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Investigating the Impact of Digital Learning on Preschool Academic Performance in Gbarnga City

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Abstract

The purpose of this study is to look at the impact of digital learning on preschool academic achievement in Gbarnga City, Bong County, Liberia. The study, which included ten participants, found financial constraints as well as educational problems. A significant 40% of respondents, however, indicated a positive impact on academic attainment. The findings shed light on the complicated dynamics of digital learning in the context of early childhood education in Liberia. Despite economic limits and pedagogical challenges, the observed gain in academic performance demonstrates that digital learning interventions may be effective. These findings are critical for improving and optimizing digital learning practices in preschool education, as well as alerting educators, policymakers, and stakeholders in Gbarnga City about the obstacles and opportunities associated with incorporating technology into the early childhood learning environment. Liberia continues to navigate advancements in education, understanding the impact of digital learning on preschoolers' academic achievement becomes imperative for fostering a more effective and inclusive early education system.

Keywords: *Academic performance, Cognitive development, Curriculum requirements, Digital learning impact, Knowledge acquired.*

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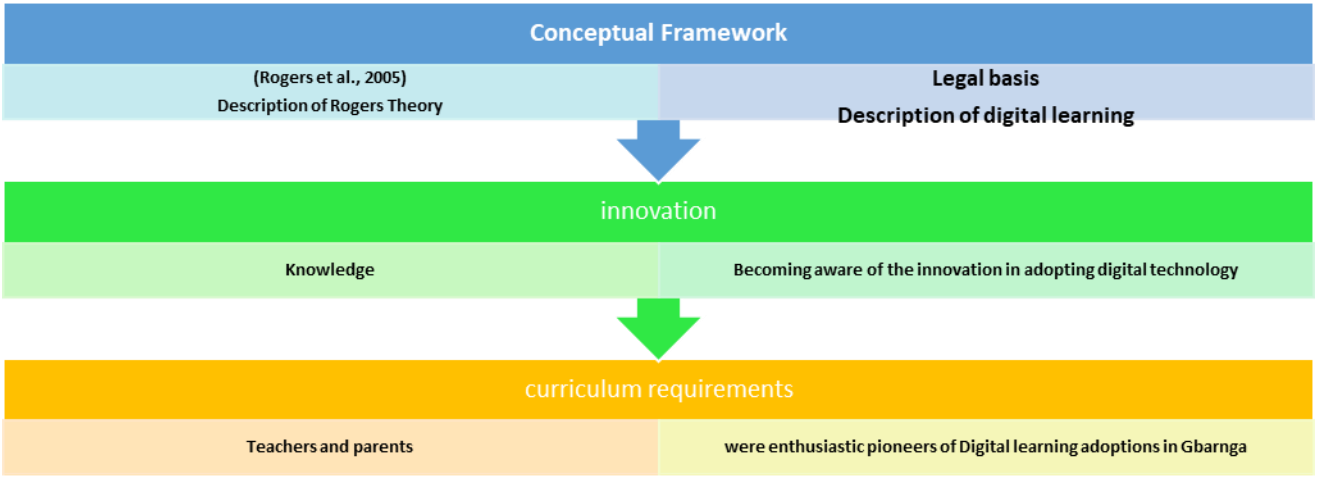
Introduction

The impact of digital learning on preschool academic performance stated the influence of technology-based educational tools, such as interactive apps, online programs, and digital possessions, on the cognitive, social, and emotional development of young children in a formal educational setting (Sari & Puteh,2018). Previously, digital technology in Liberia lacked comprehensive research and advocated for a more cautious and evidence-based approach to educational technology policy and practice for early childhood education. Theoretical: The study was based on Vygotsky and Cole's 2018 learning theory, which emphasized the importance of social interactions and tools in cognitive growth. Rogers' diffusion of innovations theory took into account elements such as innovation in adopting digital technology, curriculum requirements, student knowledge, persuasion, educators, institutions, and students with standards, which may be used throughout the adoption of educational technology (Rogers et al., 2005).



The conceptual framework emphasizes the interaction between knowledge acquisition involving both teachers and parents, innovative instructional strategies, the critical role for digital technology (DT) adoption, and dynamic curriculum adaptation to create a synergistic foundation for effective preschool educational practices.

Main Problem: The purpose of this study was to look at the impact of digital learning on preschool academic performance in Gbarnga. The key issue highlighted was Gbranga preschools' low interaction with digital technology, which resulted in a decrease in technology adoption. Inadequate equipment, lack of technology training for teachers, and the Ministry of Education's refusal to include digital education programs in the school's curriculum, has negatively impacted children's cognitive development.

