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Research Article

The Influence of Online Learning Platforms on Early Childhood Education and Its Role in Promoting Sustainable Global Economic Growth

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Baniyaminu Opeyemi Hamzat*

Abstract:

Background of the Study: Online learning platforms have become increasingly relevant in early childhood education, particularly in the context of advancing global educational equity and preparing a skilled future workforce.

Aims and Scope of the Paper: The purpose of this study is to investigate the impact of online learning platforms on early childhood education and their role in promoting sustainable global economic growth.

Methods: The study employed a quasi-experimental design with a pretest-posttest control group. A sample of 80 pupils from Olorunda Local Government area of Osun State was selected, divided into an experimental group (40 pupils) using online learning platforms and a control group using traditional learning methods. The instruments were validated by experts and tested for reliability through a pilot study, yielding a Cronbach's alpha of 0.82, indicating good internal consistency. Data were collected using a cognitive development assessment tool, an engagement and motivation survey.

Results: The results indicated a statistically significant improvement in cognitive development scores for the experimental group using online platforms (M = 75.25, SD = 8.67) and the control group (P = .037).

Conclusion: The positive impact of these platforms underscores the potential for technology to transform early childhood education and support a sustainable global economy by building a more educated and skilled future workforce.

Keywords: Cognitive Development, Early Childhood Education, Economic Growth, Engagement and Motivation, Online Learning Platforms

1. INTRODUCTION

In today's digital age, online learning platforms are digital environments designed to facilitate educational content delivery and interaction between students and educators over the internet. These platforms encompass a wide range of technologies and tools that support various learning activities, including video lectures, interactive exercises, assessments, and discussion forums. Online learning platforms can be categorized into several types: Learning Management Systems (LMS), such as Moodle and Blackboard; Massive Open Online Courses (MOOCs), like Coursera and edX; and specialized educational apps tailored for specific subjects or skills. Each type serves different educational needs and audiences, from formal academic programs to informal skill development (Strielkowski et al., 2025).

As artificial intelligence (AI) and machine learning grow, platforms provide customized learning experiences designed for each student's unique needs and learning speeds (Halder & Saha, 2023). Gamification, which incorporates game-like elements into educational content, has also gained popularity, making learning more engaging and interactive. Furthermore, the incorporation of virtual reality (VR) and augmented reality (AR) offers engaging learning experiences, enabling students to delve into topics in a more experiential and interactive way. These innovations improve the educational experience by addressing various learning preferences and boosting student motivation and involvement (Sima et al., 2022).

Online learning platforms have revolutionized early childhood education by providing accessible, engaging, and flexible learning environments for young children. These platforms provide an array of interactive and multimedia tools aimed at improving cognitive and social growth. Platforms such as ABCmouse and Khan Academy Kids employ gamified education to impart essential skills in reading and math through engaging games, videos, and activities designed for the developmental phases of early learners (Faturoti, 2022). Asserts that these tools can significantly support early childhood education by making learning more enjoyable and adaptable to individual learning paces. The

viewpoints of both the children and the teachers will be crucial, along with their joint involvement as active participants, following a critical and reflective approach to grasp the 'state-of-the-actual' regarding technology (Undheim, 2022).

Tools like Seesaw and ClassDojo enhance interaction among teachers, parents, and students, promoting a cooperative learning atmosphere that reaches beyond the classroom. These resources also give parents an understanding of their child's development and suggest methods to aid learning at home. The COVID-19 pandemic hastened the embrace of these platforms, showcasing their ability to provide quality education online and maintain learning continuity (Dong et al., 2020). Ensuring equitable access and addressing screen time concerns remain critical. There is a notable decline in educational quality during the shift to remote learning due to the lack of established learning management systems in various nations software designed for managing training courses in the context of online education (Hasanova et al., 2020). The use of these platforms can support early learning by offering adaptive content that adjusts to the child's learning progress, thereby fostering a personalized and engaging learning environment. We propose that designers of home voice interfaces can enhance current parenting methods and broaden the functionalities of voice interfaces to better align with parenting objectives (Beneteau et al., 2020).

