was placed on standby for that purpose should an unpleasant situation happen. The questions in the questionnaire were phrased carefully to prevent raising any emotive issues in the respondents. Names of schools and educators are pseudonymised and their data kept confidentially.

## **PROCEDURES FOR DATA COLLECTION AND DATA PREPARATION**

Data collection was conducted following a calendar that was prepared for that purpose. Data generation activities lasted five months. The schools were located in places that are far from one another. As such, data collection lasted one month per school. The time allotted for data collection was to allow sufficient opportunity for local travels, accommodation, administration, and retrieval of the AILESEQ. At the end of the data generation exercise, preparation for the analysis of data started. All completed questionnaires were retrieved from respondents. One mark was assigned to each descriptor in the biographical section of the AILESEQ. However, the scaling section of the questionnaire was scored in a reverse order as follows: SA = 4 marks, A = 3 marks, D = 2 marks, and SD = 1 mark. Data was inputted this way into an electronic device for statistical analysis.

## **DATA ANALYSIS**

Data from the demographic section of the AILESEQ was analysed using the simple percentage as shown on see table 1. However, simple linear regression was used to analyse data from the scaling item area of the questionnaire based on hypothesis as shown on tables 2, 3 and 4. The Statistical Package of the Social Sciences (SPSS) was deployed to aid data analysis. See SPSS output on tables 1, 2, 3 and 4 below:

Table 1: Participants’ Demographics

Category	Variable	Number	Percentage (%)
Gender	Males	500	50
	Females	500	50
	<b>Total</b>	<b>1000</b>	<b>100</b>
Age	27 – 35	600	60
	36 – 45	300	30
	46 – 50	100	10
	<b>Total</b>	<b>1000</b>	<b>100</b>
Service year	5 – 15	720	72
	16 -25	280	28
	<b>Total</b>	<b>1000</b>	<b>100</b>

Data on table 1 indicate that 500 males representing 50% and 500 females representing 50% of the sample participated. In terms of age, 600 educators aged 27-35 years representing 60 per cent and 300 of their co-teachers aged 36-45 representing 30 per cent of the sample took part. Among them, 720 teachers have spent between 5-15 years in service representing 72 per cent while 280 of them have put in between 16-25 years in service representing 28 per cent of the sample. It implies that an equal number of males and females, and among them, more of the younger teachers than the older ones participated. It also shows that a significant number of young teachers are in service and require upgrade in their skills to be able to apply AI on the job.

Table 2: Simple regression test of knowledge of AI and enhancement of educators’ skills in AI powered primary schools.

**Coefficients<sup>a</sup>**

Model	Unstandardised coefficient		Standardised coefficient	t	Sig	95% Confidence Interval for B	
	B	Std. Error	Beta			Upper bound	Lower bound
<b>1 Constant (β1)</b>	-6.04	5.061		-2.74	0	98.743	153.324
<b>Knowledge of AI (β2)</b>	0.284	0.64	3.42	4.13	0	0.832	1.625

**a. Dependent Variable: Enhancement of Educators’ Skills in AI Powered Primary Schools**

The result of linear regression analysis is shown on table 2. Estimates of the two coefficients: constant ( $\beta_1$ ) = -6.043; knowledge of AI ( $\beta_2$ ) = .284. The calculated t for  $\beta_1$  = 4.130 is higher than  $\beta_2$  = -2.742 and P-value = .000 at 95% confidence interval for B. Therefore, the null hypothesis that states: the knowledge of AI does not significantly predict the enhancement of educators’ skills in AI powered primary schools is rejected; the alternative hypothesis is accepted. It suggests that the knowledge of AI significantly predicts the improvement of teachers’ skills in AI assisted primary schools in Nigeria. Having knowledge about AI has a connection with the upgrade of educator’s abilities in the use of virtual teaching assistants in primary schools in the research context.



Table 3: Simple regression test of the use of AI devices and enhancement of educators’ skills in AI powered primary schools.

