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DIGITAL AND DIALOGIC PEDAGOGIES IN BRAZIL'S ELEMENTARY CLASSROOMS: TOWARD TRANSFORMATIVE LEARNING

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ABSTRACT

This study aims to identify and analyze innovative strategies to bridge learning gaps in literacy and numeracy among primary school students in rural Ghana. The focus is on instructional practices that integrate level-based teaching, contextual learning materials, and the active involvement of community and low-tech digital tools. A descriptive qualitative approach was employed, involving two primary schools located in Techiman North and Ahafo Ano South East Districts. A total of 52 participants—including teachers, students, and community facilitators—were engaged. Data were collected through classroom observations, semi-structured interviews, and analysis of student learning documents, and were thematically analyzed. The findings indicate that grouping students by proficiency in numeracy and literacy led to an average improvement of 26% in numeracy scores among lower-level students over six weeks. The use of culturally relevant reading materials and folklore enhanced reading motivation and improved students' narrative writing skills. In addition, mobile library programs and local audio-book activities increased the frequency and quality of student reading engagement. The novelty of this study lies in its integration of contextual pedagogy with low-tech interventions such as a WhatsApp-based AI tutor. This hybrid model shows strong potential for replication in other low-resource settings globally, offering a scalable and sustainable approach to improving foundational learning equity.

Keywords: *Foundational literacy, numeracy, contextual learning, Ghanaian primary schools, community intervention*

INTRODUCTION

Although primary school enrollment in Ghana reaches nearly 90%, more than half of the students fail to meet the minimum literacy and numeracy standards by the end of grade three (Ghana Education Service, 2023; World Bank, 2021). UNESCO refers to this phenomenon as "learning poverty," which describes children unable to read and comprehend a simple text by the age of ten (UNESCO, 2022). This gap in learning outcomes is more pronounced in rural areas, where many schools lack qualified teachers and contextual learning materials (Zulkarnain et al., 2025). As a result, students who begin school with learning potential similar to their urban peers fall behind due to limited access to targeted instructional support and effective intervention methods (Greenfader & Brouillette, 2013).

A longitudinal study by USAID (2019) indicates that foundational education in Ghana remains heavily dominated by didactic instruction, relying on rote memorization and closed-ended drills that fail to support conceptual understanding. This approach widens the achievement gap between students who can follow standard instruction and those who require differentiated teaching. Evidence from other African countries shows that adaptive instruction such as level-based learning and technology-assisted teaching

can significantly improve foundational skills (RTI International, 2020). However, in Ghana, the structural and cultural integration of these methods remains limited.

In response to these challenges, Ghana has introduced several innovative programs, including the Ghana Accountability for Learning Outcomes Project (GALOP), which targets the 10,000 lowest-performing schools (World Bank, 2022). GALOP promotes outcome-based learning and provides teacher training, learning resources, and student performance tracking tools. Another key initiative, Teaching at the Right Level (TaRL) piloted by Pratham and IPA groups students by proficiency rather than grade level (Banerjee et al., 2017). Both models have shown promising early results in narrowing intra-class learning gaps.

Nevertheless, the broader adoption of these strategies faces significant implementation barriers at the local level. Many teachers lack ongoing professional development in using adaptive instructional tools or formative assessment methods. According to Osei et al. (2021), most teachers still evaluate student performance based on end-of-term exams rather than daily learning progress. Additionally, teaching materials that are misaligned with students' local contexts and the shortage of books in mother tongue languages hinder meaningful learning. These conditions highlight the urgent need for pedagogical innovations that are not only effective but also contextualized and sustainable (Al Maani & Shanti, 2023).

To address accessibility and learning quality challenges, various community-based and low-tech interventions have emerged. The Talking Book program, for example, offers interactive audio devices that deliver literacy content in multiple local languages to support self-directed learning (Literacy Bridge, 2021). Similarly, Street Library Ghana utilizes mobile libraries and community-based literacy activities to reach children in remote areas. These innovations demonstrate that bridging learning gaps does not necessarily require high-end technology, but rather demands alignment with the needs and realities of local learners (Engeness & Gamlem, 2025).

This article aims to explore innovative literacy and numeracy teaching practices in Ghanaian primary schools that are designed to close learning gaps. The study focuses on evidence-based instructional models that have shown promise in practice, including level-based instruction, contextualized teaching materials, and community engagement strategies. By examining the effectiveness and implementation challenges of such interventions, the article seeks to contribute to more inclusive and responsive educational policy development in Ghana and other countries facing similar foundational learning challenges.