The future of online learning platforms in early childhood education appears promising. Continued advancements in technology, such as the incorporation of AI-driven tutors and advanced analytics, are expected to further personalize learning experiences and provide more precise feedback to educators and parents. In other words, education has been utilized to manage technological adoption and regulate citizens to shape preferred futures. This indicates that the challenges and aspirations of digital technologies have frequently been redefined as issues in education (Rahm, 2023). These swift transitions from in-person to online teaching have overlooked the deeper issues surrounding national educational policies and theoretical foundations. These platforms can provide excellent education to remote and underserved regions, where conventional educational infrastructure might be insufficient. As these platforms evolve, it is crucial for stakeholders to address challenges such as ensuring equitable access, maintaining data privacy, and providing adequate training for educators to maximize the benefits of online learning for young children (Adedoyin & Soykan, 2023).

Key components of effective online learning platforms include interactive content, multimedia resources, and adaptive learning technologies. These elements engage young learners, enhancing their cognitive and motor skills through interactive and visually stimulating activities (Lynn & Bassett, 2020). Stress the significance of accessibility and inclusivity in these platforms to guarantee that every child, no matter their socio-economic status, can receive quality education. This is a scenario that requires compassion and solidarity (Dhawan, 2020) .

Traditional learning methods in early childhood education typically involve face-to-face interactions, physical learning materials, and direct teacher guidance. In contrast, digital learning methods leverage technology to deliver educational content. Educational technology is a broad domain that includes all studies and methods using technologies to solve educational and teaching challenges. That those traditional methods are valuable for developing social skills and physical interactions, while digital methods offer flexibility and a vast array of resources that can cater to different learning styles (Li, 2024). Digital platforms also facilitate parental involvement by providing tools to track and support their children's progress. The success of digital learning largely relies on the quality of the material and the degree of interaction it provides. It also allows them to experience the advantages of a complete school curriculum and to take part in activities across various educational settings (Lynch et al., 2024).

Incorporating online learning platforms in early childhood education can be examined through the perspective of economic growth theories. The performance of public sector employees greatly influences the quality of the welfare state and the nation's health and well-being. Nonetheless. Produces substantial gains through a talented and efficient labor force. Online learning platforms aid in this by equipping young learners with fundamental skills crucial for future educational and career achievements (Knies et al., 2024).

These swift transitions from traditional classrooms to online instruction have overlooked deeper issues concerning national education policies and the theoretical foundations and assumptions. These platforms are capable of providing excellent education to remote and underserved regions, where conventional educational infrastructure might be inadequate. By leveraging the internet and mobile technology, children in rural and impoverished regions can access the same quality of education as their urban counterparts. This democratization of education contributes to reducing inequalities and promoting social equity, which are essential components of sustainable economic growth as per the sustainable development goals (SDGs) outlined (Teräs et al., 2020).

Technology enhances early childhood education by making learning more engaging and effective. Digital resources like educational games, interactive storybooks, and virtual experiments enhance learning for young children, cultivating a passion for knowledge. Education has turned into an urgent issue, and alongside it, educational technologies have been established as a

primary emergency response service. In recent years, Learning, Media and Technology has emerged as an essential journal for critical examinations of education and technology (Williamson et al., 2020). These tools also provide immediate feedback, helping children understand concepts better and motivating them to improve. Stresses the necessity of preparing educators to proficiently utilize these technologies, guaranteeing that they can incorporate digital tools effortlessly into their instructional methods. Digital education, AI, augmented reality, and the Internet are part of the necessities of the fourth industrial revolution (Al-Mamari et al., 2021).

