

Deployment of Artificial Intelligence for the Implementation of Early Child Care Development and Education (ECCDE) Curriculum in Public ECCDE Centres in Abuja, Nigeria

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Abstract

This study assessed the deployment of artificial intelligence (AI) for the implementation of the Early Child Care Development and Education (ECCDE) curriculum in public Early Child Care Development and Education (ECCDE) centres in Abuja, Nigeria. The research design used in the study was a survey research design. The sample size for the study was 120 teachers. The study surveyed teachers using a multistage sampling approach, beginning with the selection of area councils using a combination of purposive and simple random sampling techniques. Subsequently, a proportionate stratified sampling technique was applied to the population of teachers across the six area councils of Abuja. The researchers formulated a questionnaire – Deployment of Artificial Intelligence for the Implementation of Early Child Care Development and Education Curriculum Questionnaire (DAIIECCDECQ). The instrument was subjected to face and content validation using three experts. It also went through a test-retest reliability. Analysis revealed positive responses regarding AI's support in ECCDE curriculum implementation. The result showed that artificial intelligence has aided the effective implementation of the ECCDE Curriculum in public ECCDE centres in Abuja. The result also revealed that inadequate artificial intelligence, unstable power supply, poor funding and poor maintenance are the problems militating against the effective deployment of artificial intelligence for the implementation of the ECCDE curriculum in ECCDE centres in Abuja. Recommendations are included.

Keywords: Artificial intelligence, Curriculum Implementation, Early Child Care Development and Education (ECCDE)

Introduction:

The Nigerian educational system is a multifaceted structure comprising several stages, including primary, junior secondary, senior secondary, and higher education. Among these stages, primary education stands as the foundational level where children receive their initial formal

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education. Early Child Care Development and Education (ECCDE), as defined by the National Policy on Education (2013), focuses on the care, stimulation, and education of children aged 0 to 4 years in settings such as crèches or nurseries. This critical phase of education plays a pivotal role in shaping children's cognitive, social, emotional, and physical development. Maduewesi (1999) observed that ECCDE is the education that is offered to children who have not yet reached the statutory age of beginning primary school. He further maintained that it is a semi-formal education arrangement, usually outside the home, where young children from about the age of 3 years are exposed to play-like activities in a group setting. These group settings enhance their mental, social, and physical learning suited to their developmental stages until the mandatory age of government-approved formal schooling. Nakpodia (2003) observed that ECCDE is the education that provides for the physical, motor, health, nutritional, intellectual, aesthetic, emotional, and social development of the preschool child. This underscores the significance of ECCDE in laying the groundwork for a child's educational journey, facilitating a smooth transition from home to school, and providing a nurturing environment conducive to learning and growth. If ECCDE can provide these vital necessities which are fundamental in human life, it is not therefore unlikely to have an important and strong relationship with the pupils' performance at the primary school level and perhaps at the secondary and tertiary levels.

The objectives of ECCDE, as outlined in the National Policy on Education (2013), shall be to effect a smooth transition from the home to the school; prepare the child for the primary level of education; provide adequate care, supervision, and security for the children while their parents are at work; inculcate social, moral norms and values; inculcate in the child the spirit of enquiry and creativity through the exploration of nature, the environment, art, music and the use of toys, etc; develop a sense of co-operation and team-spirit; stimulate in the child good habits, including good health habits; and teach the rudiments of numbers; letters, colours, shapes, forms, etc, through play.

The realization of the ECCDE objectives depends on the effective implementation of the ECCDE curriculum in the various ECCDE centres across the country. Curriculum implementation is a multifaceted process that involves the execution of planned educational programs, encompassing various stages such as planning, content delivery, implementation, and evaluation. Scholars such as Ogunode, Ohibime, and Jedege (2023), Ogunode et al. (2023e), Akin-Ibidiran, Ogunode, and Akin-Ibidiran (2022), and Okoro (2010) have conceptualized curriculum implementation as the translation of planned curriculum into operational learning experiences, utilizing appropriate methods and resources. It is a dynamic process that requires careful planning, effective instructional strategies, and continuous assessment to ensure that educational goals are met, and students' needs are addressed.

In the contemporary educational landscape, the integration of artificial intelligence (AI) presents new opportunities for enhancing curriculum implementation in ECCDE centres. AI has applications across numerous fields, including health care, finance, transportation, customer service, and education. It has the potential to transform industries, improve efficiency, and create new opportunities (AFSA 2022). AI, defined by scholars such as Ogunode & Ukozor (2023e) and Alagbe (2023), refers to computer programs designed to emulate human intelligence, enabling tasks such as problem-solving, learning, and decision-making. Its potential applications across industries, including education, have led to increased interest in leveraging AI to improve learning outcomes, enhance administrative efficiency, and personalize instruction to meet individual student needs.

