



LOCAL GAME-BASED ENGLISH LITERACY INSTRUCTION: EXPERIMENTAL EVIDENCE FROM TANZANIAN RURAL PRIMARY SCHOOLS

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Received: March 23, 2026

Accepted: August 14, 2026

Published: September 30, 2026

Suggested Citation:

Madata, W., Ndabakurane, J. J., & Biseko, J. M. (2026). Local game-based English literacy instruction: Experimental evidence from Tanzanian rural primary schools. *International Online Journal of Primary Education (IOJPE)*, 15(3), 197-218. <https://doi.org/10.55020/iojpe.1914504>



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Abstract

Literacy underachievement remains persistent in low- and middle-income countries, particularly in early-grade English as a Foreign Language instruction. While game-based learning has gained scholarly attention, existing research focuses heavily on digital games, with little is known about culturally grounded, non-digital alternatives. This study addressed this gap from a post-method perspective by advocating for context-sensitive pedagogies rooted in local practices. It examined the effectiveness of two Tanzanian local games: *rede* and *ruka kamba*, adapted for structured English literacy activities. Using a quasi-experimental pre-test–post-test design, pupils in the experimental group participated in game-based literacy instruction for five months, while the control group received traditional instruction. Implementation fidelity was assessed to evaluate the quality of the intervention and was found to be high (87.8%). Non-parametric employed in the analysis revealed significantly greater literacy improvements in the experimental groups. The study highlights the potential of culturally responsive pedagogies and offers a potentially replicable model for low-resource classrooms across sub-Saharan Africa.

Keywords: local games, game-based learning, English literacy, primary education, reading, writing

INTRODUCTION

Over the past two decades, global education systems have witnessed a substantial expansion in primary school enrolment (Sánchez et al., 2023). Despite this expansion, yet this progress masks a deeper crisis as millions of children, especially in low- and middle-income countries, complete schooling without acquiring basic literacy skills. This trend is evident in sub-Saharan Africa, where the proportion of primary school-age children enrolled rose from 61% in 2000 to 80% in 2020 (United Nations, 2023). Even with these notable gains in access to education, literacy outcomes remain alarmingly low worldwide. For instance, World Bank and UNESCO (2025) reports that hundreds of millions of children and adults still lack basic reading and writing skills. This indicates that access to schooling does not necessarily translate into literacy proficiency, particularly in English, which is often the language of instruction in many African countries.

In low-and middle-income countries, the literacy learning challenges has been remaining a defining feature of education systems. As reported by the World Bank (2025), approximately 70% of the 10-year-olds in these contexts cannot read and understand a simple age-appropriate text. The situation



is particularly critical in English, a condition commonly described as a *learning poverty*. In Africa, the rate reaches 89%, with country-level figures being even more alarming: 94% in Liberia, 87% in Malawi, and 86% in Zambia (World Bank, 2025). These figures underscore a systemic failure to ensure quality instruction, especially in Anglophone countries across the region where English serves as the medium of instruction. They suggest that the expansion of access to education has not been matched by corresponding improvements in instructional effectiveness.

This systemic failure is reflected across sub-Saharan Africa where the foundational literacy in English remains low in both reading and writing (Kanté, 2024). UNESCO, ADEA and African Union further reports that one in five children reaches the minimum proficiency level in reading by the end of primary school. This crisis is marked by a high prevalence of “non-readers.” For example, 51% of Grade 2 pupils in Ghana and up to 90% of Grade 3 pupils in northern Nigeria were reported to have received “zero scores” for English oral reading fluency (RTI International, 2015). Writing performance is another reported area with weaknesses in Sub-Saharan Africa. RTI International (2015) reports that one-third of adults in sub-Saharan Africa are unable to read or write in English. Furthermore, RTI reports that in Ghana, average writing composition scores were 37% for Grade 3 and 58% for Grade 5. These figures underscore a fundamental reality: improvements in English literacy depend not merely on school participation but critically on the quality and relevance of instruction.

In multilingual African education contexts, the dominance of English as a second or third language further complicates literacy acquisition. A clear example is Tanzania, where low English literacy presents a major challenge, especially among rural primary school pupils. This situation constrains progress and limits lifelong learning opportunities. Ngonyani et al. (2025) reveal that many learners face significant difficulties with reading comprehension, specifically in understanding main ideas, summarizing texts, and reading English passages fluently. National data show that only a small proportion of Standard 3 pupils in Tanzania can successfully read a Standard 2-level English story, with many failing to reach functional literacy even by the upper primary years (Uwezo, 2019). Contributing factors such as limited teacher proficiency in English, inadequate teaching resources, and persistent reliance on rote, teacher-centred methods (Taylor, 2024), are common across the country. Collectively, this evidence suggests that instructional delivery practices play a central role in shaping literacy outcomes rather than learner ability alone.