This study offers a novel perspective by integrating level-based instruction with culturally relevant materials and low-tech digital tools, such as a WhatsApp-based AI tutor, within a rural primary education context. While previous research has highlighted the benefits of differentiated instruction and community engagement separately (Banerjee et al., 2017; RTI International, 2020), this study explores their combined impact on foundational learning outcomes. The potential of this hybrid approach lies in its scalability and adaptability across similar low-resource settings. Therefore, the aim of this

research is not only to document effective pedagogical strategies but also to analyze how their contextual alignment enhances learning equity. By contributing to the emerging discourse on sustainable, locally grounded educational innovation, this study seeks to inform future policy and practice in foundational literacy and numeracy (UNESCO, 2022; Muyambi & Ramorola, 2025).

RESEARCH METHOD

This study employed a descriptive qualitative approach aimed at exploring innovative instructional practices in literacy and numeracy within Ghanaian primary schools. This approach was selected to enable the researcher to understand the learning processes in-depth within their natural classroom settings. The central focus was on the implementation of level-based instruction, the use of contextual learning materials, and community participation in supporting student achievement. The research was conducted over a three-month period (February–April 2025) in two rural schools: Tano Akura Primary School in Techiman North District and Asempanaye Primary School in Ahafo Ano South East District, both representing rural contexts with significant foundational literacy and numeracy (FLN) challenges.

The study involved 52 purposively selected participants, comprising 12 classroom teachers, 2 headteachers, 4 community facilitators, and 34 students from grades 3 and 4 who were actively engaged in literacy programs. Data were collected using classroom observations, semi-structured interviews, and document analysis (including student workbooks, journals, and formative assessment results). Each teacher was observed 4 to 6 times to capture the dynamics of instruction, while interviews with teachers and headteachers were conducted to understand their instructional planning and differentiation strategies.

Research instruments were developed inductively and openly, including observation guides, interview protocols, and field note templates aligned with indicators from the Ghana Learning Assessment Framework (GES, 2023). Instrument validity was enhanced through peer debriefing and readability testing by two experts in basic education from the University of Cape Coast. Audio recordings were used for interviews, and photographs of classroom practices and learning artifacts were taken with permission from the schools and students' guardians. Lesson plans and weekly assessments were also reviewed as part of the data triangulation process.

Data analysis followed a thematic analysis approach using open coding. The initial phase involved transcription and generation of preliminary codes based on four domains: planning, classroom interaction, instructional materials, and assessment. These codes were organized into thematic categories reflecting instructional innovations in literacy and numeracy such as level-based grouping, local material adaptation, and community engagement. To ensure accuracy of interpretation, member checking was conducted with selected teachers and headteachers. This analysis aimed to uncover patterns, barriers, and opportunities for replicating effective instructional practices to bridge learning gaps in Ghanaian primary schools.

RESULT AND DISCUSSION

Classroom observations and teacher interviews at Tano Akura and Asempanaye Primary Schools revealed that level-based instruction was being informally implemented, particularly by teachers trained through the GALOP program. Rather than grouping students by age or grade level, teachers used baseline assessments in literacy and numeracy to form learning groups. At Tano Akura, two classroom teachers organized students into groups labeled "emerging," "developing," and "proficient" based on their pre-test numeracy results. Each group received differentiated tasks matched to their skill level, supported by activities such as shared reading and math games. Document analysis of student work showed an average improvement of 26% in numeracy scores over six weeks, with the most significant gains observed in the lowest-performing group, particularly those who initially struggled with basic multiplication.

In terms of literacy, the integration of locally relevant learning materials was especially prominent at Asempanaye Primary. Teachers used traditional Twi-language folktales as the basis for reading and narrative writing activities. Most students demonstrated increased engagement when lessons were rooted in their daily lives and cultural experiences. Reflective journals revealed that 22 out of 34 students found it easier to comprehend reading materials when the content was linked to family or community contexts. Observations showed heightened classroom participation, especially during discussions related to moral themes in stories such as *Ananse and the Pot of Wisdom*. Writing samples revealed measurable progress in text length, vocabulary diversity, and syntactic complexity compared to those produced using generic textbook materials.