Despite the numerous benefits, implementing online learning platforms in early childhood education comes with challenges. Issues such as limited access to technology, lack of digital literacy among educators and parents, and concerns about screen time and its impact on young children need to be addressed. We will determine the primary topics and themes that can be recognized, which subjects generate the most research interest, and what trends can be observed (Vermeire et al., 2025). Ensuring data privacy and security is also crucial, as highlighted. They were putting money into new technologies to provide educational experiences and examining how the sector could address the future requirements of industry and employment (Bonfield et al., 2020). These challenges necessitate a comprehensive approach that includes infrastructure development, training programs, and policy frameworks to support the effective use of online learning platforms.

Parental engagement is essential in the realm of online education platforms. Parents are crucial in directing and aiding their children's educational path. Digital platforms can assist in this by offering parents tools and resources to track their child's development, engage in educational activities, and interact with teachers. Involvement of families allows educators to gain a deeper insight into their students, improving educational quality and leading to more favorable results for children and their families (Albaiz & Ernest, 2021). Found that increased parental involvement through online platforms positively impacts children's academic performance and overall development. It is crucial to clarify that, in this article, parents denote any legally recognized adult responsible for the children and regarded as role models by them, whereas children and students hold similar significance. This research highlights the perspective of parental involvement, defined by Janet Goodall and her team, as a framework that aligns with the holistic pedagogical principles related to partnerships between teachers and parents (Levinthal de Oliveira Lima & Kuusisto, 2020).

The prospective trajectory of online learning platforms within the realm of early childhood education appears highly favorable. As advancements in technology persist, these platforms are anticipated to attain greater sophistication, thereby providing immersive educational experiences through the utilization of virtual and augmented reality, as previously indicated. Augmented reality (AR) integrates digital information with the physical environment, facilitating users' engagement with virtual elements in a manner that is seamlessly integrated without necessitating concentrated attention on a device's screen. Consequently, AR distinguishes itself from other interaction modalities by permitting users to sustain an uninterrupted connection with their immediate environment, thus ensuring that their attention remains oriented toward the tangible world (AlGerafi et al., 2023). Artificial intelligence (AI) and machine learning can further personalize learning, adapting to each child's needs and providing tailored content. Integrating online learning with traditional classroom activities, a hybrid approach, can offer the best of both worlds, combining the benefits of digital and face-to-face learning methods (Robert & Muscanell, 2023). The home setting is the initial environment for the child, making it adaptable and unstructured compared to the classroom. It is a common belief that kids are fond of technological tools and devices, so they might find online learning enjoyable. Engaging in games on these tools and attending lessons in front of a device are entirely distinct experiences. Despite these challenges, effectively addressing them through infrastructure development, educator training, and responsible platform design can unlock the immense potential of online learning platforms to prepare a future generation with the skills and knowledge to drive sustainable global economic growth (P. Gernail Singh & Saminder Singh, 2023).

2. MATERIAL AND METHOD

The study employed a quasi-experimental design incorporating a pretest-posttest control group methodology to investigate the impact of online learning platforms on early childhood education and their role in promoting sustainable global economic development. A cohort of 80 students from the Olorunda Local Government area of Osun State was selected, partitioned into an experimental group (40 students) engaging with online learning platforms and a control group (40 students) adhering to traditional pedagogical methods. Data were gathered utilizing a cognitive development assessment instrument alongside an engagement and motivation survey. The validation of these assessment instruments was conducted by experts in the field, and their reliability underwent scrutiny in a preliminary investigation, yielding a robust Cronbach's alpha coefficient of 0.82, denoting a high level of internal coherence. Utilizing descriptive statistics, independent samples t-tests were executed to scrutinize the postulations at a significance level of 0.05, examining the impact of web-based instruction on cognitive development and involvement. Throughout the research process, ethical considerations including informed consent, confidentiality, and anonymity were meticulously observed.

This study adopted a quasi-experimental research design, specifically the pretest-posttest control group design, to rigorously assess the influence of online learning platforms on early childhood education, particularly in terms of their effect on cognitive development, engagement, and motivation.

Additionally, the study aimed to explore how such digital interventions might contribute to broader goals such as sustainable global economic growth through the development of foundational human capital.

a) Research Design

The quasi-experimental design was chosen due to its suitability in educational settings where full randomization may not be feasible. In this model, both an experimental group and a control group are established, with pretests and posttests administered to both groups. This allows for the measurement of changes attributable to the intervention, while controlling for other external factors.