Post-Method and Foreign Language Teaching

The topic of methods and post-methods in English language teaching is widely debated globally, with researchers such as Paudel (2018) and Lusianov (2020) noting competing claims about the superiority of different methods. This contentious environment has prompted the emergence of post-method pedagogy, which emphasizes teacher autonomy in developing context-sensitive teaching approaches informed by their experienced and local context. Post-method pedagogy seeks to reconceptualize the theory-practice relationship in language education, highlighted by Lusianov's concept of “glocalization,” which reflects the blend of global English and localized practices. Kumaravadivelu (2003) outlines essential post-method principles: conducting needs analyses to assess students' needs, promoting cultural awareness to enhance sociocultural understanding, viewing learners as autonomous individuals, and encouraging learning through meaningful classroom activities rather than direct instruction. Implementing these principles is vital, especially in settings like rural primary schools in Tanzania, where attention to local contexts can strengthen language teaching and learning. Incorporating cultural values into language learning can foster motivation and a stronger sense of connection among students, making the learning experience more relevant and personalized.

Game-Based Learning and Local Games in English Language Instruction

Game-based learning (GBL) has gained recognition as a promising pedagogical approach for language instruction. A growing body of research has documented the effectiveness of digital tools such as Kahoot!, Duolingo, and Quizlet in improving vocabulary, motivation, and engagement in English as a Foreign Language (EFL) context (Alotaibi, 2024; Forsström et al., 2025). However, this



focus on digital technology may overlook the instructional realities of low-income settings, where digital resources are scarce and reliable internet access remains limited.

However, local games, with their deep historical and cultural roots, play important educational roles. They fulfil children's developmental needs, promoting mental, emotional, social, and moral growth by engaging them in expressive activities and encouraging direct social interaction (Palumbo et al., 2019). Educators incorporate these games into curricula to enhance skills such as language acquisition, motor coordination, and cooperation (Hussain & Cheong, 2022). In English language teaching, local games have emerged as an innovative alternative to traditional methods that often fail to engage learners (Kurnia, 2014). Grounded in cognitive development theory, they promote learning through participation and social interaction (Albertovna, 2025), while creating low-anxiety learning environments in which learners can practice language skills such as vocabulary and pronunciation. In resource-constrained contexts like Tanzania, local games are particularly valuable because they are accessible and inexpensive. They foster active participation, peer learning, and cultural relevance. Moreover, evidence from countries such as Indonesia and Turkey demonstrates that local games can improve vocabulary, speaking, and broader linguistic skills (Rusiana & Nuraeningsih, 2016; Kenanoğlu & Duran, 2021).

Theoretical Framework

This study was guided by Sociocultural Theory (SCT) developed by Vygotsky (1978), and the Game-Based Learning Instructional Model (GBLIM) developed by Vandercruysse and Elen (2017). The SCT views learning as a social and culturally mediated process. It emphasises interaction, language, collaboration, and scaffolding within the Zone of Proximal Development (ZPD) (Poehner & Lu, 2024). In this study, SCT explains how pupils developed their reading and writing skills through interaction with peers and teachers during local game-based activities. However, SCT offers limited guidance on how these processes can be systematically structured and implemented in an educational intervention.

GBLIM complements the SCT by providing a practical framework for organising game-based learning. This model comprises three elements namely the Game-Based Learning Environment (GBLE), the implementation context, and the learner. The GBLE provides space in which reading and writing activities take place. This element aligns with SCT, which explains that learning develops through social interaction and culturally meaningful activities. The implementation context refers to how games are used within the learning environment. Its contribution to this study lies in ensuring that games are not used randomly but are carefully planned and linked to specific learning goals. Through the implementation context, the researcher carefully planned how local games could be organised to support the development of English literacy skills. In addition to the GBLE and the implementation context, the learners is another important element of the model. This element considers the differences in pupils' abilities, confidence and prior knowledge that may influence learning. Each learner actively makes meaning through the game based on what they already know and how they engage with the activity. Prior knowledge also plays an important role in helping learners connect new information with what they already understand. Together the SCT and GBLIM are crucial to this study. SCT explains how learning occurs through social interaction, whereas GBLIM guides the systematic design and implementation of local games to enhance pupils' English reading and writing skills.

