INFLUENCE OF AI ON CHILDREN VOCABULARY SKILLS IN EARLY CHILDHOOD EDUCATION IN MAKURDI LOCAL GOVERNMENT AREA, BENUE STATE

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Abstract
The study investigated artificial influence of AI on children vocabulary skills in early childhood education in Makurdi Local Government Area, Benue State. Two research questions guided the study and two hypotheses were tested at 0.05 level of significant. The study Adopted a descriptive survey research design. The area of study was Makurdi local government, the headquarters of Benue State. The population of the study was 221 primary school teachers from 22 government aided primary schools within the 11 council wards in Makurdi Government Area of Benue state (Source: Ministry of Education, 2026). The study adopted a multi-staged sampling procedure. The sample size of the study comprised of 212 teachers. The study collected data with the use of a 15 items instrument titled: Artificial Intelligence as Instructional Tool Questionnaire (ATIITQ). The instrument was validated by three experts in the Faculty of Education, Rev. Fr. Moses Orshio Adasu University for scrutiny to ensure that they are capable of measuring the variables of the study. Data were analysed using mean and standard deviation to answer research questions. The cut-off point of 2.50 was used to determine positive role than 2.50 was regarded as non-significant. Chai-square was used to test hypotheses at 0.05 level of significance, the study revealed that artificial intelligence is an instructional toll in childhood education. Artificial intelligence plays significant role on vocabulary skills and learning motivation in early childhood education. The study recommended among others that early childhood education centres should integrate artificial intelligence-powered instructional tools into classroom teaching to enhance children's vocabulary skills and learning motivation. Government agencies and school proprietors should provide adequate technological infrastructure, including computers, tablets, internet connectivity, and AI-based educational software, to support effective implementation of AI in early childhood education

Keywords: Artificial Intelligence, Instructional Tool, Early Childhood Education, vocabulary skills, Learning Motivation.

Introduction

Globally, early childhood education (ECE) is still grappling with significant challenges, even though its importance for children's overall development and future academic success is widely acknowledged. One of the biggest hurdles is the unequal access to quality early learning opportunities, especially for children from disadvantaged socioeconomic backgrounds. Many countries are also dealing with issues like insufficient funding, a lack of qualified teachers, poor infrastructure, and limited learning resources. These obstacles often lead to disparities in educational quality and learning outcomes, making it tough for many kids to develop the foundational skills they need for lifelong learning (Aina & Bipath, 2021). On top of that, weak policy implementation and governance issues continue to stifle the growth and effectiveness of ECE programs in various parts of the world (Yoshikawa et al., 2023).

In Africa, the situation is even more challenging due to factors like

poverty, rapid population growth, inadequate educational infrastructure, and minimal government investment in the sector. Many African nations face shortages of trained early childhood educators, overcrowded classrooms, and a lack of teaching and learning materials. Access to quality ECE is particularly tough for children in rural and marginalized communities, which exacerbates inequalities in school readiness and educational achievement (Luckin, 2024). Moreover, ineffective policy implementation and poor monitoring mechanisms often limit the success of existing programs, hindering ECE's ability to effectively support children's cognitive and social development (Ngware & Ezeh, 2022). In Nigeria, early childhood education faces its own set of challenges, including inadequate funding, poor infrastructure, and a shortage of instructional materials.

Early childhood education (ECE) is all about the formal and informal learning experiences that children receive from the moment they're born up until around eight years old. This time is crucial for their cognitive, social, emotional, physical, and language development. ECE includes a variety of programs and learning settings aimed at nurturing children's overall growth and getting them ready for a lifetime of learning and active participation in society. The focus is on creating engaging and supportive experiences that spark curiosity, creativity, problem-solving skills, and positive social interactions during these formative years (Copple & Bredekamp, 2022). As noted by Whitebread and Bingham (2023), early childhood education is a child-centered approach that encourages learning through play, exploration, interaction, and guided experiences tailored to the unique developmental needs of young children. They emphasize that high-quality ECE lays a solid foundation for future academic success, social skills, and emotional health. With the right curricula, skilled educators, and supportive learning environments, early childhood education equips children with the essential skills, values, and attitudes that are vital for their overall development and future educational achievements (Whitebread & Bingham, 2023).

There are several factors that can impact how effective and accessible early childhood education is, such as family socioeconomic status, parental involvement, teacher quality, the learning environment, government policies, and the availability of educational resources. Kids from economically disadvantaged families often encounter obstacles when trying to access quality early learning programs, while active parental involvement can significantly boost children's cognitive and social development. The qualifications, experience, and teaching methods of educators also play a crucial role in shaping the quality of ECE. (Whitebread & Bingham, 2023).