The experimental group received the intervention in the form of online learning platforms, whereas the control group continued with conventional, face-to-face learning methods. By comparing the pretest and posttest results of both groups, the study aimed to isolate the effects of online learning on specific developmental outcomes.

b) Population and Sample

The research was carried out among students in the Olorunda Local Government Area of Osun State, Nigeria, concentrating on the early childhood education sector. Eighty students were chosen to take part in the research. The participants were split into two equal groups of 40 students each, employing a stratified random sampling method to guarantee balanced representation in terms of gender, age, and socio-economic status.

- The experimental group (n = 40) was exposed to structured learning via online platforms.
- The control group (n = 40) continued with traditional instructional approaches without the use of technology.

This sampling technique ensured internal validity by reducing selection bias and increasing the comparability of the two groups.

c) Instrumentation

To evaluate the effectiveness of the intervention, two key instruments were developed and utilized:

1. Cognitive Development Assessment Tool:
   This tool was designed to measure essential components of early cognitive skills, including:
   - Logical reasoning
   - Memory retention
   - Language and communication skills
   - Early numeracy and problem-solving abilities

   The items were age-appropriate and structured in formats easily understandable by early learners. The design included both performance-based tasks and observation checklists.
2. Engagement and Motivation Survey:
   This survey was administered to assess the emotional and behavioral engagement of the pupils in learning activities. It covered areas such as:
   - Interest and enjoyment during lessons
   - Willingness to participate in learning tasks
   - Attention span and sustained focus
   - Expressed enthusiasm toward schoolwork

   Items were adapted into simplified language and visual cues to accommodate the developmental level of early childhood learners.

d) Validity and Reliability

The panel of experts in early childhood education, educational measurement, and psychology conducted content validation for both instruments. The specialists evaluated the tools for suitability, clarity, and cultural significance. A pilot study was then carried out with a limited group of early learners apart from the primary study sample. The objective was to evaluate the internal consistency and clarify any unclear items. The pilot study produced a Cronbach's alpha coefficient of 0.82, reflecting a strong degree of reliability and indicating that the tools were appropriate for assessing the target constructs.

e) Data Collection Procedure

1. The study followed a three-phase approach:
   - Pretest Phase:
     Both groups were administered the cognitive assessment and the engagement/motivation survey to establish a baseline before the intervention. This provided a reference point to evaluate changes after the learning period.
   - Intervention Phase:
     Over a specified duration (e.g., six weeks), the experimental group engaged in learning through selected online platforms, which may have included interactive lessons, educational games, videos, and digital storytelling. Platforms were chosen based on accessibility, curriculum alignment, and user-friendliness.
     The control group, in contrast, received lessons through the usual classroom setting with physical materials and teacher-led activities. Both groups covered the same curriculum topics to ensure content equivalency.
   - Posttest Phase:
     After the intervention period, the same instruments were re-administered to both groups. The goal was to measure any improvements or changes in cognitive

performance and learning engagement attributable to the digital learning experience.

f) Data Analysis

The gathered data underwent quantitative statistical analysis. Initially, descriptive statistics like means and standard deviations were employed to summarize both groups' performance on every measure.

Subsequently, independent samples t-tests were performed to analyze the posttest scores of both the experimental and control groups. The significance level was established at 0.05, and the hypotheses were evaluated accordingly:

- HO1: There is no significant effect of online learning platforms on the cognitive development of early childhood learners.
- HO2: There is no significant effect of online learning platforms on the engagement and motivation of young children in the learning process.