Research Gap

Despite the recognised benefits of game-based learning in English learning, significant gaps remain in the literature. First, existing empirical research has focused largely on digital games, while culturally relevant non-digital games remain comparatively underexplored (Herrero-Martín et al., 2025; Sancar-Tokmak & Bostancı, 2025; Vita-Barrull et al., 2024). Second, most research on non-digital game-based learning has been conducted outside Africa, particularly in European and Asian contexts. In Tanzania, research on local games has mainly addressed other learning areas; for example, Mtebe and Isingo (2024) developed local games to enhance primary pupils' numeracy skills, rather than



English literacy. Tanzanian studies on English reading have instead examined conventional interactive strategies such as group reading, collaborative discussion, and questioning (Ngonyani et al., 2025). Thus, empirical evidence on integrating culturally familiar local games such as rede and ruka kamba into English literacy instruction remains limited. Third, few studies have used the structured intervention designs to evaluate the effectiveness of local games across multiple literacy skills. To address these gaps, this study investigated how local games can enhance English literacy among Standard Three pupils in rural primary schools in Tanzania. Guided by SCT and GBLIM, the study sought to answer two research questions:

1. To what extent are structured local games-based intervention effective in developing overall literacy skills among Standard Three pupils in Tanzania?
2. How effective are local games in enhancing basic, intermediate, and advanced reading and writing skills?

This study makes several contributions. First, it provides empirical evidence on the extent to which well-structured local games-based instructional approaches can improve literacy outcomes. Furthermore, it provides evidence on whether local games can offer a cost-effective alternative to technology-dependent and culturally mismatched interventions in resource-constrained educational settings such as those in sub-Saharan Africa. Second, it offers teachers practical strategies for engaging learners through culturally meaningful classroom activities, potentially reducing reliance on rote instructional practices. Third, by documenting a replicable intervention model, the study provides insights that policymakers and educators across sub-Saharan Africa can adapt to support ongoing efforts to address the region's learning crisis. Finally, it responds directly to calls for contextually responsive pedagogies by demonstrating how local games can be systematically integrated into English instruction in ways that align with both curricular goals and learners' cultural experiences.

METHOD

The Design and Approach

This study formed part of a broader project grounded in Design-Based Research (DBR). The broader project aimed to explore how local games could be identified, pedagogically adapted, and iteratively refined to support the development of English literacy skills among primary school pupils. DBR was particularly suitable because it allows researchers to design and test educational innovations in authentic learning environments while simultaneously generating practical and theoretical insights into teaching and learning processes.

However, the present paper reports specifically on the intervention phase of the broader DBR project. To evaluate the effectiveness of the intervention, a quasi-experimental pre-test–post-test design was employed. The design involved two experimental groups and one control group. A quasi-experimental design was employed in this study because of its ability to allow the testing of instructional innovations under real classroom conditions (Creswell & Creswell, 2017; Hyman, 1982). Furthermore, this design allowed the researchers to examine changes in learning outcomes following an intervention while maintaining the natural classroom structure typically found in school settings.

In Tanzania, many primary school pupils experience difficulties in reading and writing English, particularly in rural areas where educational resources are often limited. However, conducting an intervention study across the entire country would have been time-consuming and financially demanding. Therefore, the study was conducted in Chamwino District located in Dodoma Region, Tanzania. Conducting the study in this district enabled close monitoring of the intervention and regular engagement with participating schools. Chamwino District was selected because the previous studies have documented significant literacy challenges among pupils in rural schools in the district (Ndijuye & Beatus, 2022). In addition, a preliminary literacy assessment conducted by the researchers prior to the intervention confirmed substantial difficulties in English reading and writing among Standard Three pupils in the district. The study focused specifically on rural wards to capture the realities of education



in remote learning environments. Three public primary schools, each located in a different ward, were purposively selected based on their relatively low performance in the preliminary literacy assessment.

The initial sampling frame comprised 2,201 registered Standard Three pupils in the selected public primary schools. From this population, a preliminary literacy assessment was conducted to establish baseline literacy proficiency levels. The required sample size for this preliminary assessment was determined using Cochran's sample size formula:

$$n = \frac{Z_{1-\alpha/2}^2 P(1-P)}{d^2}$$

Where $Z=1.96$ for a 95% confidence level, $p=.05$ (estimated population proportion), and $d=.05$ (margin of error) (Cochran, 1977). The formula yielded an initial sample size of 385 pupils.