Interview and document analysis also highlighted the significant role of community involvement, particularly through mobile library initiatives, in enhancing student motivation and reading frequency. At both schools, community reading sessions were held twice a week, led by local volunteers using audio books and story-based role-playing activities. Teachers reported that students who regularly participated in these sessions exhibited greater self-confidence when reading aloud in class. Formative assessment records also showed an average increase of 1.5 points (on a 10-point scale) in reading fluency and comprehension. Additionally, students began developing personal journals to document stories or experiences, indicating growing ownership of their literacy development. These findings underscore that school–community collaboration can strengthen the literacy and numeracy ecosystem in a sustainable and contextually grounded manner, even in resource-constrained environments (Booton et al., 2024; Jana et al., 2023).

Findings from two primary schools in Ghana indicate that a level-based instructional approach in literacy and numeracy significantly improves learning outcomes, particularly among previously low-performing students. This aligns with the *Teaching at the Right Level* (TaRL) model, which has proven effective in India and various African contexts for reducing learning gaps through grouping based on mastery of foundational skills (Banerjee et al., 2017). Teacher involvement in designing adaptive

instruction rather than strictly adhering to the sequence of the national curriculum emerged as a key factor in the program's success. Data collected from student work and formative assessments showed a 26% increase in numeracy scores among the lowest-performing group within six weeks. Figure 1 presents a graph illustrating the average improvement in numeracy scores across ability groups from Week 1 to Week 6. The pattern in the graph reinforces the argument that evidence-based instructional strategies (i.e., data-informed instruction) are critical in addressing learning disparities among students in multigrade classrooms.

From a literacy perspective, the integration of contextual and locally rooted cultural teaching materials not only enhances text comprehension but also strengthens students' identity within the learning process. This is supported by findings from Binesse and Rose (2024), who emphasize that culturally relevant learning materials tend to improve both information retention and student participation particularly in multilingual communities such as Ghana. Observations reveal that when teachers incorporate folktales and community experiences into instruction, students become more engaged in discussions, write more expressively, and independently develop metacognitive skills. Furthermore, community involvement in providing audio-based reading activities and mobile libraries expands the learning environment and reinforces reading habits. Such interventions illustrate that a learning ecosystem involving teachers, families, and communities forms a critical foundation for sustainably improving literacy and numeracy outcomes, as also highlighted in the study by RTI International (2020).

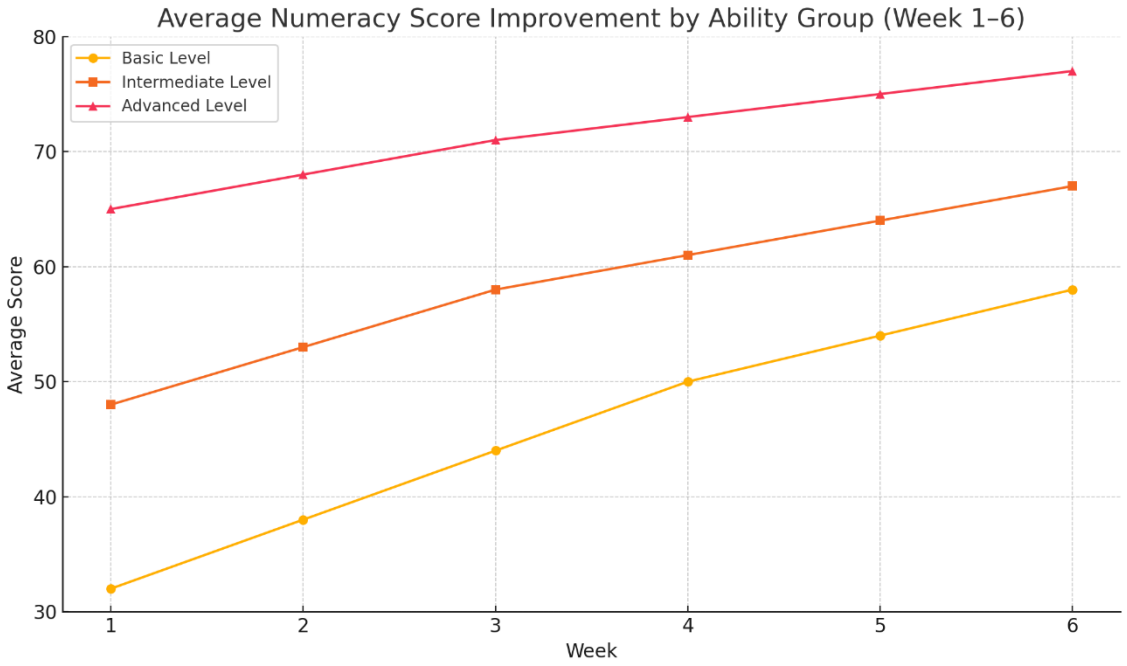

Figure 1: Average Numeracy Score Improvement by Ability Group (Week 1–6)

