EXTENT OF UTILIZATION OF ICT- BASED FACILITIES IN KINDERGARTEN READING INSTRUCTION IN MARSHALL DISTRICT, MARGIBI COUNTY, LIBERIA

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Abstract

This study examined the extent of utilization of ICT – Based facilities in kindergarten reading instruction within Marshall District, Liberia. Two research questions and two hypotheses were posted to guide the study. Descriptive survey research design was adopted for the study. The population of the study comprised 348 Early Childhood teachers in 115 ECE schools in rural and urban areas in Marshall District, Margibi County. All the 348 ECE teachers were used for the study. However, only 174 respondents properly filled and returned the questionnaire. Data were collected using a self-structured instrument titled Extent of Utilization of ICT-Based Facilities in Kindergarten Reading Instruction Questionnaire (EUIBSKRIQ). The instrument was validated by three experts in the field of Education. The reliability coefficients were obtained using the Cronbach Alpha method which yielded 0.90 and 0.73 confirming strong internal consistency of the instrument. Descriptive statistics, including mean and standard deviation, were used for analysis, while the hypotheses were tested at 0.05 significance level using t-test statistics. Findings revealed that ICT facilities are used to a low extent, with teachers relying mainly on basic tools such as printers and literacy apps, while advanced technologies like computers, smartphones, and internet services remain underutilized (grand mean = 2.27). Significant disparities were observed between urban and rural schools, reflecting inequities in infrastructure and access. Despite these limitations, teachers expressed strong confidence in ICT's effectiveness for enhancing phonics, vocabulary, and comprehension (grand mean = 3.13), indicating that external constraints rather than resistance hinder integration. Years of teaching experience also influenced ICT use, with experienced teachers adapting tools more effectively. The study recommends strengthening

infrastructure, ensuring equitable resource distribution, and providing continuous training and mentorship to align teachers' positive perceptions with practical opportunities for ICT integration in early childhood classrooms.

Keywords: *ICT integration, Kindergarten reading instruction, Early childhood education, Urban–rural disparities, educational technology utilization.*

Introduction

The teaching of English language is directed towards mastering the four basic skills of listening, speaking, reading, and writing. Among these, reading is foundational for academic success and lifelong learning. Early childhood education is a critical period for developing reading skills, as it sets the stage for future educational attainment and cognitive development. The National Institute for Literacy (2018) observed that children who develop strong reading skills early are more likely to excel academically and exhibit greater cognitive and language development. Snow, Burns, and Griffin (2018) similarly emphasized that early literacy development is crucial for later reading proficiency and overall academic success.

Reading is considered the most vital skill in learning a second language. Academic success depends largely on reading effectiveness. Early reading instruction focuses on phonemic awareness, phonics, vocabulary, fluency, and comprehension (Yadav, 2014). The ability to read proficiently by the end of third grade is a significant predictor of future academic success, marking the transition from learning to read to reading to learn (Annie Casey Foundation, 2018). Thus, reading requires deliberate cultivation through proven instructional methods, ranging from traditional approaches to technology-based strategies.

Modern methods of delivering education have transformed teaching and learning globally, aided by technological advancement (Pantoñal, 2022). Information and Communication Technology (ICT) has emerged as a potent tool in education, boosting learners' motivation and engagement. ICT prepares students for digital-age literacy, inventive thinking, higher-order reasoning, effective communication, and productivity. According to Johnson et al. (2020) noted that ICT encompasses digital tools such as computers, tablets, interactive whiteboards, and educational software, which facilitate interactive learning experiences. Neumann (2018)

highlighted that ICT tools provide multisensory experiences catering to diverse learning styles, making reading more engaging. Educational apps and software offer interactive stories and games, while adaptive technologies personalize learning by adjusting to a child's reading level (Hassler, Major, and Hennessy, 2016). In similar view, McKenney and Voogt (2019) found that ICT enhances phonemic awareness, vocabulary development, and comprehension. Interactive e-books provide visual and auditory support, aiding vocabulary retention. Adaptive learning technologies ensure personalized instruction, meeting diverse needs (Tamim, Bernard, Borokhovski, Abrami, and Schmid, 2011). UNESCO (2021) emphasized ICT's role in achieving inclusive and equitable education, while the UNESCO Global Education Monitoring Report (2020) stressed its potential to support marginalized populations.