**Coefficients<sup>a</sup>**

Model	Unstandardised coefficient		Standardised coefficient	t	Sig	95% Confidence Interval for B	
	B	Std. Error	Beta			Upper bound	Lower bound
<b>1 Constant (β1)</b>	-6.04	5.061		-2.74	0	98.743	153.324
<b>Use of AI devices (β2)</b>	0.274	0.64	3.42	4.307	0	0.832	1.625

**b. Dependent Variable: Enhancement of Educators’ Skills in AI Powered Primary Schools**

Outcome of linear regression analysis is on table 3. Estimates of the two coefficients: constant (β1) = -6.043; use of AI devices (β2) = .274. The calculated t for β1 = 4.407 is higher than β2 = -2.742 and P-value = .000 at 95% confidence interval for B. Therefore, the null hypothesis that states: the use of AI devices does not significantly predict influence on the enhancement of educators’ skills in AI powered primary schools is jettisoned; the alternative hypothesis is retained. It indicates that the use of AI devices significantly predicts the improvement of teachers’ skills in AI assisted primary schools in Nigeria. The ability to use AI devices has a link with the improvement of educator’s skills in AI powered schools in the research location.

Table 4: Simple regression test of the understanding the ethical issues about AI technologies and enhancement of educators’ skills in AI powered primary schools.

**Coefficients<sup>a</sup>**

Model	Unstandardised coefficient		Standardised coefficient	t	Sig	95% Confidence Interval for B	
	B	Std. Error	Beta			Upper bound	Lower bound
<b>1 Constant (β1)</b>	-6.04	5.061		-2.74	0	98.743	153.32
<b>Understanding the ethical issues of AI technologies (β2)</b>	0.288	0.64	3.42	4.421	0	0.832	1.625

**c. Dependent Variable: Enhancement of Educators’ Skills in AI Powered Primary Schools**

Outcome of linear regression analysis is on table 3. Estimates of the two coefficients: constant (β1) = -6.043; understanding the ethical issues of AI technologies (β2) = .288. The calculated t for β1 = 4.421 is higher than β2 = -2.742 and P-value = .000 at 95% confidence interval for B. Therefore, the null hypothesis that states: the understanding of the ethical issues about AI technologies does not significantly predict the enhancement of educators’ skills in AI powered primary schools is jettisoned; the alternative hypothesis is retained. It hints that understanding the ethical issues about AI technologies significantly predicts the improvement of teachers’ skills in AI assisted primary schools in Nigeria. The ability to understanding the ethics of AI has a connection with the improvement of educator’s skills in AI powered schools in the research site.

## SUMMARY OF FINDINGS

The following results were obtained from data analyses:

1. The knowledge of AI significantly predicts the improvement of educators' skills in AI powered primary schools in Nigeria.
2. The use of AI devices significantly predicts the improvement of educators' skills in AI powered primary schools in Nigeria.
3. Understanding the ethical issues about AI technologies significantly predicts the improvement of educators' skills in AI powered primary schools in Nigeria.

## DISCUSSION OF FINDINGS

Results that emanated from data analyses are being discussed based on hypotheses as follows:

### Hypothesis One

The outcome of data analysis for hypothesis one revealed that having knowledge about AI is an investment that can predict the enhancement of educators' skills for them to be effective in AI assisted environment in state primary schools in Nigeria. Knowledge of AI is having awareness about AI and its functions in education. According to Kong, Korte, Burton, Keskitalo, Turunen, Smith, Wang, Lee & Beaton (2024) it is a kind of knowledge that equips learners with the skills required to use AI to solve professional challenges at school to improve day-to-day practice. Besides, having knowledge about AI will assist to differentiate between technological devices that use and do not use AI (Stolpe and Hallstrom, 2024). It is a medium by which a teacher can identify an AI tool from a non-AI one. More so, it enables the tutor to have substantial information as to whether a machine thinks or it is being programmed to function in particular modes within contexts. Such capability helps the educator to know which AI device is appropriate to apply execute tasks at school. By constructing ideas about the ways smart machines work a teacher is able to become a more effective teacher, and that places the educator in an advanced teaching position. Also, it is possible for the educator to learn more about AI and to use it as a concrete material to deliver instruction on AI technology to benefit pupils.

### Hypothesis Two

Results from analysis of data suggested that the use of AI devices significantly predicts the improvement of educators' skills in AI powered primary schools in Nigeria. By developing the ability to use AI devices in teaching at school makes the educator more human, enhancing the creative capacity of the person (Gocen and Aydemir, 202; Manyika, Chui, Miremadi, Bughin, George, Willmott & Dewhurst, 2017) and lessening teacher workload. It is an automation era in which the educator becomes relieved of the burden of manual handling of classroom and administrative duties. An artificial intelligence support school reduces the energy and time a teacher uses to work. That enables a dual teacher mode in which the educator can work hand-in-hand with a virtual teaching assistant (Pedro et al, 2019), thus helping to free up the teacher time for the individual to attend to other serious matters in the school. Faults and malfunctions are bound to occur in the use of AI devices. While utilising the devices it is likely for the educator to develop the abilities to detect the faults in the devices and to fix them.