Artificial Intelligence (AI) is a fascinating area of computer science focused on creating systems that can handle tasks usually requiring human smarts. This includes things like learning, reasoning, problem-solving, making decisions, processing language, and recognizing patterns. AI technologies rely on algorithms, machine learning, and vast amounts of data to analyze information, predict outcomes, and improve their performance over time. Nowadays, AI is making waves in various fields such as education, healthcare, finance, transportation, and business, where it boosts efficiency, automates processes, and enhances decision-making (Eke, 2024). For instance, in education, AI plays a crucial role in personalized learning, intelligent tutoring systems, automated assessments, and learning analytics, all of which contribute to better teaching and learning experiences. However, while the benefits are numerous, there are valid concerns about data privacy, algorithmic bias, ethical issues, and the risk of replacing human jobs, which underscores the importance of implementing AI technologies responsibly and with proper regulations (Russell & Norvig, 2022; Long & Magerko, 2023).

In Nigeria, the use of artificial intelligence (AI) as a support tool in early childhood and basic education is still in its infancy, but it's gradually gaining traction through digital learning platforms, intelligent tutoring apps, automated content creation, and teacher support systems. AI tools are being used to help teachers with lesson

planning, personalized learning, assessments, and creating age-appropriate instructional materials. Recent research shows that Nigerian educators generally have a positive outlook on adopting AI and see its potential to enhance teaching effectiveness, boost learner engagement, and improve educational outcomes. Nonetheless, challenges like insufficient digital infrastructure still pose hurdles to widespread adoption (Eke, 2024; Bali et al., 2024).

In Benue State, it seems that the use of AI in education is primarily taking root in teacher training institutions and educational management systems, rather than making its way into early childhood classrooms (Asue, 2025). Research shows that there's a growing awareness and use of AI technologies among educators and administrators, especially for things like instructional planning, educational management, and digital learning support. The gradual incorporation of digital technologies in teacher training and educational programs in the state points to a slow but steady shift towards AI-enhanced teaching practices, which could eventually benefit early childhood education. However, the effective application of AI in nursery and lower primary settings is still hampered by a lack of technological resources, poor internet connectivity, limited professional development opportunities, and funding issues (Cabell et al., 2023; Quinn et al., 2024). To truly harness the potential of AI as a supportive tool in education in Benue State, we need to invest more in digital infrastructure, build teacher capacity, and create supportive policies (Adole & Asue, 2025; Asongo et al., 2024). In early childhood education, AI can serve as a valuable instructional support tool in various ways. For instance, teachers can leverage AI to boost students' vocabulary skills and enhance their motivation to learn (Asue, 2025).

When we talk about vocabulary skills, we're referring to how children learn, understand, and effectively use words to express their ideas, thoughts, feelings, and experiences. This is a crucial part of language development that kicks off in early childhood and continues throughout life as individuals come across new words and meanings

in different situations. Children with well-developed vocabularies are better able to comprehend texts, express themselves clearly, and engage successfully in learning activities, while limited vocabulary knowledge can hinder educational progress and communication skills (Cabell et al., 2023; Quinn et al., 2024). Such development is capable of also enhancing learning motivation among pupils'.

Learning motivation is all about the internal and external factors that spark, guide, and maintain a child's eagerness to dive into learning and reach their educational goals. It includes the interest, excitement, determination, and effort that kids show when they tackle academic tasks and pick up new knowledge or skills. In the realm of early childhood education, several elements play a role in shaping this motivation, such as strong teacher-child relationships, nurturing learning environments, engaging teaching methods, encouragement from parents, and chances to succeed (Asue, 2025). Kids who are really motivated to learn often get more involved in classroom activities, display a greater sense of curiosity, push through challenges, and achieve better results in their education. On the flip side, when motivation is low, it can lead to less engagement and slow down cognitive and academic growth (Asue, 2025). That's why it's so important to nurture learning motivation in those early years-t sets the stage for lifelong learning habits and a positive outlook on education (Schunk & DiBenedetto, 2023; Wentzel & Miele, 2024).

A number of studies have highlighted how AI can be a game-changer in childhood education. For instance, Holmes et al. (2023) discovered that students who engaged with AI-supported vocabulary instruction showed a remarkable boost in both vocabulary acquisition and retention compared to their peers who learned through traditional methods. The researchers pointed out that AI tools offer personalized learning experiences and instant feedback, which really help enhance vocabulary skills. Similarly, Chen and Hsu (2024) found that kids who interacted with an AI storytelling system scored significantly higher in vocabulary tests and used words more effectively in communication activities than those who received standard

instruction. Their findings suggest that AI-driven storytelling can be a powerful way to improve vocabulary learning for young children.