The study was chosen because the preschool years are key for cognitive development. Investigating the impact of digital learning on academic achievement can indicate how technology influences cognitive processes in young learners, allowing educators and parents to make educated decisions about technology use in early childhood education programs.

Methodology

The research design for this study is quantitative in nature, primarily relying on structured surveys administered to preschool teachers and parents/guardians.

Research Respondents: A sample of preschool teachers and parents (N = 10) from various preschools in Gbarnga City Bong County will participate in the survey. A sample of preschool teachers and parents (n=10) from various preschools in Voinjama City participate in the interview and survey.

Data Collection/Administering:

Qualitative and quantitative data through interview and surveys were distributed to preschool teachers and parents.The formula to estimate the sample size is:

$n = Z^2 * (p) * (1-p) / E^2$ Where: - n is the sample size - Z is the z-score (which corresponds to the confidence level you want to achieve. For example, for a 95% confidence level, Z is 1.96). - p is the estimated proportion of the population that has the attribute in question (if you don't know, you can assume p=0.5) - E is the margin of error. I was able to derive a sample size of 10 from the population of 21 based on the equation (Lu & Lohr, 2010).

Data Collection/Administering:

Quantitative data will be through structured surveys distributed to preschool teachers in the study area.

Data Gathering:

Closed-ended questions about the influence of digital learning on academic performance, attitudes toward technology, and demographic information will be included in the survey questionnaire.

Result dan Discussion

Result

Numerous research investigations on children's collaborative engagements with digital content coined the term 'coviewing' (Konca & Erden, 2021). The importance of evidence-based research in supporting technology integration in early childhood education was underlined by the researchers. While acknowledging children's natural curiosity in technology, it was critical to exercise caution to maintain instructional value. The Jamaican National Standards Curriculum established requirements for early childhood education, which may have influenced the inclusion of digital learning materials for preschoolers (Ministry of Education, Youth, and Information (Jamaica), 2017)." The use of open educational resources (OER) in Sub-Saharan Africa revealed the potential for boosting educational access and quality, serving as a model for Liberian officials attempting to promote online learning for preschoolers (Cadiz, 2020). "Digital Citizenship in Schools" by Ribble was highlighted as a resource encouraging responsible online engagement, emphasizing the need of digital literacy and ethics in school settings (Siame, 2020).

Rogers' Diffusion of Innovations theory was proposed to explain how educational technology adoption can differ across Liberian preschool children, taking into

consideration factors such as innovators, early adopters, and laggards (Rogers, 2003). Findings obtained have been presented and analyzed in line with the specific objectives of the study in two ways; first, analysis were done for parents' responses and the second was done for teachers in the following format: What are the perceived barriers faced in the implementation of the digital learning by: 1 Preschool Teachers 2. Parents: What are the issues and challenges of the digital learning resources used by
preschoolers? To what extent does the use of digital learning resources positively affect the preschoolers in their academic performance? Section One: Preschool Teachers Perceived Barriers Faced in the Implementation of Digital Learning
This objective deals with the preschoolers perceived barriers faced in the implementation of digital learning and can be seen through the table below:

What are the perceived barriers faced in the implementation of the digital learning by teachers?	AF (Absolute Frequency)	RF (Relative Frequency)
The cultural beliefs of some parents to stick to the archaic pattern of teaching their kids thereby refusing to adopt and use new and advanced technology	2	20%
Availability and accessibility of digital learning devices to teachers	3	30%
Funds for the implementation of digital learning is scarce, if not easily made available to the teachers	4	40%
Individual choice to implement digital learning varies and most, if not all of the people, are not ready to adopt the new technology	1	10%
Total	10	100%

Source: Field survey October, 2023

From the table above, it could be seen that out of the total number of teachers interviewed, 4 (40%) of them said funds for the implementation of digital learning is scarce, if not easily made available to the teachers, while 3 (30%) of them interviewed said

availability and accessibility of digital learning devices to teachers, whereas 2 (20%) of them said the cultural beliefs of some parents to stick to the archaic pattern of teaching their kids thereby refusing to adopt and use new and advanced technology, and finally, 1 (10%) of them said individual choice to implement digital learning varies and most, if not all of the people, are not ready to adopt the new technology. Conclusively, 4 (40%) of the teachers interviewed said funds for the implementation of digital learning is scarce, if not easily made available to the teachers in the study area.

