Existentia: Concrescence Journal of Arts and Humanities
Volume 4, Issue 1, 2026, pp 115 -123
©: B. M. Asabor
https://doi.org/10.68251/ecojah.v4.i1.9

USE OF ARTIFICIAL INTELLIGENCE IN THE MANAGEMENT OF THE CONTENT AND STRUCTURE OF PRE-PRIMARY EDUCATION IN DELTA STATE

Asabor, Bivwiere Mary
Department of Educational Psychology,
Faculty of Education,
University of Delta, Agbor Delta State
E-mail: mary.asabor@unidel.edu.ng
ORCID: 0009-0002-2629-9170

Abstract

The use of Artificial Intelligence (AI) is transforming the educational system's approach to planning, teaching and managing learning across all levels of schooling, including pre-primary education. The present paper investigates the Nigeria's use of Artificial Intelligence in the management of content and structure of pre-primary education in Delta State, Nigeria. The pre-primary education is the foundation of a child's cognitive, social and emotional growth and the content and structure need to be carefully planned to achieve these goals. The paper conceptualizes the Artificial Intelligence (AI) and pre-primary education and investigates how the tools of Artificial Intelligence can support the planning, organization, sequencing and delivery of the content of pre-primary education as well as the organization of the enrolment and the management of the resources and supervision in pre-primary schools. It also notes the advantages of the use of AI, such as personalized learning, efficient administration and decision-making, and quality assurance; as well as emerging challenges, including poor digital infrastructure, low caregiver and teacher AI literacy, funding limitations and ethical issues about data privacy of young children. The paper is a narrative/desk review approach, using literature sourced from the existing work on the use of Artificial Intelligence in education and early childhood education management in Nigeria, especially Delta State. It concludes that although AI has great potential to enhance the management of pre-primary education content and structure in Delta State, there is a need for intentional policy backing, infrastructural investment, teacher and administrator training, and child-friendly and contextually appropriate design of the AI tools. Government, school administration and educational technology developers are recommended.

Keywords: Artificial Intelligence, Pre-Primary Education, Content Management, Curriculum Structure, Delta State, Early Childhood Education

Introduction

Education continues to be the most powerful tool to develop human capital and the basis of education is created during pre-primary education. Pre-primary education, also referred to as early childhood education (ECE), covers the learning experiences provided to children roughly between the ages of three and five, prior to their entry into formal primary schooling (Federal Republic of Nigeria, 2014). It is at this stage that children begin to acquire foundational literacy, numeracy, social, and psychomotor skills that shape their later academic trajectory. The quality of the content delivered and the structure through which it is delivered therefore has far-reaching implications for a child's overall development (Ejieh, 2016). Like in many parts of Nigeria, pre-primary education in Delta

State is still facing problems of uniformity of curriculum, lack of proper infrastructure, lack of adequate funding and lack of administrative coordination (Egwunatum and Atakpo, 2025; Ogunode et al., 2021). These challenges relate to the content of what is taught as well as the structure and administration of the school system. Content management, in this context, involves choosing, sequencing, updating and delivering learning content, and structural management involves the management of the school system, such as enrolment, scheduling, allocation of classrooms, deployment of teachers, supervision and keeping of records.

With the advent of Artificial Intelligence (AI) as a game-changing technology, some of these age-old management problems have new avenues for solutions. AI, in its broadest sense as the ability of machines to undertake tasks that normally require human intelligence, is already being used in different stages of education around the world, ranging from adaptive learning tools on platforms such as Term Pathways to intelligent administrative systems (Holmes et al., 2019; Chen et al., 2020). In Nigeria, AI is increasingly being applied in different areas of university administration, teacher training and classroom education (Ajayi and Ganiyu, 2026; Bali et al., 2024), while its penetration and research in pre-primary education – especially in sub-national settings like Delta State – is still limited.

This paper examines the role of Artificial Intelligence in managing content and structure of pre-primary in Delta State. It looks at the conceptual foundations of AI and pre-primary education, identifies key areas of potential for AI to assist with content and structural management, considers the potential advantages and difficulties involved in implementing such technologies and makes recommendations for stakeholders. This is especially timely in the light of the ongoing quality assurance and administrative issues reported in the early childhood education sector in Delta State (Egwunatum and Atakpo, 2025; Owhe-Ureghe and Atakpo, 2023).