Luckin (2024) discovered that students using AI-supported instructional platforms were not only more interested in their learning activities but also participated more in class and showed greater determination when tackling academic tasks. The study wrapped up by highlighting that AI technologies can really boost learning motivation by offering engaging, personalized, and interactive experiences. Similarly, Zawacki-Richter et al. (2023) found that students who had access to AI-supported tutoring systems displayed noticeably higher motivation, improved self-confidence, and a greater level of engagement in their learning compared to those taught through traditional methods. The researchers concluded that AI-driven instructional support can have a positive impact on students' motivation and overall involvement in their academic pursuits. It is against this background that this study seeks to examine influence of AI on children vocabulary skills in early childhood education in Makurdi Local Government Area of Benue State.

Statement of the Problem

Early childhood education plays a crucial role in developing children's vocabulary and learning motivation, which are essential foundations for future academic success. Despite the importance of these skills, observations by the researcher in several early childhood education centres in Makurdi, Benue State, indicate that many children experience difficulties in vocabulary acquisition and exhibit low levels of interest and participation during classroom activities. Some learners struggle to understand and use age-appropriate words effectively, while others show limited enthusiasm for learning tasks. These challenges appear to be associated with the continued reliance on traditional teaching methods, inadequate instructional materials, overcrowded classrooms, and limited opportunities for individualized learning experiences. As a result, many children may not be developing the language and motivational skills necessary for effective learning and communication. Although artificial

intelligence has emerged as an innovative instructional support tool capable of providing personalized learning experiences, immediate feedback, and interactive educational activities, its effectiveness in early childhood education remains uncertain. The researcher observed that most early childhood educators have little or no access to AI-powered learning tools that could enhance children's vocabulary skills and stimulate their motivation to learn. This situation raises concerns about whether the integration of artificial intelligence into early childhood classrooms could improve learning outcomes among young learners. Therefore, there is a need to investigate the influence of AI on children vocabulary skills in early childhood education in Makurdi Local Government Area, Benue State.

Purpose of the Study

The general purpose of the study was to investigate influence of AI on children vocabulary skills in early childhood education in Makurdi Local Government Area, Benue State. Specifically, the study examined:

a. examine the role of artificial intelligence as an instructional support tool for vocabulary skills among pupils.
b. examine the role of artificial intelligence as an instructional support tool for learning motivation in early childhood education.

Research Questions

The study was guided with the following research questions:

1. What is the role of artificial intelligence for enhancing vocabulary skills in early childhood education in Makurdi Local Government Area, Benue State?
2. What is the role of artificial intelligence in promoting learning motivation in early childhood education?

Hypotheses

The following hypotheses guided were tested at 0.05 level of significance

1. Artificial intelligence has no significant role in vocabulary skills in early childhood education in Makurdi Local Government Area, Benue State.
2. Artificial intelligence has no significant role in promoting learning motivation in early childhood education.

Methodology

The study adopted descriptive survey research design; A descriptive research design is a way of organizing data and looking at the object to be studied as a whole. Descriptive Research design determines and describes the way things are. It seeks to describe a unit in detail, in context and holistically. The area of study was Makurdi local government, the headquarters of Benue State. The population of the study was 221 primary school teachers from 22 government aided primary schools within the 11 council wards in Makurdi Government Area of Benue state (Source: Ministry of Education, 2026). The sample size of the study comprised of 212 teachers using multistage sampling procedure. The study collected data with the use of a 15 items instrument titled: Artificial Intelligence and Vocabulary Skills Questionnaire (AVSQ). The instrument was validated by three experts in the Faculty of Education, Rev. Fr. Moses Orshio Adasu Universityfor scrutiny to ensure that they are capable of measuring the variables of the study. A trial test was carried out of 25 teachers to ascertain the reliability of the instrument using Crobach Alpha Coefficient. Clusters of the instrument yielded the following coefficient: Cluster A= .70, B=.72, and cluster C= .70 respectively. Data were analysed using mean and standard deviation to answer research questions. The cut-off point of 2.50 was used to determine positive role than 2.50 was regarded as non-significant. Chai-square was used to test hypotheses at 0.05 level of significance.

Results

Research Question one

What is the role of artificial intelligence for enhancing vocabulary skills in early childhood education in Makurdi Local Government Area, Benue State.

Mean Scores and Standard Deviation for enhancing vocabulary skills in early childhood education in Makurdi Local Government Area, Benue State

S/N	SA	A	D	SD	N	Mean	SD	Decision
1	47	105	46	14	212	2.87	.831	Agreed
2	58	83	37	34	212	2.78	1.022	Agreed
3	80	73	39	20	212	3.00	.971	Agreed
4	54	91	61	6	212	2.91	.807	Agreed
5	39	99	62	12	212	2.78	.810	Agreed
						2.90	**0.85**	Agreed

Source: Field Work 2026

Table 1 finding indicates that the mean ratings of respondents' responses for items 1 to 5 with corresponding standard deviations as. 2.87 (.831), 2.78 (1.022), 3.00 (.971) 2.91 (.807), 2.78 (.810), Respondents rated all items above the 2.50 cut-off point as indicated on the cluster mean of 2.90and standard deviation of 0.85. This implies that artificial intelligence plays a significant role on vocabulary skills in early childhood education.