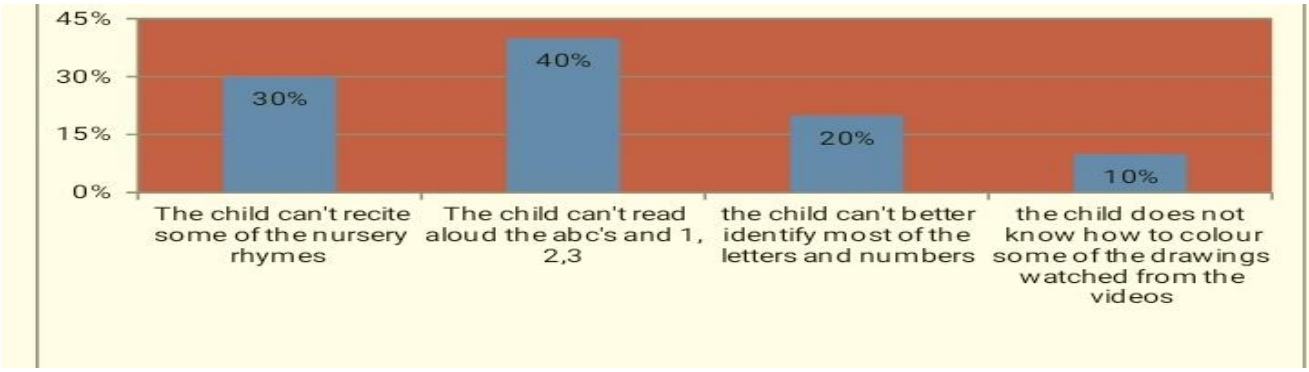
Parents Perceived Barriers Faced in the Implementation of Digital Learning

What are the perceived barriers faced in the implementation of the digital learning by parents?	AF (Absolute Frequency)	RF (Relative Frequency)
Funds for the purchase of digital devices are not easily made available	4	40%
Preference for the archaic method of teaching kids at home	2	20%
The government's lethargic efforts to include digital learning for preschool in the national curriculum	3	30%
Students find it difficult to use the digital learning devices	1	10%
Total	10	100%

Source: field survey October, 2023

From the table above, it could be deduced that out of the parents interviewed in the study area, 4 (40%) said funds for the purchase of digital devices are not easily made available, while 3 (30%) of them said the government's lethargic efforts to include digital learning for preschool in the national curriculum, whereas 2 (20%) of them said preference for the archaic method of teaching kids at home and 1 (10%) said students find it difficult to use the digital learning devices. Conclusively, 4 (40%) of the parents said funds for the purchase of digital devices are not easily made available in the study area.

Section Two: What are the issues and challenges of the digital learning resources used by preschoolers? This objective deals with the issues and challenges of the digital learning resources used by preschoolers and can be seen below:



Source: field survey October, 2023

From the figure above, it could be seen that out of the total number of people interviewed in the study area, 8 (40%) of them said that the child can't read loud the ABC's and 1, 2, 3, while 6 (30%) of them said that they child can't recite some of the nursery rhymes, whereas, 4 (20%) said the child can't better identify most of the letters and numbers and finally, 2 (10%) of them said the child does not know how to colour some of the drawings watched from the videos. Conclusively, majority (40%) of them said that the child can't read aloud the A, B, C's and 1, 2, 3 in the study area. Section Three: To what extent does the use of digital learning resources positively affect the preschoolers in their academic performance? This objective deals with the extent of the use digital learning resources and how it positively affects their academic performance and can be seen in the table below:

To what extent does the use of digital learning resources positively affect the preschoolers in their academic performance?	AF (Absolute Frequency)	Relative Frequency (RF)
The child can operate the digital devices without any help from an adult and can recite some of the nursery rhymes	6	30%
The child is exposed to the outside world through the use of digital technology	4	20%
The child has improved on his/her existing knowledge of learning	8	40%
The child's usage of the digital device can help	2	10%

ease the burden of parents and teachers alike		
Total	20	100%

Source: Field survey October, 2023

From the above table, it could be reduced that out of the total number of people interviewed with reference to how the usage of digital learning devices has positively affected preschoolers in their academic performance, 8 (40%) said that the child has improved on his/ her existing knowledge of learning, while 6 (30%) said that the child can operate the digital learning devices without any help from an adult and can recite some of the nursery rhymes, whereas 4 (20%) said that the child is exposed to the outside world thought the use of digital technology, and finally, 2 (10) said that the child's usage of the digital devices can help ease the burden of parents and teachers alike. Conclusively, majority (40%) of them said that the child has improved on his/her existing knowledge of learning in the study area.