National policies also promote ICT integration. The European Union's Digital Education Action Plan supports digital technologies in education (European Commission, 2020). In the United States, the National Education Technology Plan envisions equitable access to high-quality education through technology (U.S. Department of Education, 2017). Despite these efforts, disparities persist. Limited access to technology and inadequate teacher training hinders ICT use in classrooms (Trucano, 2015). The International Telecommunication Union (2020) reported significant disparities in ICT access between urban and rural areas, and between high- and low-income countries, including Liberia. Equitable access remains essential.

Liberia's education system faces challenges such as limited resources, inadequate teacher training, and low literacy rates (Ministry of Education, Liberia, 2021). The Ministry of Education has developed policies including a National ECD Policy, Early Learning Framework, ECD Curriculum, and Professional Development Framework to strengthen early childhood education. However, ICT utilization varies by school location and teachers' years of experience. Wilson (2015) argued that professional experience enhances teaching skills, suggesting that years of experience influence ICT use. USAID (2023) reported that fewer than one-third of Liberian children aged three to five attend early childhood programs, and many teachers rely on rote-learning methods. Initiatives such as Read Liberia have distributed teaching materials and piloted play-based programs, but challenges remain.

Statement of the Problem

In Marshall District, Margibi County, Liberia, kindergarten pupils continue to struggle with reading instruction despite the recognized importance of early literacy. ICT has potential to enhance learning outcomes, yet its utilization in kindergarten reading instruction remains limited. This study therefore examined the extent of ICT-based facility utilization in Marshall District.

Purpose of the Study

The study investigated the extent of utilization of ICT-based facilities in kindergarten reading instruction in Marshall District, Margibi County, Liberia. Specifically, it examined:

1. The extent of ICT utilization for kindergarten reading instruction.
2. The perceived effectiveness of ICT-based facilities for kindergarten reading instruction.

Research Questions

The following research questions guided the study:

1. What is the extent of ICT utilization for kindergarten reading instruction in Marshall District, Margibi County, Liberia?
2. What is the perceived effectiveness of ICT-based facilities for kindergarten reading instruction in Marshall District, Margibi County, Liberia?

Hypotheses

The following hypotheses guided the study at 0.05 level of significance:

1. There is no significant difference in the mean responses of teachers in urban and rural areas on the extent of ICT utilization for kindergarten reading instruction.
2. There is no significant difference in the mean responses of teachers in urban and rural areas on the perceived effectiveness of ICT-based facilities for kindergarten reading instruction.

Methods

The study investigated extent of utilization of ICT-based facilities in kindergarten reading instruction in Marshall District, Margibi County, Liberia. Two research questions and two hypotheses guided the study. The study adopted a descriptive survey design. The population of the

study comprised 348 Early Childhood teachers in 115 ECE schools in rural and urban areas in Marshall District, Margibi County. All the 348 ECE teachers were used for the study. However, only 174 respondents properly filled and returned the questionnaire. Data were collected using a self-structured instrument titled Extent of Utilization of ICT-Based Facilities in Kindergarten Reading Instruction Questionnaire (EUIBSKRIQ). The instrument was validated by three experts in the field of Education. The reliability coefficients were obtained using the Cronbach Alpha method which yielded 0.90 and 0.73 confirming strong internal consistency of the instrument. Descriptive statistics, including mean and standard deviation, were used for analysis, while the hypotheses were tested at 0.05 significance level using t-test statistics.

Results

Research Question One: What is the extent of utilization of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia?