Conceptual Clarification

The Concept of Artificial Intelligence

According to the different fields, there are many ways to define AI, but most of them converge on the fact that Artificial Intelligence is the capability of a machine or computer system to mimic human intellectual capabilities, learning, reasoning, problem solving and decision making (Chen et al., 2020). In the context of education, AI is mostly represented by adaptive learning systems, intelligent tutoring systems, NLP, learning analytics dashboards, and automated administrative systems (Holmes et al., 2019; Celik et al., 2022).

Celik et al. (2022) categorise AI for education into three types: AI for the learner, AI for the teacher and AI for institutional administration and management. This third dimension – apart from the content-support dimension – is at the heart of this paper, both because it is in relation to organizing and managing the content and structure of pre-primary education. In the Nigerian context, AI adoption in education is still at an early and uneven stage. Bali *et al.* (2024), in a systematic review of AI applications in Nigerian education between 2008 and 2022, found a growing but still limited trend of AI utilization, concentrated mostly in tertiary institutions, with early childhood and pre-primary applications largely underexplored. Similarly, Ajayi and Ganiyu (2026) argue that AI holds strategic potential for repositioning educational administration in Nigeria generally, a potential that, this paper argues, extends logically to the pre-primary sub-sector.

The Concept of Pre-Primary Education

Pre-primary education, in the Nigerian policy context, is defined as the education given in an educational institution to children aged three to five years prior to their entering primary school (Federal Republic of Nigeria, 2014). Its objectives include effecting a smooth transition from the home to the school, preparing the child for primary level education, providing adequate care and supervision for children while their parents are at work, and inculcating social norms, as well as a spirit of enquiry and creativity in the child through the use of play, art, music, and exploration of the natural and social environment (Federal Republic of Nigeria, 2014; Egwunatum and Atakpo, 2025). Ejieh (2016) notes that despite its policy recognition, pre-primary education in Nigeria has historically been left largely to private providers, with inconsistent implementation of the national curriculum framework across states. Ajayi (2018) also notes that although the significance of early childhood education (ECE) is known, its implementation in reality is marred by an illusion of quality: teachers with limited training, poorly equipped classrooms, and ineffective monitoring processes. Specifically in Delta State, Egwunatum and Atakpo (2025) identified that lack of adequate government funding, inconsistency in policy and inadequate supervision are challenges for public nursery schools, which have direct implications to content and structure in this level.

Content and Structure of Pre-Primary Education

The 'content' of pre-primary education is about the 'stuff' that is taught: themes, topics, activities and teaching materials that are aligned with the developmental domains of literacy, numeracy, motor skills, socio-emotional skills, and creative expression (Federal Republic of Nigeria, 2014). Content management, therefore, includes the process of age-appropriation, cultural relevance, review, selection, storage and dissemination of these learning materials which are aligned with national and state content standards.

The 'structure' of pre-primary education, however, is the organizational and administrative structure through which the content of pre-primary education is provided. This encompasses class size and composition, scheduling and timetabling, enrolment and pupil records, teacher allocation, classroom space, supervision and inspection procedures and all governance arrangements across individual nursery schools to Local Government Education Authorities and the State Universal Basic Education Board. Content and structural weaknesses, as reported in Delta State (Egwunatum and Atakpo, 2025; Owhe-Ureghe and Atakpo, 2023), tend to reinforce each other: poorly structured schools can poorly deliver well-designed content; and poorly designed content can undermine the value of a well-structured school system.

The conceptual model that served as the basis for this paper can be summarized in the figure shown below (Figure 1), which distinguishes between two complementary streams of AI applications: applications for content management and applications for structure management, in pre-primary education.

Existentia: Concrescence Journal of Arts and Humanities
Volume 4, Issue 1, 2026, pp 115 -123
©: B. M. Asabor
https://doi.org/10.68251/ecojah.v4.i1.9