Discussion

From the segmentation of the questionnaires (two sets of questionnaires were administered to teachers and parents), they were analyzed separately. From the respondents, 10 people were used as a sample size and they were divided into two equal halves (5 parents and 5 teachers) with 3 questionnaires each. From their responses gotten from the survey with special reference to teachers, 4 (40%) of them said funds for the implementation of digital learning is scarce, if not easily made available to the teachers, while another 4 (40%) of the parents said funds for the purchase of digital devices are not easily made. 4 (40%) said funds for the purchase of digital devices are not easily made available. With regards to the issues and challenges of the digital learning resources used by preschoolers, 8 (40%) of them said that the child can't read loud the ABC's and 1, 2, 3. Finally, considering the extent of the use of digital learning resources positively affecting preschoolers in their academic performance, 8 (40%) said that the child has improved on his/ her existing knowledge of learning. Categorically, it could be seen that there is a slight difference in the responses of teachers and parents regarding the perceived barriers faced in the implementation of digital learning in the study area.

Conclusion

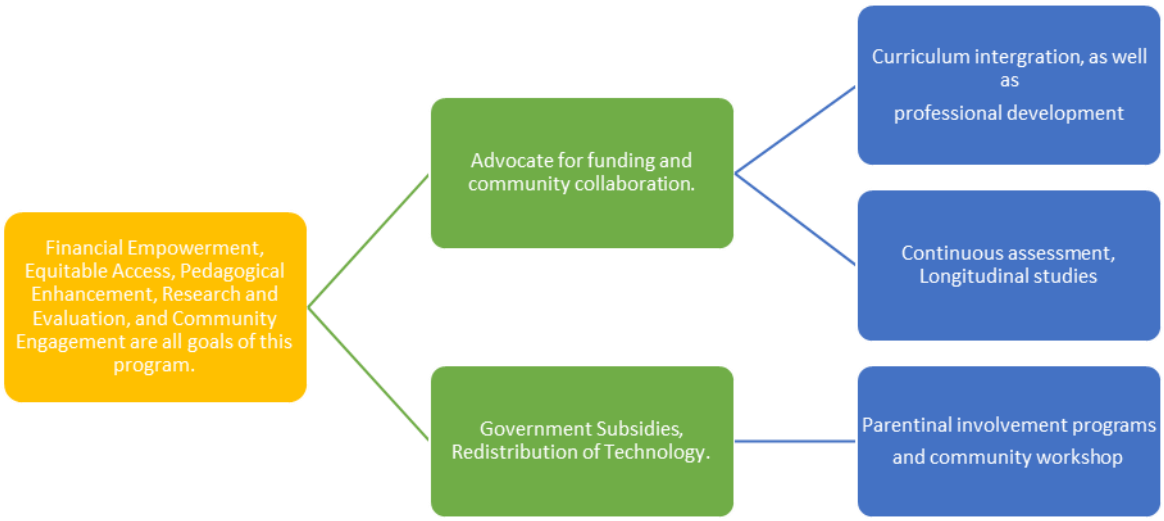
Inadequate equipment, lack of technology training for teachers, and the Ministry of Education's refusal to include digital education programs in the preschool school's curriculum, has negatively impacted children's cognitive development and their academic performance of digital learning in preschools of the Gbarnga community.

Emergent theory.

The study's findings, in preschool digital learning, the Dual Challenge theory emerges, where teachers (40%) stress a lack of funding for digital learning implementation, while an

equal number of parents indicate difficulties affording digital gadgets. The theory highlights concern about preschoolers' digital literacy, with 40% of respondents reporting difficulties reading ABCs and counting 1, 2, 3. The combination of these studies reveals a Dual challenge: negotiating economic hurdles to full adoption while addressing specific educational content gaps.

Emerging framework for actions.



The emerging framework strives to achieve educational goals by eliminating socioeconomic constraints and enhancing equal access to digital resources for preschoolers. Objectives involve securing funding, fostering community collaborations, investing in teacher development, and refining curriculum integration. Continuous assessment and community engagement align with the goal of data-driven improvement, aiming to create a collaborative educational environment for optimal digital learning efficacy in early childhood education. Furthermore, equitable access is pushed through programs such as technology redistribution and government subsidies. Community engagement techniques, such as parental involvement programs and workshops, aim to develop knowledge and support for preschool digital learning.

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