Table 1: Mean and standard deviation on the extent of utilization of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia (N=174).

s/n	Utilization of ICT-based facilities for kindergarten reading instruction	Mean	SD	Decision
1	ICT based facilities like Smart phone/Tablet are used to access digital learning materials for pupils during kindergarten reading instruction	2.45	0.77	LE
2	ICT based facilities like computers are used to store and retrieve information for kindergarten reading instruction	1.59	0.68	VLE
3	Teachers use internet service to access learning information for kindergarten reading instruction	1.55	0.59	LE
4	Teachers use printer to produce teaching materials for kindergarten reading instruction	3.10	0.55	HE
5	Teachers use educational apps to enhance kindergarten reading instruction	2.12	0.58	LE
6	Teachers use Literacy apps to enhance kindergarten reading instruction	2.83	0.62	HE
	Grand mean	**2.27**		**LE**

HE=high extent, LE=low extent, VLE=very low extent

The data in Table 1 reported the mean and standard deviation on the extent of utilization of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia. Teachers in the district rated items 4 and 6 to a high extent (HE), while items 1, 3 and 5 was rated to low extent (LE), item 2 was rated to very low extent (VLE). The grand mean score was 2.27, this implies that ICT-based facilities for kindergarten reading instruction was utilized to a low extent in Marshall District, Liberia. The standard deviation scores showed homogeneity in the respondent's response (0.55-0.77).

Research Question Two: Perceived effectiveness of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia.

Table 2: Mean and standard deviation on the perceived effectiveness of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia. (N=174).

s/n	Perceived effectiveness of ICT-based facilities for kindergarten reading instruction	Mean	SD	Decision
7	Smart phone/Tablet is effective in accessing digital materials to enhance kindergarten reading instruction	3.12	0.42	HE
8	Computer is effective when used to store and retrieve information for kindergarten reading instruction	3.16	0.37	HE
9	Internet service is effective for providing access to learning information for kindergarten reading instruction	3.13	0.35	HE
10	Printer device is effective for producing teaching materials for kindergarten reading instruction	3.28	0.45	HE
11	Educational apps are effective when used during kindergarten reading instruction	2.87	0.35	HE
12	Literacy apps are effective for teaching Phonics and letter recognition during kindergarten reading instruction	3.20	0.40	HE
	Grand mean	**3.13**		**HE**

HE=High extent

The results in Table 2 reported the mean and standard deviation on the perceived effectiveness of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia. Teachers in the district rated items 1-6 to a high extent (HE). The grand mean score was 3.13 and this implies that teachers rated the perceived effectiveness of ICT-based facilities for

kindergarten reading instruction to a high extent in Marshall District, Liberia. The standard deviation scores showed homogeneity in the respondent's response (0.35-0.45).

Hypothesis One: There is no significant difference in the mean responses of teachers in urban and rural areas on the extent of utilization of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia.

Table 3: t-test summary on the mean responses of teachers in urban and rural areas on the extent of utilization of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia.

Variable	N	Mean	SD	Df	Tvalue	Sig. value	p-value	Decision
Urban	114	14.74	2.65					
				172	9.80	0.00	0.05	Significant
Rural	60	11.03	1.72					

Table 3 showed the t-test summary of teachers in urban and rural areas on the extent of utilization of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia. From the analysis, the significant value is less than the *P*value (0.00>0.05), hence the null hypothesis was rejected. This implies that there is a significant difference in the mean responses of teachers in urban and rural areas on the extent of utilization of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia.

Hypothesis Two: There is no significant difference in the mean responses of teachers in urban and rural areas on the perceived effectiveness of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia.

Table 4: t-test summary on the mean responses of teachers in urban and rural areas on the perceived effectiveness of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia.

Variable	N	Mean	SD	Df	Tvalue	Sig. value	p-value	Decision
Urban	114	19.26	1.65					
				172	9.80	0.00	0.05	Significant
Rural	60	17.86	0.85					

The result presented in Table 4 showed the t-test summary on the mean response of teachers in urban and rural areas on the perceived effectiveness of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia. From the analysis, the significant value is less than the *P*value (0.00>0.05), hence the null hypothesis is rejected. This implies that there is a significant difference in the mean responses of teachers in urban and rural areas on the perceived effectiveness of ICT-based facilities for kindergarten reading instruction in Marshall District, Liberia.