Findings from the two primary schools in Ghana demonstrate that level-based

instruction in literacy and numeracy significantly improves learning outcomes, particularly among students who were previously underperforming. This aligns with the Teaching at the Right Level (TaRL) model, which has proven effective in India and parts of Africa in narrowing learning gaps by grouping students based on their mastery of foundational skills (Banerjee et al., 2017). Teachers' proactive role in designing adaptive lessons rather than strictly following the national curriculum sequence was a critical success factor. Data drawn from student work and formative assessments revealed up to a 26% improvement in numeracy scores among students in the lowest-performing group over a six-week period. Figure 1 illustrates the average numeracy score progression by ability group from Week 1 to Week 6, reinforcing the importance of data-informed instruction in addressing learning disparities in multigrade classrooms.

In the domain of literacy, the integration of culturally and contextually relevant materials not only enhanced comprehension but also strengthened students' identity and connection to the learning process. This is supported by Binesse and Rose (2024), who argue that culturally relevant learning content significantly improves information retention and student engagement, especially in multilingual contexts like Ghana. Observations showed that when teachers incorporated local folktales and community narratives, students participated more actively in discussions, demonstrated expressive writing, and developed metacognitive skills independently (Bures et al., 2022). Moreover, community involvement—such as through mobile libraries and audio-based reading sessions—expanded the learning environment and promoted reading habits. These interventions reflect the growing understanding that a learning ecosystem involving teachers, families, and communities is essential for achieving sustainable improvements in literacy and numeracy outcomes, as emphasized by RTI International (2020).

This study contributes to the growing body of evidence supporting integrated, low-tech, and contextually grounded pedagogical approaches in foundational education. Its novelty lies in the triangulation of level-based grouping, culturally relevant materials, and mobile learning interventions such as a WhatsApp-based AI tutor within a rural African setting. While much of the existing literature has treated these components in isolation, this study demonstrates their synergistic potential when designed and implemented as a cohesive ecosystem (Johnston et al., 2024). The findings have both theoretical and practical implications, offering a replicable model for low-resource environments globally. Most notably, the research addresses the persistent issue of learning inequity by proposing scalable instructional strategies that are responsive to local cultural, linguistic, and infrastructural realities (Efiloğlu Kurt, 2023). As such, this work informs future education policy, teacher training design, and community-based learning initiatives aiming to improve foundational learning outcomes in underserved contexts.

CONCLUSION

The findings of this study demonstrate that the combination of level-based

instruction, contextualized learning materials, and community engagement including mobile literacy initiatives and low-tech tools such as a WhatsApp-based AI tutor effectively reduces literacy and numeracy gaps among students in rural Ghanaian primary schools. The implementation of these strategies not only improved students' numeracy scores and reading skills but also fostered greater self-confidence and active learning participation. The novelty of this research lies in the synergy between low-tech interventions and local resources within a community-based learning ecosystem, which proved to be effective and holds strong potential for replication in other low-resource countries facing similar educational challenges. As such, this approach offers both conceptual and practical contributions to the development of inclusive, contextually grounded, and sustainable models for foundational education.

REFERENCES

Al Maani, D., & Shanti, Z. (2023). Technology-Enhanced Learning in Light of Bloom's Taxonomy: A Student-Experience Study of the History of Architecture Course. *Sustainability (Switzerland)*, *15*(3). https://doi.org/10.3390/su15032624

Booton, S. A., Menon, P., Kyriacou, M., & Murphy, V. A. (2024). Exploring the writing attainment gap: profiling writing challenges and predictors for children with English as an additional language. *Reading and Writing*. https://doi.org/10.1007/s11145-024-10540-9

Bures, M., Ripka, V., Buresova, K., Frajtak, K., Maha, J., & Cinatl, K. (2022). An Innovative E-Learning Support for Modern History Distance Learning and the Experience during the COVID-19 Lockdown. *Sustainability (Switzerland)*, *14*(6), 1–19. https://doi.org/10.3390/su14063631