While numerous studies have explored the use of AI in various educational contexts (e.g. Ogunode, Agbade, and Basse, 2023; Ogunode, Edinoh, and Chinedu, 2023; Ogunode and Gregory, 2023; Ogunode and Ukozor, 2023; Xiaolin and Xiaojun, 2022; Femi, 2023), there is a notable gap in research on its deployment in ECCDE centres in Nigeria. Therefore, this study aims to address this gap by evaluating the utilization of artificial intelligence for implementing the ECCDE curriculum in public ECCDE centres in Abuja, Nigeria. By assessing the effectiveness and challenges of AI deployment in this specific educational context, the study seeks to contribute to the ongoing discourse on technology integration in early childhood education and inform policy and practice in ECCDE centres nationwide.

This study is of particular significance given the growing recognition of the importance of early childhood education in laying the foundation for lifelong learning and development. Research has consistently shown that quality early childhood experiences have a profound impact on children's academic achievement, social-emotional well-being, and long-term success. However, despite the crucial role of ECCDE, there are several challenges facing its effective implementation in Nigeria. Through this multidimensional research approach, the study aims to generate rich insights into the opportunities, challenges, and implications of deploying AI in ECCDE centres in Nigeria. By shedding light on the current state of AI integration in early childhood education and identifying strategies for overcoming barriers to implementation, the study seeks to inform evidence-based policy and practice in ECCDE and contribute to the advancement of early childhood education in Nigeria.

Purpose of the Study:

The objective of this study is to assess the deployment of artificial intelligence for the implementation of the Early Child Care Development and Education (ECCDE) curriculum in public ECCDE centres in Abuja, Nigeria.

Research Questions:

Based on this research objectives, the researchers formulated the following research questions to address the objectives:

- i. What is the impact of artificial intelligence in the implementation of the ECCDE Curriculum in public ECCDE centres in Abuja, Nigeria?
- ii. What are the problems militating against the effective deployment of artificial intelligence for the implementation of the ECCDE Curriculum in public ECCDE centres in Abuja, Nigeria?

Method:

The research design employed in this study was a survey research design, aimed at gathering insights from teachers in public Early Child Care Development and Education (ECCDE) centres in Abuja, Nigeria. The target population consists of 120 teachers distributed across 203 ECCDE centres, encompassing all six area councils in Abuja. To ensure representation, ten ECCDE centres were selected from each of the six area councils, and two teachers were selected from each ECCDE centre, totalling 120 teachers. A multistage sampling procedure was employed, beginning with the selection of area councils using a combination of purposive and simple random

sampling techniques. Subsequently, a proportionate stratified sampling technique was applied to the population of teachers across the six area councils. This ensured the adequate representation of each geographical region. The researchers formulated a questionnaire – Deployment of Artificial intelligence for the Implementation of Early Child Care Development and Education Curriculum Questionnaire (DAIIECCDECQ). The questionnaire was divided into two parts- Part A and Part B. Part A covered information about the respondents while part B contained the 10 items separated into 3 research questions. To ensure the validity and reliability of the questionnaire, it underwent rigorous face and content validation by three experts, two of whom were from the Educational Management at the University of Abuja. Feedback from the validators prompted necessary revisions, which were duly incorporated by the researchers. The final version of the questionnaire was validated through a test-retest method. In this case, the same questionnaire was administered twice after a two-week interval to 10 teachers from other centres who were not part of the original respondents. When the first and second results were correlated, it yielded a coefficient of 0.86 which the researchers considered reliable. A mean rating was used to analyze the data from the questionnaire.

Data Analysis:

The researchers utilized mean rating to analyze the questionnaire items, which is a common method for assessing respondents' perceptions or attitudes. They also set a decision rule for the interpretation of the mean scores, using a cutoff point of 2.5 to determine agreement or disagreement with statements. This means that 2.5 was the cut-off mark for accepting an item at the agreed level and a mean rating below 2.5 was taken as an indication of mean scores within the disagreed level. The presentation of the data in Table 1 facilitates clear interpretation, showing the mean scores for each item along with a decision about whether each item was accepted or rejected based on the decision rule.