This approach enabled the researchers to determine whether any observed differences between groups were statistically significant.

g) Ethical Consideration

In line with ethical standards for research involving children, the study followed strict protocols to protect the rights and welfare of participants:

- Informed consent was obtained from parents or legal guardians, with a detailed explanation of the study's purpose, procedures, and voluntary nature.
- Confidentiality of all participants was maintained by anonymizing data using unique codes.
- Right to withdraw: Parents and children were duly apprised of their prerogative to discontinue their participation in the research project at any point without incurring any repercussions.
- All activities were conducted in a manner that ensured the physical, emotional, and psychological safety of the childre

3. RESULT AND DISCUSSION

3.1 Result

The statistical analysis presented in Table 1 reveals a statistically significant difference in cognitive development scores between early childhood learners who used online learning platforms and those who continued with traditional classroom instruction. The following table 1 explains.

Table 1: Independent Samples T-Test Results for Cognitive Development Scores

Group	N	Mean	Std. Deviation	T	Df	Sig. (2-Tailed)
Online Learning (Experimental)	40	75.25	8.67			
Traditional Learning (Control)	40	70.13	9.45	2.12	78	0.037

Table 1 results showed a notable difference in cognitive development scores between the experimental group utilizing online learning platforms (M = 75.25, SD = 8.67) and the control group employing traditional learning methods (M = 70.13, SD = 9.45), t(78) = 2.12, p = .037. This indicates that online learning platforms positively influenced the cognitive growth of early childhood learners, resulting in the dismissal of the null hypothesis (HO1)

Comparison of Mean Scores

- The experimental group (online learning) had a mean cognitive development score of 75.25 with a standard deviation of 8.67.
- The control group (traditional learning) had a mean score of 70.13 with a standard deviation of 9.45.

The difference in mean scores (5.12 points) indicates that children exposed to online learning platforms demonstrated higher cognitive development than their peers in the traditional learning environment.

Inferential Statistical Results

- The calculated t-value is 2.12, with 78 degrees of freedom (df).
- The p-value (Sig. 2-tailed) is 0.037.

The null hypothesis (H_{01}) is rejected because the p-value of 0.037 is below the significance threshold of 0.05. This indicates that the difference noted between the two groups is statistically significant and not a result of random chance.

Interpretation and Significance of the Findings

- Effectiveness of Online Learning Platforms
  The results confirm that online learning platforms have a significant and positive effect on the cognitive development of early childhood learners. Children in the experimental group likely benefited from features such as interactive content, personalized pacing, instant feedback, and multimedia resources.

- Advantages of Digitally-Mediated Learning
  Online platforms typically include gamified and visually enriched materials, which are known to enhance memory retention, logical reasoning, and information processing. These features make the learning experience more engaging, helping young learners to develop foundational cognitive skills more effectively than through traditional methods alone.
- Educational and Policy Implications
  The findings provide evidence that early investment in educational technology can yield tangible benefits in foundational learning outcomes. This supports the argument for integrating online learning tools into early childhood education as a strategy to improve learning equity and contribute to sustainable global economic growth through human capital development.

Based on the significant difference in post-test scores between the experimental and control groups, the study concludes that online learning platforms are not only effective but also lead to measurable improvements in cognitive development among early childhood learners. As such, incorporating digital learning into early education should be viewed as a critical component in modernizing teaching practices and enhancing educational quality for young learners worldwide.

Table 2: Independent Samples t-Test for Engagement and Motivation Scores

Group	N	Mean	Std. Deviation	T	Df	Sig. (2-Tailed)
Online Learning (Experimental)	40	78.45	7.28			
Traditional Learning (control)	40	73.42	8.14	2.567	78	0.012

Children in the online learning group scored significantly higher in engagement and motivation (M = 78.35) compared to those in the traditional learning group (M = 73.42).

The independent samples t-test in table 2 compare the engagement and motivation scores for young children using online learning platforms (experimental group) and traditional learning methods (control group). The results indicated that there was a significant difference in the scores for the experimental group (M = 78.35, SD = 7.28) and the control group (M = 73.42, SD = 8.14); t (78) = 2.567, p = .012. These findings suggest that online learning platforms have a significant effect on the engagement and motivation of young children in the learning process, leading to the rejection of the null hypothesis (HO2). The higher mean score for the experimental group indicates that children who used online learning platforms showed greater engagement and motivation compared to those who used traditional learning methods.