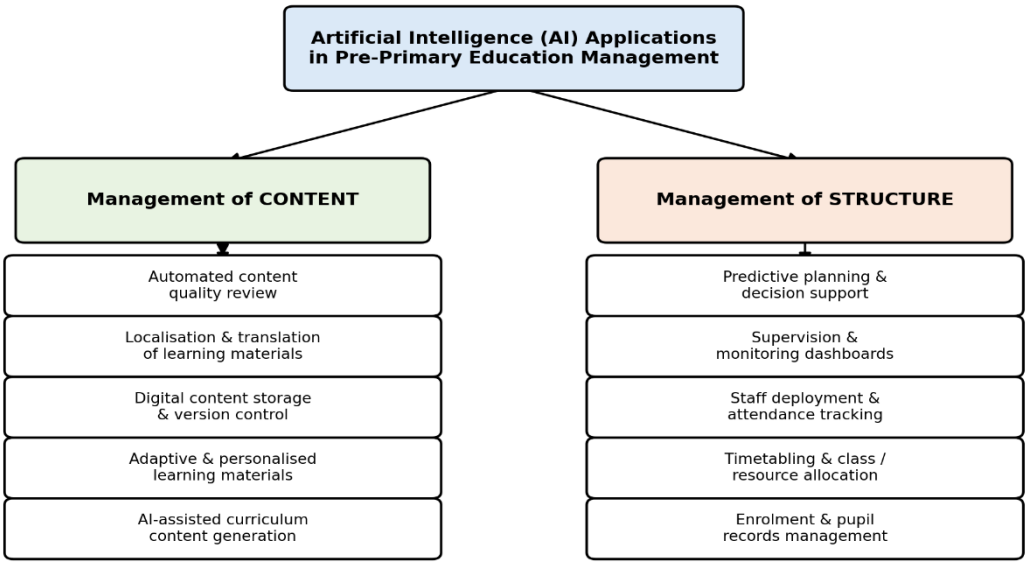


Figure 1: Conceptual Model of AI-Supported Management of Pre-Primary Education Content and Structure
Source: (Celik *et al.,* 2022)

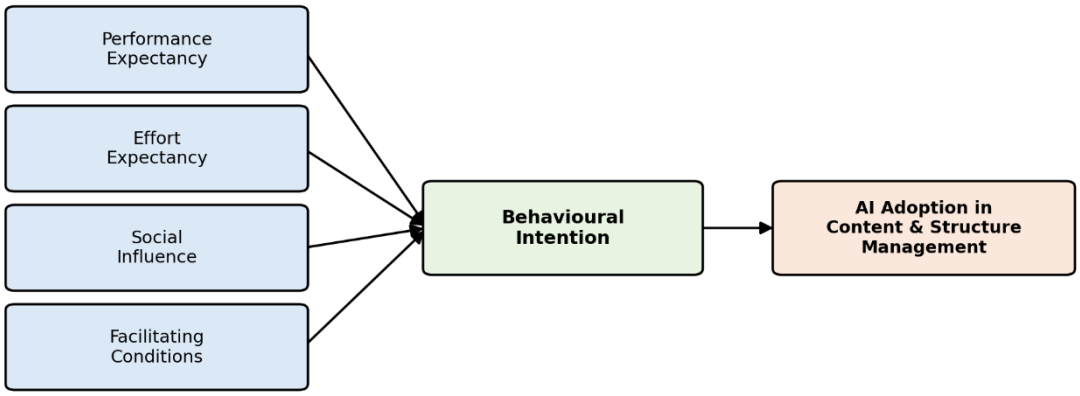
Theoretical Framework

This paper places itself in the context of Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003). The UTAUT model consists of four constructs that describe the technology adoption behavior: performance expectancy, effort expectancy, social influence, and facilitating conditions. The model indicates that when it comes to the adoption of such AI tools in pre-primary education management, teachers, caregivers, and administrators in Delta State are likely to be more inclined to use AI tools for content and structural management if they believe that using them is useful (performance expectancy), easy to use (effort expectancy), socially supported (social influence), and have sufficient infrastructure and training support (facilitating conditions).

The framework is useful because it highlights that the use of AI in the management of pre-primary education in Delta State isn't solely a technological issue, but also a socio-organizational one, which relies on how the technology is perceived, capable and enabled within the local educational system. The four UTAUT constructs are shown in Figure 2 to explain how they lead to behavioral intention and, in turn, actual adoption of AI for content and structure management.

Figure 2: Unified Theory of Acceptance and Use of Technology (UTAUT) Applied to AI Adoption in Pre-Primary Education Management
Source: (Venkatesh *et al.,* 2003).