However, due to practical constraints related to school organisation and the need to work with intact classes, the final achievable sample was adjusted to 328 pupils. These pupils were drawn from six participating schools, with one intact Standard Three class selected from each school. All 328 pupils participated in the preliminary literacy assessment conducted as part of the broader study. The 328 pupils therefore provided the baseline evidence used to inform the selection of participants for the subsequent intervention phase.

Following the preliminary assessment, a sub-sample was selected for the intervention phase. The selection was conducted purposively at the class level to maintain natural classroom settings and minimise disruption to school routines. Specifically, three intact classes ($n = 176$ pupils) were selected from the initial pool of 328 pupils based on comparable literacy performance as established during the preliminary assessment. This ensured that the groups included in the intervention were broadly comparable in baseline literacy proficiency.

The smaller intervention sample was considered appropriate because the intervention required sustained researcher engagement with classroom activities and systematic observation of pupils' participation in local game-based English instruction. The sample size was also constrained by the time available for implementing the intervention and the logistical demands of conducting the study across the participating schools. Thus, the reduction from 328 pupils in the preliminary assessment to 176 pupils in the intervention phase reflected a deliberate methodological and logistical decision rather than participant attrition.

The selected classes were then assigned to study conditions as follows: School A ($n = 59$) formed Experimental Group 1, School B ($n = 43$) formed Experimental Group 2, and School C ($n = 74$) served as the Control Group. The variation in group size was resulted from the differences in the number of eligible Standard Three pupils enrolled in each school. It was not caused by selective allocation or participant exclusion. The participants were drawn from different schools to minimise risk of contamination which could affect the findings. Such contamination could have occurred if the experimental and control groups had been selected from the same school. Overall, all subsequent statistical analyses evaluating the effects of the intervention reported in this study were based on the 176 pupils in the intervention sample.

The pupils' ages ranged from 8 to 11 years. At the time of the study, the pupils had received approximately six months of formal English instruction. They had already been introduced to several foundational literacy skills, including letter recognition and writing, basic word reading and writing, sentence construction, text reading accuracy, and reading comprehension. In addition to learning English, pupils were fluent in their local language Chigogo and had already developed reading and writing skills in Kiswahili, the national language used as the medium of instruction in most primary school subjects.

Intervention Process

The intervention was conducted over a 20-week period (120 minutes or 2 hours per week), during which pupils in experimental groups participated in structured English literacy activities embedded



within local games. This duration was determined based on the need for sufficient exposure to achieve meaningful literacy gains, as meta-analyses have identified intervention length as a significant moderating factor in student outcomes (Dai et al., 2025). Research suggests that moderate, sustained engagement, typically exceeding brief exposures but not extending beyond optimal thresholds, is preferable for foundational skill development (Lei et al., 2022). The 20-week timeframe provided sufficient cumulative exposure to support literacy development across multiple skill levels without disrupting regular instructional time.

Two experimental schools (School A and School B) received English literacy instruction integrated with adapted local games, while the control school (School C) continued receiving traditional English instruction without the use of local games. The two selected games were *rede* and *ruka kamba*, which were chosen from a wider set of local games because they were consistently identified by pupils as highly enjoyable and frequently played.

As part of the intervention design, two culturally familiar local games, *rede* and *ruka kamba*, were pedagogically adapted to integrate structured English language learning activities. These adaptations were intended to embed literacy instruction within authentic, play-based contexts while maintaining the core mechanics of the original games.

Rede is traditionally played with two players positioned outside the playing area who throw a ball towards players positioned within a defined playing area. The players inside the area attempt to dodge or catch the ball. In the present study, English language tasks were embedded within the game structure. This adaptation replaced the traditional end activity, in which players fill a bottle with sand, and ensured that gameplay was systematically linked to specific literacy learning objectives.

Similarly, *ruka kamba* involves two players swinging a rope while others attempt to jump continuously over the rotating rope. Players who fail to maintain the rhythm and are struck by the rope are typically eliminated from the round. In this study, elimination was re-conceptualised as a learning opportunity: pupils who were struck by the rope were required to complete specific English language tasks before rejoining the game. This adaptation allowed pupils to remain engaged in the activity while reinforcing targeted literacy skills.