Table 1: Impact of Artificial Intelligence in the Implementation of ECCDE Curriculum in Public ECCDE Centres

S No	Items	Mean	Decision
1.	Artificial intelligence supports the implementation of the ECCDE curriculum in public ECCDE centres	3.11	Accepted
2.	Artificial intelligence makes teaching interesting in public ECCDE centres	3.07	Accepted
3.	Children learn fast with the deployment of artificial intelligence in the implementation of the ECCDE curriculum in public ECCDE centre	2.92	Accepted
4.	Artificial intelligence deployment in public ECCDE curricula and centres helps individuals leaning	3.16	Accepted
5.	Artificial intelligence deployment aids creativity, critical thinking, and social-emotional skills development in children	2.89	Accepted
6.	Artificial intelligence technologies have the potential to transform traditional education systems from a one-size-fits-all approach to a personalized and adaptive learning environment	3.01	Accepted
Grand Mean		3.36	

Data obtained from Table 1 revealed that items 1 to 6 had positive responses in agreement. It showed that artificial intelligence supports the implementation of the ECCDE curriculum in public ECCDE centres with a mean of 3.11; artificial intelligence makes teaching interesting in public ECCDE centres with a mean of 3.07; children learn fast with the deployment of artificial

intelligence in the implementation of the ECCDE curriculum in public ECCDE centres with mean of 2.92; artificial intelligence deployment in public ECCDE curriculum centres help individual learning with mean of 3.16; artificial intelligence deployment aid creativity, critical thinking, social-emotional skills development in children with mean of 2.89; and that artificial intelligence technologies have the potential to transform traditional education systems from a one-size-fits-all approach to personalized and adaptive learning environments with mean of 3.01. These gave a grand mean of 3.36 which is greater than the cut-off point of 2.50.

Table 2: Problems Militating against the Effective Deployment of Artificial Intelligence for the Implementation of ECCDE Curriculum in Public ECCDE Centres in Abuja.

S No	Problems militating against the effective deployment of artificial intelligence for the implementation of the ECCDE curriculum	Mean	Decision
1.	Inadequate artificial intelligence	3.17	Accepted
2.	Unstable power supply	3.09	Accepted
3.	Poor funding	3.03	Accepted
4.	Poor maintenance	2.87	Accepted
Grand Mean		3.24	

Data collected on problems militating against the effective deployment of artificial intelligence for the implementation of the ECCDE Curriculum in public ECCDE centres indicated positive answers for all items 1 to 4. The agreement showed that inadequate artificial intelligence with a mean of 3.17; unstable power supply with a mean of 3.09; poor funding with a mean of 3.03; and poor maintenance with a mean of 2.87 were all greater than the cut-off point of 2.50, with a total mean of 3.24.

Discussion of Findings:

The data collected revealed that artificial intelligence has aided the effective implementation of the Early Child Care Development and Education (ECCDE) Curriculum in public Early Child Care Development and Education (ECCDE) centres in Abuja. This result is in line with the findings of Bordia (2023) and Borbajo, Malbas, and Dacanay (2023), that artificial intelligence has helped teachers implement school curricula, and that artificial intelligence also supports teachers in carrying out their functions.

The result also indicates that inadequate artificial intelligence, unstable power supply, poor funding, and poor maintenance are the problems militating against the effective deployment of artificial intelligence for the implementation of ECCDE centres in Abuja. This result collaborates with the findings of Ogunode, Agbade, and Bassey (2023) and Igbokwe (2023), who concluded that shortage of personnel, inadequate funding, poor maintenance, poor digital literacy, unstable internet service, and high cost of artificial intelligence facilities were the challenges militating against the effective deployment of artificial intelligence in educational management.

Conclusion:

In conclusion, this study examined the deployment of artificial intelligence (AI) for the implementation of the Early Child Care Development and Education (ECCDE) curriculum in

public ECCDE centres in Abuja, Nigeria. The findings revealed positive responses regarding AI's contribution to the effective implementation of the ECCDE curriculum. Teachers acknowledged AI's role in supporting teaching, enhancing learning experiences, and fostering individual development among children in ECCDE centres. However, the study also identified several challenges hindering the effective deployment of AI in ECCDE centres, including inadequate AI resources, unstable power supply, insufficient funding, and poor maintenance. These obstacles underscore the need for strategic interventions to address infrastructure deficiencies and enhance the utilization of AI technologies in ECCDE settings.

Recommendations:

Based on these findings, the study recommended that government agencies and educational stakeholders should prioritize investments in AI infrastructure in the various public ECCDE curricula in public ECCDE centres in Abuja. Also, regular monitoring and evaluation tools should be put in place to assess the impact of AI deployment in the ECCDE curriculum, with a view to identifying areas for improvement. Efforts should be made to improve the reliability and sustainability of power supply in ECCDE centres. Alternative energy sources such as solar power or backup generators can be used as alternatives. By putting the above recommendations into practice, stakeholders can foster an atmosphere that makes it possible for AI technologies to be used effectively in ECCDE centres, thus enhancing the holistic development of young learners and advancing the quality of early childhood education.

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