Existentia: Concrescence Journal of Arts and Humanities
Volume 4, Issue 1, 2026, pp 115 -123
©: B. M. Asabor
https://doi.org/10.68251/ecojah.v4.i1.9



The Use of Artificial Intelligence in Managing the Content of Pre-Primary Education

In Delta State, the use of AI can enhance the management of the content of pre-primary education in several ways. First, AI-supported content generation and curation can support teachers who are not trained teachers in creating age-appropriate lesson materials, stories, songs, and activity guides that follow the National Early Childhood Curriculum, thereby lowering their burden to create these materials (Ayanwale et al., 2024; Holmes et al., 2019). In situations of teacher scarcity and poor teacher preparation like observed in Nigerian pre-primary schools (Ejieh, 2016), these can be used to ensure uniformity of instructional content in schools.

Second, adaptive learning applications, though more established at later levels of education, are increasingly being designed for early years' contexts. Su and Zhong (2022) argue that AI-supported early learning tools can adjust the pace, difficulty, and mode of content presentation, for instance through pictorial, audio, or interactive formats, to suit the developmental level of individual children. Within a Delta State nursery classroom, such adaptive content tools, deployed via tablets or shared classroom devices, could help address the wide variation in school-readiness levels that teachers often encounter among children from different home backgrounds.

Third, AI-driven content management systems can support the digitization, storage, and retrieval of curriculum materials, lesson plans, and teaching aids, allowing content to be more easily updated, shared, and monitored for consistency across the numerous public and private nursery schools spread across Delta State's three senatorial districts. This addresses, in part, the curriculum uniformity concern raised by Egwunatum and Atakpo (2025) as a persistent challenge in the state's early childhood education sub-sector.

Fourth, AI-based translation and localization tools can support the development of content in local languages and in forms that reflect the cultural context of Delta State's diverse communities, an important consideration given the emphasis the national policy places on mother-tongue instruction at the pre-primary level (Federal Republic of Nigeria, 2014). Finally, AI-supported quality assurance mechanisms, such as automated content review or plagiarism and appropriateness checks, can help supervisors and curriculum officers more efficiently vet materials before they reach the classroom, complementing rather than replacing the human oversight that remains essential when working with young children (Celik *et al.,* 2022).

The Use of Artificial Intelligence in Managing the Structure of Pre-Primary Education

In addition to the contents, AI has enormous leverage to assist in the structural and administrative management of pre-primary education in Delta State. Most of the school administration and Local Government Education Authorities are responsible for pupil enrolment, class allocation, deployment of teachers, attendance monitoring and reporting to the State Universal Basic Education Board. The manual way of carrying out these tasks tends to be very tedious, prone to errors, and hard to aggregate at the State level for planning purposes, as problematized by Egwunatum and Atakpo (2025) and Ogunode et al., (2021).

An AI powered school management system can auto-populate enrollment records, create optimized class list and timetable based on manpower and space requirements, and also provide alerts on anomalies like overcrowding of classes or underutilization of facilities. Such systems could also facilitate predictive planning: planning for an upcoming academic year, based on the patterns of enrolment across Local Government Areas, administrators could better forecast the need for new classrooms, teachers or feeding programmers to ensure that there were no gaps in infrastructural provision which has been identified as a recurring challenge to quality ECD in Nigeria (Ejieh, 2016; Ajayi, 2018).

AI-powered monitoring and supervision dashboards can also help Local Government inspectors and quality assurance officers manage the attendance and progress of teachers and the adherence to curriculum guidelines, in the many, often geographically dispersed, nursery schools in the state. In the view of Atakpo (2024), digitalization of this nature has become the core of a sustainable future of ECE in Nigeria, as digital record-keeping and monitoring systems can ease supervisor administrative burden and facilitate timely and accurate data for policy makers.

Second, AI-powered decision-support tools can help Nigeria's state education planners to organize policy interventions such as leveraging class sizes, teacher-pupil ratios, and school proximity, among others, to inform decisions about school siting, teacher recruitment, or resource allocation, aligning with the strategic administrative function that Ajayi and Ganiyu (2026) claim for AI in Nigerian schools generally. This approach allows AI to serve not only as a replacement for human administrators but also as an analytical and organizational tool that enhances the framework that underpins the delivery of pre-primary content.