### Hypothesis Three

Data analysis of hypothesis two indicates that understanding the ethical issues about AI technologies significantly predicts the improvement of educators' skills in AI powered primary schools in Nigeria. It

involves being clear about the guidelines for ‘establishing and implementing policies, procedures, and standards for the appropriate development, use and management of the infosphere’ (Floridi, 2018, p.3). This can guarantee transparency and accountability in the ways educators use AI in education. According to Data Curation Centre (2020), the transparency aspect has to do with the data itself, where it is generated, what it shows, what happens to it, and how it is used. On the other hand, the teacher demonstrates accountability when he or she takes responsibility for whatever issues that may arise from the use of AI either in the classroom or in general school management or both. The educator will be able to act in ways that would guide against the occurrence of unpleasant situations due to the application of AI. Consequently, the tutor can show that he or she is able to prevent or address the risks that may arise in the application of AI tools at school.

## RECOMMENDATIONS

Based on the findings above, the following recommendations were made:

1. Government should organise training workshops on AI literacy for educators in primary schools;
2. The policy on education needs review to produce a framework for the introduction of AI powered education to benefit state primary schools;
3. The curriculum of teacher education has to be revised to feature AI in education;
4. AI literacy should be a requirement during the recruitment of new teachers for primary schools;
5. Schools have to produce guidelines for the application of AI devices during classroom instruction and general school management;
6. Government can create a demonstration school to test run the AI initiative. The outcome will inform mass implementation of the programme in schools;
7. Government can commit one percent (1%) of value added tax to serve as a sustainable source of funding the implementation of AI literacy in public primary schools nationwide;
8. Awareness campaigns should be organised regularly via various media to educate parents, children, community leaders etc about the benefits of AI technologies in primary schools. This will help to provide support to and address potential challenges to the implementation of AI literacy programmes in primary schools.

## CONCLUSION

Since its emergence, substantial research about AI in education is taking place around the world. Such attention given to the issue is also occurring in Nigeria. That is causing a shift from computerisation to AI in education. In this study focus is directed towards AI literacy as an approach for upgrading the skills of educators to be able to function more effectively in an AI assisted environment in public primary schools in Nigeria. It implies making significant investments to enhance the competencies of teachers to match the requirements of the profession in the era of smart technologies in terms of knowledge, ability to use AI devices and having the understanding about ethics of AI. It is not an attempt to introduce a practice where robots or smart machines would substitute the place of teachers in school. Rather, it is efforts in a direction where the human educators are repositioned to be able to collaborate with virtual teaching assistants to be able to deliver better on the job in the age of AI.

## ACKNOWLEDGEMENTS

The author expresses profound gratitude for the huge support, which the following persons provided in various ways to facilitate the successful completion of this research: God Almighty, Mrs. Gegbazi Moses Ewa, JamesMoses, Johnmoses and Jedmoses, teachers, school heads, staff of the Universal Basic Education Boards across the states, participant schools, authors whose views are referenced herein, colleagues who

shared critical insights to enhance the study as well as helped to proofread the draft research report, and friends. Thank you all.