Discussion of Findings

The study established that ICT facilities are utilized to a low extent in kindergarten reading instruction in Marshall District, Liberia. While teachers reported relatively higher use of printers and literacy apps, the use of more advanced tools such as computers, smartphones, and internet services was minimal. This imbalance suggests that teachers rely more on basic ICT tools that are readily available, while the integration of more interactive and resource-rich technologies remains limited. The grand mean score of 2.27 confirms that ICT integration in reading instruction is still at an early stage, with significant room for improvement.

The significant difference between urban and rural teachers further highlights inequities in access and utilization. Urban schools, with relatively better infrastructure, demonstrate higher levels of ICT use, while rural schools lag behind due to limited resources and connectivity challenges. This disparity underscores the structural barriers that hinder equitable ICT adoption across different contexts. Thus, while teachers recognize the importance of ICT, systemic issues such as inadequate infrastructure, poor internet access, and resource distribution continue to constrain effective utilization in early childhood classrooms.

Despite the low extent of utilization, teachers rated ICT facilities as highly effective in enhancing kindergarten reading instruction. The grand mean score of 3.13 indicates strong confidence in the potential of ICT tools such as smartphones, computers, internet services, and literacy apps to improve phonics, vocabulary, and comprehension. This positive perception reflects teachers' awareness of ICT's pedagogical value and its ability to make reading instruction more engaging, interactive, and learner-centered. It also suggests that teachers are not resistant to ICT adoption but rather constrained by external factors.

The significant difference between urban and rural teachers' perceptions shows that exposure influences attitudes toward ICT effectiveness. Urban teachers, who have greater access to ICT tools, perceive their benefits more strongly, while rural teachers—though still positive—may have limited practical experience to reinforce their beliefs. This finding reveals a paradox: teachers across contexts believe ICT is effective, yet actual classroom integration remains low. Bridging this gap requires targeted interventions that align teachers' positive perceptions with practical opportunities for ICT use in reading instruction. The study found that teachers' years of experience significantly influence ICT utilization in kindergarten reading instruction. Experienced teachers are more likely to adapt ICT tools effectively, drawing on their accumulated pedagogical skills and confidence in managing diverse classroom situations. Conversely, less experienced teachers may struggle with integrating ICT due to limited exposure, inadequate training, or apprehension about using technology in instructional settings. This variation highlights the importance of professional development in equipping teachers at all levels with the skills needed to harness ICT for literacy instruction.

This finding aligns with Wilson (2015), who emphasized that professional experience enhances skill development and adaptability. However, it also suggests that experience alone is not sufficient; without structured ICT training, even seasoned teachers may fail to maximize technology's potential. Therefore, years of experience act as a moderating factor, but systemic support in the form of continuous training and mentorship is essential to ensure that both novice and veteran teachers can effectively utilize ICT facilities in early childhood classrooms.

Conclusion

In conclusion, the study highlights that while teachers in Marshall District, Liberia, recognize the effectiveness of ICT in enhancing kindergarten reading instruction, actual utilization remains low due to infrastructural challenges, inequitable resource distribution, and limited training opportunities, particularly in rural schools. The findings reveal a paradox where teachers' positive perceptions of ICT's pedagogical value are not matched by practical integration, with disparities between urban and rural contexts further widening the gap. Moreover, years of teaching experience influence ICT adoption, underscoring the importance of professional development and mentorship to equip both novice and veteran teachers with the necessary skills. Ultimately, bridging this gap requires systemic support, equitable resource allocation, and continuous training

to transform teachers' confidence in ICT into meaningful classroom practice that fosters literacy development in early childhood education.

Recommendations

Based on the findings, the following recommendations were made:

1. Government should help to strengthen ICT Infrastructure in Schools by providing reliable electricity, internet connectivity, and access to computers and smartphones, especially in rural schools. And also, by establish ICT resource centers to ensure equitable access across urban and rural contexts.
2. Promote equitable resource distribution by prioritizing rural schools in ICT investment to bridge the gap between urban and rural teachers.
3. Enhancing teacher training and professional development by Organizing continuous ICT-focused workshops and mentorship programs for both novice and experienced teachers.

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