The findings of the study indicated that online learning platforms significantly enhanced the cognitive development of early childhood learners. Statistical analysis revealed a meaningful difference in cognitive development scores between the experimental group (M = 75.25, SD = 8.67) and the control group (M = 70.13, SD = 9.45), with t(78) = 2.12, p = .037. In addition, engagement and motivation scores were also significantly higher in the experimental group (M = 78.35, SD = 7.28) compared to the control group (M = 73.42, SD = 8.14), t(78) = 2.567, p = .012. These results confirm that online learning platforms have a statistically significant positive impact on both cognitive development and engagement among young learners.

The findings suggest that digital learning environments significantly increase children's motivation and involvement in the learning process. Interactive features such as games, animations, immediate feedback, and personalized learning paths can stimulate curiosity, emotional connection, and active participation in young learners.

At early stages of development, emotional engagement and motivation are essential for nurturing lifelong learning habits. The use of technology provides a more engaging, adaptive, and multisensory learning experience that aligns with the developmental needs of young children. Educators should be encouraged to integrate digital learning tools into early childhood classrooms to foster enthusiasm and deeper engagement. Education policymakers should support the adoption of educational technology as a strategy to improve foundational learning outcomes and overall classroom dynamics.

Based on the results of the independent samples t-test, it can be concluded that online learning platforms have a statistically significant positive effect on the engagement and motivation of early childhood learners. Therefore, integrating digital technologies into early education is not only beneficial it is essential for modern, effective learning environments.

According to the results of hypothesis one, the experimental group's cognitive development scores improved statistically significantly when they used

online learning platforms. The null hypothesis (HO1) is rejected in light of this finding, which shows that online learning platforms significantly improve the cognitive development of young learners. This aligns with the work found that interactive online platforms significantly enhanced cognitive skills in young learners, supporting the effectiveness of digital interventions in early education. Also asserted that online learning environments can foster greater cognitive engagement and development among preschoolers compared to traditional methods.

Young children who use online learning platforms and those who use traditional learning techniques have significantly different engagement and motivation scores, according to the results of the independent samples t-test in Table 2. These outcomes are consistent with research showing that by providing dynamic and customized learning experiences, digital learning environments dramatically increase student motivation and engagement. Additionally, it was discovered that using online learning resources, which offer instant feedback and a variety of learning materials, greatly increases student engagement.

3.2 Discussion

The results of this study offer compelling proof that online learning environments significantly improve early childhood learners' motivation, engagement, and cognitive development. When digital resources like interactive games, multimedia information, and rapid feedback systems are incorporated into traditional classroom education, the result is a more dynamic learning environment that draws youngsters in and keeps them interested in learning activities. The higher cognitive scores achieved by the experimental group highlight the effectiveness of these features in supporting logical reasoning, memory retention, problem-solving, and early literacy and numeracy skills.

Another important finding is the significant increase in children's engagement and motivation when learning through online platforms. Motivation during early childhood is essential since it encourages curiosity and establishes the groundwork for enduring learning practices. The findings indicate that gamification, animations, and tailored pacing offered by digital resources enhance academic performance while also fostering a more pleasant learning environment. This corresponds with previous research that highlights the importance of technology in enhancing emotional engagement and self-motivated involvement among young students.

Furthermore, the study demonstrates that online learning platforms can complement and sometimes surpass the traditional classroom in terms of effectiveness. While face-to-face teaching remains essential for socialization and hands-on interaction, the combination of digital elements enriches the learning experience by catering to diverse learning styles. Children who may struggle with conventional instruction often benefit from the adaptive features of digital platforms, which adjust content to their individual progress. This personalized approach ensures that no child is left behind, making learning more inclusive.