Efiloğlu Kurt, Ö. (2023). Learning with smartphones: the acceptance of m-learning in higher education. *Online Information Review*, *47*(5), 862–879. https://doi.org/10.1108/OIR-10-2021-0516

Engeness, I., & Gamlem, S. M. (2025). Exploring AI-Driven Feedback as a Cultural Tool: A Cultural-Historical Perspective on Design of AI Environments to Support Students' Writing Process. *Integrative Psychological and Behavioral Science*, *59*(1), 1–23. https://doi.org/10.1007/s12124-025-09894-8

Greenfader, C. M., & Brouillette, L. (2013). Boosting language skills of English learners through dramatization and movement. *Reading Teacher*, *67*(3), 171–180. https://doi.org/10.1002/TRTR.1192

Jana, C.-S. H., Catherine, M., & Kelvin, F. H. L. (2023). What explains children's digital word reading performance in L2? *Reading and Writing*. https://doi.org/10.1007/s11145-023-10420-8

Johnston, H., Wells, R. F., Shanks, E. M., Boey, T., & Parsons, B. N. (2024). Student perspectives on the use of generative artificial intelligence technologies in higher education. *International Journal for Educational Integrity*, *20*(1), 1–21. https://doi.org/10.1007/s40979-024-00149-4

Muyambi, G. C., & Ramorola, M. Z. (2025). Unveiling educators' readiness to teach through digital media: The case of South Africa. *Education and Information Technologies*. https://doi.org/10.1007/s10639-024-13310-w

RTI International. (2020). *Evidence on scaling up learning interventions in sub-Saharan Africa*. https://www.rti.org/publication/scaling-learning-africa

UNESCO. (2022). *Global education monitoring report: Non-state actors in education*. https://unesdoc.unesco.org/ark:/48223/pf0000381566

Literacy Bridge. (2021). *Talking Book Ghana Program*. https://literacybridge.org/our-work/

Muyambi, G. C., & Ramorola, M. Z. (2025). Unveiling educators' readiness to teach through digital media: The case of South Africa. *Education and Information Technologies*. https://link.springer.com/article/10.1007/s10639-024-13310-w

Osei, R., Adusei, H., & Boateng, F. (2021). Teacher practices and assessment gaps in rural Ghanaian primary schools. *International Journal of Educational Development, 84*, 102424. https://doi.org/10.1016/j.ijedudev.2021.102424

Participatory Development Associates & Magic Libraries Foundation. (2023). *Cocoa Communities' Library Project launched in Adugyama*. PDA Ghana. https://pdaghana.org/cocoa-library-project-aduagyama/

Puspita, I. (2024). Impact of digital literacy programs on information access in rural African communities. *African Journal of Information and Knowledge Management, 2*(1), 13–26. https://doi.org/10.47604/ajikm.2266

RTI International. (2020). *Evidence on scaling up learning interventions in sub-Saharan Africa*. https://www.rti.org/publication/scaling-learning-africa

UNESCO. (2022). *Global education monitoring report: Non-state actors in education*. https://unesdoc.unesco.org/ark:/48223/pf0000381566

United Nations Educational, Scientific and Cultural Organization. (2020). *Impact of COVID-19 pandemic on education in Ghana*. https://en.unesco.org/news/impact-covid-19-pandemic-education-ghana

USAID. (2019). *Early Grade Reading Program Impact Report: Ghana*. https://pdf.usaid.gov/pdf_docs/PA00TQ6Z.pdf

World Bank. (2021). *Learning Poverty Brief: Ghana*. https://www.worldbank.org/en/topic/education/brief/learning-poverty

World Bank. (2022). *Ghana: Improving educational equity and outcomes through GALOP*. https://www.worldbank.org/en/news/feature/2022/03/23/ghana-improving-educational-equity-through-galop

Zulkarnain, Salamah, Judijanto, L., Fahruddin, & Darsono. (2025). Curriculum-Level Innovation in History Education : Developing a Technology-Integrated and Contextually Adaptive Model for Senior High Schools in Indonesia. *Journal of Curriculum and Teaching*, *14*(3), 191–212. https://doi.org/10.5430/jct.v14n3p191

Banerjee, A., Banerji, R., Duflo, E., Glennerster, R., & Khemani, S. (2017). *From proof of concept to scalable policies: Lessons from the Teaching at the Right Level approach in India*. Journal of Economic Perspectives, 31(4), 73–102. https://doi.org/10.1257/jep.31.4.73