Benefits of Artificial Intelligence in the management of Pre-Primary Education in Delta State

Adopting AI in the management of pre-primary education content and structure in Delta State has several potential advantages. It can facilitate consistency, quality assurance and control in curricular matters by ensuring uniformity in curriculum content and tracking compliance levels across schools in order to address the concerns on lack of uniformity in curriculum content which were raised in the literature (Egwunatum and Atakpo, 2025). It may also minimize the administrative work for teachers and supervisors, thereby creating more time for direct contact with children and which is especially beneficial in a setting where teachers are scarce (Ejieh, 2016).

Considering that a nursery school child's developmental needs are diverse, AI can be used to further improve the delivery of personalised learning experiences which cater for the different home backgrounds and school readiness levels of children entering Delta State's nursery schools (Su and Zhong, 2022). Furthermore, the AI-powered data systems can enhance the timeliness and accuracy of data made available to policymakers, which

Volume 4, Issue 1, 2026, pp 115 -123
©: B. M. Asabor
https://doi.org/10.68251/ecojah.v4.i1.9

facilitates better-informed planning and funding choices, a gap identified with current management practice (Ogunode et al., 2021).

Finally, the use of AI-related digital tools at the school level, even at the administrative level, can contribute to the overall digital literacy of the education workforce, which can help keep Delta State's ECE system aligned with the digital evolution seen in tertiary and secondary education in Nigeria (Bali et al., 2024; Atakpo, 2024).

Adoption Artificial Intelligence in Pre-Primary Education Management and its Challenges in Delta State

Although AI has potential for content and structural management in pre-primary education, it is beset with many challenges in Delta State. Likely one of the most prevalent challenges is the lack of digital infrastructure. Likewise, the majority of public nursery schools in Delta State (and Nigeria generally) lack reliable connections to electricity, internet, and computing devices, which are essential pre-requisites for any meaningful use of AI (Egwunatum and Atakpo, 2025). These are similar to the broader infrastructural problem identified in the national level-education AI adoption analysis (Bali et al., 2024).

Second, the problem of funding continues to be a big hurdle. As pointed out by Ogunode et al. (2021), the government's budget for early childhood education in Nigeria is well below the UNESCO recommended amount, resulting in limited financial resources to invest in AI systems, staff training, and digital system maintenance. Third, there is the issue of low digital and AI literacy among caregivers, teachers, and even some of the administrators, many of whom may lack technical confidence or professional development opportunities to effectively apply AI-based tools (Celik et al., 2022; Ayanwale et al., 2024).

Fourthly, ethical and child safety issues are a unique problem at pre-primary. The use of AI tools with young children is especially concerning regarding data privacy, consent and the fitting use of AI because these tools might elicit sensitive behavioural and developmental information, which is often collected from the child without their actual consent. These considerations call for thoughtful and child-centred design of, and rigorous regulatory oversight on, any AI system implemented in a nursery school.

Fifth, cultural and contextual relevance is an issue. The majority of AI-based learning tools are created in and optimized for settings outside of rural or semi-urban Delta State communities, which could lead to an importation of AI content that may not be in line with local languages, values, and realities (Federal Republic of Nigeria, 2014). Lastly, there is a lack of policy and regulatory frameworks: Nigeria does not have a specific, early-childhood-focused policy framework on the use of AI in schools, and decisions on school AI adoption are largely fragmented and inconsistent across both public and private schools.

Role of Educational Stakeholders in Ensuring the Effective Use of AI in Pre-Primary Education Management

It takes deliberate action from several parties to realize the benefits of AI and manage the risks. State and Local Government education authorities can be involved in formulating a clear policy guidance on the acceptable use of AI tools in nursery schools which will include data protection safeguards for young children and prioritizing investment in the basic digital infrastructure without which it would be impossible to use AI (Ogunode et al., 2021).

The school administration and head teachers should choose and select AI tools that fit their school context, and they should design the use of the AI-supported content and administrative system in a way that it is used in parallel with, not instead of, the existing

supervision and quality assurance system and is monitored properly. The teachers and caregivers, on the other hand, need specific professional development to develop confidence and competence in using AI tools, which is a challenge faced by educators in general, as highlighted by Ayanwale et al. (2024) and Celik et al. (2022).

Educational technology developers and researchers are also responsible for creating contextually appropriate, affordable, and Nigerian National Early Childhood Curriculum aligned AI tools, not just porting tools from other national or cultural contexts. Lastly, parents and communities can play a part in fostering digital literacy at home while also being constructively involved in schools as they embrace tools that incorporate artificial intelligence, as their participation is well known to be key to the success of early childhood education programs in Delta State (Egwunatum and Atakpo, 2025).