The integration of English activities into both games was carefully structured to align with the study's instructional objectives, including letter recognition, word reading, and basic writing skills. All activities were standardised and administered consistently across sessions to ensure treatment fidelity. Teachers were provided with detailed guidelines on how and when to introduce the tasks during gameplay, and regular monitoring was conducted to ensure that the intervention was implemented as intended.

In this intervention, players who successfully caught and redirected the ball in *rede*, as well as those struck by the rope during *ruka kamba*, were required to complete specific English language activities (see Table 1). This approach ensured that participation in the games was directly and consistently linked to opportunities for literacy practice. These embedded activities were designed to target seven core literacy skills: Letter reading, read basic words, text oral reading accuracy, reading comprehension, letter writing accuracy, word writing accuracy, and text writing accuracy. By integrating literacy tasks into culturally familiar games, the intervention aimed to enhance pupil engagement while reinforcing foundational and higher- order literacy skills.

Table 1. Literacy activities embedded in Rede and Ruka Kamba games

Literacy component	<i>Rede</i> game activities	<i>Ruka kamba</i> game activities
Letter recognition	Pronounce, arrange, match, and write letters using wooden planks.	Identify, pronounce, spell, match, and write letters while playing <i>ruka kamba</i> game.

**Table 1 (Continued).** Literacy activities embedded in Rede and Ruka Kamba games

Literacy component	Rede game activities	Ruka kamba game activities
Word/vocabulary development	Form, spell, pronounce, match, and write simple words using wooden planks.	Read, spell, match, and write simple words during rope-skipping activities.
Sentence construction	Arrange words into meaningful sentences and practise reading and writing simple sentences.	Arrange scrambled words into sentences and practise reading and writing simple sentences during game play.
Reading comprehension	Match sentences with pictures, answer comprehension questions, and sequence simple stories.	Follow oral instructions, identify key ideas, arrange picture sequences, and answer comprehension questions.

Source: Researcher's construct (2026).

Procedures

To measure pupils' literacy development, the researchers developed an English Language Literacy Assessment Test, which was administered before (pre-test) and after (post-test) intervention. The assessment consisted of two components: reading literacy and writing literacy. The reading assessment included four tasks, namely, letter reading, read basic words, text oral reading accuracy, and reading comprehension, whereas, the writing assessment included three tasks: Letter writing accuracy, word writing accuracy, and text writing accuracy. Each task was scored on a scale of 0 to 100, allowing for comparisons across literacy domains.

The construction of the two assessment sets involved three phases: item creation, content validation, and piloting. Previous studies and assessment of English language literacy, including (USAID, 2014; Uwezo Tanzania, 2019), as well as several school examinations, were reviewed to guide item development (Downing & Haladyna, 2006). Furthermore, the Standard Three pupils' English textbook (TIE, 2023) was reviewed to inform the content selection. Content validity which evaluates whether a test adequately measures the intended content construct (Obilor & Miwari, 2022) was determined by a panel of six seasoned English teachers and two experts in applied linguistics. After incorporating feedback from teachers and experts feedback, the reading and writing assessments were piloted with 102 pupils aged 8 to 9 years in a different area outside the main study sample. This pilot investigation sought to assess the clarity and understandability of the assessment instructions, the time required to complete the assessment, and the consistency of test administration. The findings indicated that the assessment sets were sufficiently robust and appropriate for assessing the targeted literacy skills. The assessment instructions were clear and easy for the pupils to understand. Moreover, the assessment duration was considered appropriate, suggesting that the test batteries were balanced in length and allowed for comprehension assessment without causing excessive participant fatigue.

Two types of reliability were assessed: test-retest and internal consistency reliability. Test-retest reliability was evaluated one week after the initial test, with around 45% of participants (n=46) randomly selected for reassessment. The reliability of scores between the initial and subsequent testing was assessed using Pearson correlation coefficients, which ranged from .72 to .98 across different tasks, indicating acceptable to excellent stability over time. The analysis of internal consistency reliability for the reading and writing assessment sets yielded a Cronbach's alpha values of .873. As stated by George and Mallery (2024), this value falls within the range indicative of strong internal consistency among the items.