## REFERENCES

1. Adeyemi, O. A. (2020). Integrating artificial intelligence into STEM education in Nigerian Secondary Schools. *Journal of Educational Technology Research*, 15(2), pp. 112-130.
2. Aina, M. A., Gbenga-Epebinu, M. A., Olofinbiyi, R. O., Ogidan, O. C. & Ayedun, T. O. (2023). perception and acceptance of medical chatbot among undergraduates in Ekiti State University, Nigeria. *British Journal of Education*, 11(11), 1-14.
3. Amudha, T. (2022). Artificial intelligence: a complete insight. In Kaliraj, P. & Devi, T. (Eds.), *Artificial intelligence, theory, models and applications*. Boca Raton, FL: CRC Press, Taylor & Francis Group, LLC.
4. Becker, G. S. (1993). *Human capital: a theoretical and empirical analysis with special reference to education* (3rd ed.). Chicago: University of Chicago Press.
5. Brown, C. (2000). *Entrepreneurial education teaching guide*. Kansas City: M. O Kauffman.
6. Burgsteiner, H., Kandhofer, M. & Stenbauer, G. (2016). Irobot: teaching the basics of artificial intelligence in high schools. *Proceedings of AAAI Conference on Artificial Intelligence*, 30(1), pp. 4126-4127.
7. Chen, X., Xie, H., Zou, D. & Hwang, G. J. (2020). Application and theory gaps during the rise of artificial intelligence in education. *Computers & Education: Artificial Intelligence*, 1, Article 100002.
8. Creswell, J. (2003). *Research design: qualitative, quantitative and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: SAGE Publications.
9. Digital Curation Centre, The University of Edinburgh (2020). The role of data in AI: report for the data governance working group of the global partnership of AI. <https://www.research.ed.ac.uk/en/publications/the-role-of-data-in-ai>
10. Eke, D. O., Wakunuma, K. & Akintoye, S. (2023). *Responsible AI in Africa: challenges and opportunities*. Switzerland Palgrave Macmillan.
11. Federal Government of Nigeria (2013). *National policy on education*. Abuja: NERDC Press.
12. Floridi, L. (2018). Soft ethics and the governance of the digital. *Philosophy & Technology*, 31(1), pp. 1–8.
13. Gay, L.R., Mills, G.E. & Airasian, P. (2009). *Educational research competencies for analysis and applications*. Pearson, Columbus.
14. Gocen, A. & Aydemir, F. (2020). Artificial intelligence in education and schools. *Research on Education and Media*, 12(1), pp. 14-21.
15. Kong, S., Korte, S., Burton, S., Keskitalo, P., Turunen, T., Smith, D., Wang, L., Lee, J. C. & Beaton, M. (2024). Artificial intelligence (AI) literacy – an argument for AI literacy in education. *Innovations in Education and Teaching International*.
16. Manyika, J., Chui, M., Miremadi, M., Bughin, J., George, K., Willmott, P., & Dewhurst, M. (2017). *A future that works: automation, employment, and productivity*. Chicago: McKinsey Global Institute.
17. McCarthy, J., Minsky, M. L., Rochester, N. & Shannon, C. E. (2006). A proposal for the Dartmouth research project on artificial intelligence. *AI Magazine*, 27(4).
18. Mertler, C. A. & Charles, C. M. (2014). *Introduction to educational research*. London: Pearson Education Limited.
19. Muijs, D. (2004). *Doing quantitative research in Education with SPSS*. London: Sage Publications.
20. Ng, D. T. K., Leung, J. K.L. Chu & Qiao, S. K. W. (2021). Conceptualizing AI literacy: an exploratory review. *Computers and Education: Artificial Intelligence*, 2.
21. Nguyen, A., Ngo, H. N., Hong, V., Dang, B. & Nguyen, B. T. (2022). Ethical principles for artificial intelligence in education. *Education and Information Technologies*, 28, pp. 4221 – 4241.

22. Okunade, A. I. (2024). The role of artificial intelligence in teaching of Science Education in secondary schools in Nigeria. *European Journal of Computer Science and Information Technology*, 12 (1), pp. 57-67.
23. Organization for Economic Co-operation and Development (OECD) (2001). *The well-being of nations: the role of human and social capital*. Paris: OECD.
24. Pedro, F., Subosa, M., Rivas, A. & Valverde, P. (2019). *Artificial intelligence in education: challenges and opportunities for sustainable development*. Paris: UNESCO.
25. Priya, P. K. (2016). Play way method: an effective approach for self-regulated learning practices. *International Journal of Science and Research*, 7(11), pp. 951-955.
26. Smith, A. T. (2024). The impact of AI: the benefits and challenges that lie ahead for AI in education. <https://nationalparentsunion.org/wp-content/uploads/2024/01/The-Impact-of-AI.pdf>.
27. Stolpe, K. & Hallstrom, J. (2024). Artificial intelligence literacy for technology education. *Computers and Education Open*, 6, pp. 1-8.
28. Su, J. & Yang, W. (2020). Artificial intelligence in early childhood education: a scoping review. *Computers & Education: Artificial Intelligence*, Article 1000049
29. Wang, P. (2019). On defining artificial intelligence. *Journal of Artificial General Intelligence*, 10(2), pp. 1-37.
30. Zhao, L., Wu, X. & Luo, H. (2022). Developing AI literacy for primary and middle school teachers in China: based on a structural equation modeling analysis. *Sustainability*, 14, pp. 14549.