Research Question Two

What is the role of artificial intelligence in promoting learning motivation in early childhood education?

Mean Scores mean and standard deviation in promoting learning motivation in early childhood education

S/N	SA	A	D	SD	N	Mean	SD	Decision
1	54	63	22	73	212	2.46	1.206	Agreed
2	43	82	23	64	212	2.49	1.125	Agreed
3	50	64	42	56	212	2.51	1.121	Agreed
4	87	36	37	52	212	2.75	1.228	Agreed
5	35	64	41	72	212	2.29	1.105	Agreed
					212	2.50	1.13	Agreed

Source: Field Work 2026

Table 2 finding indicates that the mean ratings of respondents' responses for items 1 to 5 with corresponding standard deviations as 2.46 (1.206), 2.49 (1.125), 2.51 (1.121) 2.75 (1.228), 2.29 (1.105), Respondents rated all items above the 2.50 cut-off point as indicated on the cluster mean of 2.50and standard deviation of 1.13. This implies that artificial intelligence plays a significant role on learning motivation among pupils.

Hypothesis One

Artificial intelligence has no significant role in vocabulary skills in early childhood education in Makurdi Local Government Area, Benue State.

Chi-Square Test for role of artificial intelligence in vocabulary skills in early childhood education in Makurdi Local Government Area, Benue State.

Response	O	E	Df	Chi-Square	Sig.	Decision
SD	14	53.0				
D	46	53.0				
A	105	53.0	3	279.019[b]	0.000	Rejected
SA	47					

Source: Field Work 2026

Response	O	E	Df	Chi-Square	Sig.	Decision
SD	72	53.0				
D	41	53.0				
A	64	53.0	3	233.736b	0.000	Rejected
SA	35					

Hypothesis 2 result shows X^2 of 233.736[b], df= 3, and P-value= 0.000. Since P-value 0.00<0.05 level of significance, the null hypothesis which states that artificial intelligence has no significant role on learning motivation in early childhood education in Makurdi Local Government Area is rejected. This implies that artificial intelligence play a significant role on learning motivation in early childhood education.

Discussion of Findings

The discussion of the findings of this study is based on the result of the hypotheses tested. The two null hypotheses that were formulated and tested have been all rejected.

Research question one and hypothesis one revealed that artificial intelligence plays significant role on vocabulary skills in early childhood education in Makurdi Local Government Area. Teachers responses indicated that the use of artificial intelligence enhance pupils vocabulary skills. This finding agrees with Holmes et al. (2023) who found that pupils exposed to AI-supported vocabulary instruction demonstrated significantly higher vocabulary acquisition and retention than those taught using conventional teaching methods.. Chen and Hsu (2024) who found that children who interacted with the AI storytelling system achieved significantly higher vocabulary scores and demonstrated better word usage in communication activities than those who received traditional instruction.

Research question two and hypothesis two revealed that artificial intelligence play a significant role on learning motivation in early childhood education. Teachers responses revealed that the use of artificial intelligence promotes learning motivation in early childhood education. This finding agrees with Luckin (2024) who found that learners who used AI-supported instructional platforms showed increased interest in learning activities, greater classroom participation, and higher levels of persistence when completing academic tasks. The study concluded that AI technologies can enhance learning motivation by providing engaging, personalized, and interactive learning experiences. While Zawacki-Richter et al. (2023) who found that learners exposed to AI-supported tutoring systems exhibited significantly higher motivation levels, improved self-confidence, and greater engagement in learning activities compared to learners taught through traditional methods. The researchers concluded that AI-driven instructional support can

positively influence learners' motivation and overall academic participation.

Conclusion

Based on the findings of the study it was concluded that artificial intelligence plays as an instructional tool in early childhood education. This implies that artificial intelligence is used to enhance pupils' vocabulary skills and learning motivation.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Early childhood education centres should integrate artificial intelligence-powered instructional tools into classroom teaching to enhance children's vocabulary skills and learning motivation.
2. Government agencies and school proprietors should provide adequate technological infrastructure, including computers, tablets, internet connectivity, and AI-based educational software, to support effective implementation of AI in early childhood education.
3. Early childhood educators should receive regular training and professional development programmes on the effective use of artificial intelligence tools for teaching, assessment, and learner support.
4. Curriculum developers and educational policymakers should incorporate AI-supported learning activities into early childhood education curricula to promote interactive, personalized, and learner-centred instruction.

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