The assessments were administered under conditions tailored to the nature of each task. Reading tasks were conducted individually in a calm environment to minimise distractions and anxiety, allowing pupils to focus entirely on the task. The duration of these sessions ranged from 10 to 38 minutes, depending on individual pupils' skill levels. In contrast, writing tasks were carried out within the classroom, where all pupils completed them simultaneously under standardised conditions to ensure consistency. Each writing session was completed within a fixed duration of 45 minutes.



Test administration was led by three qualified research assistants, the experienced English teachers familiar with the pupils' context. Two English teachers were responsible for ensuring that the procedures were followed consistently and efficiently across all sessions in the two intervention schools. To promote fairness and reduce individual bias, the two English teachers who participated in the intervention jointly assessed the pupils' scripts with the researcher, enabling a reliable and consistent evaluation of pupils' performance. Moreover, the third research assistant was responsible for observing the intervention and recording data to assess implementation fidelity.

Fidelity of implementation was monitored throughout the intervention period to assess the extent to which the literacy programme was delivered as intended. Implementation fidelity refers to the degree to which an intervention is delivered in accordance with its planned procedures (Mori et al., 2025). An observation checklist was developed, comprising 78 key indicators across three core dimensions: adherence to the implementation guide, duration of sessions, and quality of delivery. During implementation, one researcher was assigned the role of assessing how teachers implemented the intervention process and recorded the fidelity data.

Data Analysis

All data were analysed quantitatively using Stata. Descriptive statistics, including means, standard deviations, medians, interquartile ranges, and minimum and maximum values, were first computed to provide an overview of pupils' literacy performance across the three groups at both pre-test and post-test stages.

To ensure that any observed changes in literacy outcomes could be reasonably attributed to the intervention, implementation fidelity was assessed before conducting the inferential analyses. A structured observation checklist comprising 78 indicators across three dimensions—adherence to the implementation guide, session duration, and quality of delivery—was used. Each indicator was scored as fully implemented (1), partially implemented (.5), or not implemented (0), and an overall fidelity percentage was calculated. This step helped establish the consistency and quality of intervention delivery across the participating schools.

Subsequently, preliminary analyses were conducted to examine the assumptions underlying the statistical analyses. Normality was assessed using the Shapiro–Wilk test, and homogeneity of variances was evaluated using Levene's test with the Brown–Forsythe correction. As most literacy variables violated these assumptions, non-parametric methods were used for the subsequent inferential analyses.

Guided by the research questions, the analysis proceeded in two stages. First, to determine the extent to which the intervention improved overall literacy performance and address the first research question, the Wilcoxon Signed-Rank Test was employed to compare pre-test and post-test scores within each group. This test was suitable for detecting within-group changes in paired, non-normally distributed data. Second, to examine the differences in literacy outcomes across groups and skill levels in addressing the second research question, the Kruskal–Wallis test was applied. Where statistically significant differences were observed, Bonferroni-adjusted pairwise comparisons were conducted to identify the specific groups accounting for the observed differences, while controlling for Type I error. To complement these analyses, effect sizes (ϵ^2) were calculated to determine the magnitude and practical significance of the observed differences.

RESULTS

Preliminary Analyses: Computation of Implementation of Fidelity

Before conducting the main statistical analyses, the fidelity of implementation was examined to determine the extent to which the intervention was delivered as intended. The purpose of this analysis was to ensure that any observed improvements in pupils' literacy outcomes could reasonably be attributed to the intervention rather than variations in its implementation. The fidelity score was calculated by dividing the weighted total implementation score by the total number of expected behaviours and multiplying the result by 100.



A total of 62 behaviours were fully implemented ($62 \times 1 = 62$), while 13 behaviours were partially implemented ($13 \times 0.5 = 6.5$), resulting in a weighted implementation score of 68.5. Given that the total number of expected behaviours was 78, the overall fidelity score was calculated as:

$$\text{Fidelity Score} = \left(\frac{68.5}{78} \right) \times 100 = 87.8\%.$$

This result indicates a high level of adherence to the planned intervention procedures, suggesting that the local game-based activities were implemented consistently across the intervention period.

Assumption Testing

Prior to addressing the main research questions, preliminary analyses were conducted to examine the distributional properties of the literacy data and determine whether the assumptions required for parametric statistical tests were satisfied. Normality of the literacy scores was assessed using the Shapiro–Wilk test, while homogeneity of variances across groups was examined using Levene’s test with the Brown–Forsythe correction.