Conclusion and Recommendations

The paper delved into the application of Artificial Intelligence for the content and structure of pre-primary education in Delta State. It has shown that AI holds substantial promises to solve some of the major challenges that exist in the early childhood education sub-sector in the State, such as curriculum uniformity, inefficiencies in administration and ineffective monitoring. AI could be a useful tool for pre-primary management, helping to create content geared towards a child's age and facilitating better enrolment, scheduling, and supervision. Despite its potential, the adoption of it is still inhibited by the infrastructural, financial, digital literacy and ethical concerns and the absence of a proper regulatory framework on children's data.

Based on these results, the following recommendations are made. One, there should be a clear policy framework set forth by the Delta State Government, the Universal Basic Education Board and Ministry of Education, on how the use of AI tools will be done in the pre-primary education, with a clear attention on ethical use and age appropriateness, together with a strong emphasis on data privacy and child protection. Second, government has to invest in the basic digital infrastructure of public nursery schools first, before any meaningful changes in the use of AI can take place.

Third, there need to be structured professional development programs for pre-primary teachers, as well as caregivers and administrators to build their AI and digital literacy, identified in the wider literature on the capacity building needs of individuals working within Nigeria's educational system. Fourth, there is a need to build partnerships between Government, private sector technology developers and International development partners to develop and pilot meaningful, contextually suitable and low-cost AI tools that will reflect the reality of Delta State's public and private nursery schools. Finally, there is a call for further empirical studies to gain context-specific understanding of readiness, acceptance, and good practices in the application of AI in pre-primary management in Delta State.

References

Ajayi, H.O. (2018). Early childhood education in Nigeria: A reality or a mirage?. *Contemporary Issues in Early Childhood*, 9(4), pp. 375-380.

Ajayi, I.A. and Ganiyu, A.O. (2026). Repositioning university administration in Nigeria: The strategic role of artificial intelligence. *EKSU Journal of Multidisciplinary Studies*, 4(1), pp. 66-72.

Atakpo, T.E. (2024). Digital natives and digitalization for building early childhood education future in Nigeria. *International Journal of Research and Innovation in Social Sciences,* 8(11), pp. 3406-3415.

Ayanwale, M.A., Adelana, O.P., Molefi, R.R., Adeeko, O. and Ishola, A.M. (2024). Examining artificial intelligence literacy among pre-service teachers for future classrooms. *Computers and Education Open*, 6, pp.100179.

Bali, B., Garba, E.J., Ahmadu, A.S., Takwate, K.T. and Malgwi, Y.M. (2024). Analysis of emerging trends in artificial intelligence for education in Nigeria. *Discover Artificial Intelligence,* 4, 110.

Celik, I., Dindar, M., Muukkonen, H. and Järvelä, S. (2022). The promises and challenges of artificial intelligence for teachers: A systematic review of research. *TechTrends*, 66(4), pp. 616-630.

Chen, L., Chen, P. and Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*, 8, pp. 75264-75278.

Egwunatum, B.N. and Atakpo, T.E. (2025). Exploring effective management strategies for improving early childhood education in Delta State, Nigeria. *International Journal of Research and Innovation in Applied Science*, 10(1), pp. 378-384.

Ejieh, M.U.C. (2016). Pre-primary education in Nigeria: Policy implementation and problems. *Elementary Education Online*, 5(1), pp. 56-64.

Federal Republic of Nigeria. (2014). National Policy on Education. Lagos: NERDC Press.

Holmes, W., Bialik, M. and Fadel, C. (2019). Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. Boston, MA: Center for Curriculum Redesign.

Ogunode, N.J., Jegede, D. and Ajape, T.S. (2021). Education policies of early child education programme in Nigeria: Challenges of implementation and the ways forward. *European Journal of Humanities and Educational Advancements,* 2(3), pp. 1-10.

Owhe-Ureghe, A.O. and Atakpo, T.E. (2023). Moral decadence in primary schools in Delta State, Nigeria. *International Journal of Research and Innovation in Social Sciences,* 7(6), pp. 1-9.

Su, J. and Zhong, Y. (2022). Artificial Intelligence (AI) in early childhood education: Curriculum design and future directions. *Computers and Education: Artificial Intelligence*, 3, pp.100072.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), pp. 425-478.