The discussion also points toward the broader educational significance of adopting online platforms. By providing equitable access to quality learning resources, digital tools can bridge gaps in educational opportunities, particularly for children in rural or under-resourced areas. This has direct implications for global educational equity and human capital development, which are critical in sustaining long-term economic growth. The evidence from this study, therefore, supports the idea that investments in educational technology at the early childhood level are not merely supplementary but essential for modern education systems.

Lastly, the results highlight the need for balanced implementation. Although online platforms bring notable benefits, careful attention must be given to issues such as screen time, parental supervision, and teacher training. Educators should be equipped with the skills to effectively integrate technology into their pedagogy, while parents must be actively involved in guiding children's use of digital tools. Only through a collaborative approach between teachers, parents, and policymakers can the full potential of online learning platforms be realized in early childhood education.

3.2.1 Implications

These results hold important consequences for educational practice and policy. Incorporating digital platforms into early childhood education can enhance basic learning results and facilitate equal access to quality education, particularly in underprivileged regions. At the policy level, implementing educational technology can bridge gaps in conventional systems, encourage innovation in instruction, and align with worldwide objectives for sustainable economic advancement. Teachers and parents can also leverage these platforms to monitor progress and reinforce children's learning at home.

3.2.2 Research Contribution

This study contributes to the growing body of knowledge on educational technology by providing empirical evidence of the effectiveness of online learning platforms in early childhood education. Specifically, it highlights the dual benefits of cognitive development and increased engagement, areas that are vital in shaping future learning behavior. By connecting these findings with broader economic growth perspectives, the research bridges the gap between micro-level educational outcomes and macro-level societal development.

3.2.3 Limitations

Although the findings are promising, the study has its limitations. The study took place in a confined geographic area (Olorunda Local Government, Osun State, Nigeria), which could influence how results apply to other locations. The sample size of 80 students, though sufficient for statistical evaluation, is still comparatively limited for wider policy conclusions.

Moreover, the study focused on short-term outcomes without assessing the long-term effects of online learning platforms. Issues such as screen time, digital literacy of teachers and parents, and infrastructural constraints were not extensively explored.

3.2.4 Suggestions

Subsequent studies need to broaden participant demographics across various geographical and socio-economic backgrounds to improve the applicability of results. It is suggested that longitudinal studies be conducted to explore the lasting effects of online learning on children's growth. Policymakers should invest in training programs for teachers and parents to strengthen digital literacy and ensure effective platform use. It is also crucial to address infrastructure challenges, such as internet connectivity and device accessibility, particularly in rural areas. Finally, further exploration into the balance between digital and traditional learning (hybrid models) can provide valuable insights into creating more holistic educational systems.

4. CONCLUSION

This research presents empirical findings that online learning platforms greatly improve cognitive growth, engagement, and motivation in early childhood learners. The results emphasize technology's transformative capability in early education, demonstrating that digital resources provide an engaging and interactive learning atmosphere as well as significant enhancements in fundamental skills. Moreover, the integration of these platforms into early childhood education supports broader global goals by preparing a more educated and skilled workforce, thereby contributing to sustainable economic growth. Despite the challenges of access, digital literacy, and equity, the study emphasizes the importance of adopting educational technology as a critical element in modern teaching practices. Future research and policies should continue to address these challenges while expanding opportunities for digital inclusion in early childhood education.

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6. CONTRIBUTION STATEMENT

All authors participated equally in formulating and designing the study, creating and validating research tools, and in the processes of data collection and analysis. Every author played a role in analyzing the results, enhancing the theoretical and practical implications, and writing and modifying the manuscript. Additionally, all authors were actively involved in maintaining the ethical standards of the research and offered important contributions during the writing process. The final version of the manuscript was reviewed and approved collectively by all authors, reflecting their shared responsibility for the content and conclusions presented in this paper.

AUTHOR INFORMATION

Corresponding Authors

Baniyaminu Opeyemi Hamzat, Federal College of Education Iwo, Nigeria
https://orcid.org/0009-0000-5255-2825
Email: hamzatbo@fceiwo.edu.ng
Author phone (*Whatsapps*): +2347066234122

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