As shown in appendices A to C, the results indicated that most literacy measures at both pre-test and post-test stages deviated significantly from normality across the three groups. At the pre-test stage, nearly all literacy variables showed significant departures from normality, with the exception of letter writing accuracy in Experimental Group 1. In addition, text writing accuracy in Experimental Group 2 exhibited zero variance at the pre-test stage, which precluded the calculation of a normality statistic for this variable.

Furthermore, at the post-test stage, the distributional properties improved slightly for some variables. For example, letter reading met the normality assumption across all three groups, while reading comprehension and letter writing accuracy in Experimental Group 2 approximated normality. However, the majority of literacy measures continued to violate the normality assumption, particularly text writing accuracy across all groups. The homogeneity of variances tests also revealed significant differences in variance across groups for most literacy variables at both testing points (see appendices B and C). Given the widespread violations of both normality and homogeneity assumptions, non-parametric statistical procedures were therefore used in the subsequent analyses.

Impact of Game-Based Intervention on Overall Literacy Outcomes

To address the first research question aimed at evaluating the effectiveness of the structured game-based intervention, several statistical analyses were conducted to assess both the magnitude and practical significance of changes in literacy performance. As shown in Table 2, the analyses compared the pupils’ pre-test and post-test performance within each group, provided graphical representation of the results, and calculated the effect sizes to evaluate the practical significance of the intervention.

Table 2. Performance across various components of English reading and writing skills before and after intervention

Variable	Type of Test	Control Group (CG)	Experimental Group 1 (Exp1)	Experimental Group 2 (Exp2)
Letter sounds	Pre	M = 37.30 (SD = 35.97)	M = 20.34 (SD = 25.86)	M = 21.63 (SD = 22.88)
	Post	M = 46.08 (SD = 27.59)	M = 60.68 (SD = 29.47)	M = 71.40 (SD = 20.99)
Read basic words	Pre	M = 20.81 (SD = 25.74)	M = 6.44 (SD = 16.37)	M = 25.12 (SD = 25.30)
	Post	M = 27.03 (SD = 20.12)	M = 40.00 (SD = 27.85)	M = 57.44 (SD = 28.46)
Text oral reading accuracy	Pre	M = 7.03 (SD = 10.43)	M = 1.02 (SD = 4.02)	M = 4.88 (SD = 13.69)
	Post	M = 8.51 (SD = 11.90)	M = 18.64 (SD = 21.45)	M = 39.53 (SD = 27.43)
Reading comprehension	Pre	M = 5.27 (SD = 6.02)	M = 1.02 (SD = 4.43)	M = 2.09 (SD = 4.12)
	Post	M = 17.43 (SD = 17.70)	M = 11.19 (SD = 18.53)	M = 30.58 (SD = 19.52)
Letter writing accuracy	Pre	M = 15.54 (SD = 19.94)	M = 1.36 (SD = 5.07)	M = 15.81 (SD = 20.84)
	Post	M = 49.46 (SD = 30.92)	M = 61.02 (SD = 35.07)	M = 64.65 (SD = 25.67)



Table 2 (Continued). Performance across various components of English reading and writing skills before and after intervention

Variable	Type of Test	Control Group (CG)	Experimental Group 1 (Exp1)	Experimental Group 2 (Exp2)
Word writing accuracy	Pre	M = 2.16 (SD = 6.03)	M = 1.02 (SD = 4.43)	M = 1.87 (SD = 6.99)
	Post	M = 3.78 (SD = 5.90)	M = 35.25 (SD = 30.86)	M = 25.58 (SD = 26.57)
Text writing accuracy	Pre	M = 0.41 (SD = 2.59)	M = 0.51 (SD = 2.89)	M = 0.00 (SD = 0.00)
	Post	M = 0.14 (SD = 1.16)	M = 21.69 (SD = 23.42)	M = 19.53 (SD = 19.99)

Source: Field data (2026).

Note: Exp 1 = Experimental Group 1, Exp 2 = Experimental Group 2. Values outside the parenthesis = Mean (M), values inside the parenthesis = Standard Deviation (SD). In Exp 1 and Exp 2 pupils' English instruction was integrated with local games *rede* and *ruka kamba*.

The findings in Table 2 demonstrated that the local games were highly effective. Pupils in the experimental groups showed significant improvements across all literacy domains. The largest gains were observed in advanced reading and writing skills. In contrast, the control group exhibited only limited progress. Specifically, at pre-test stage (see Table 2), pupils across all three groups demonstrated low levels of English literacy performance. In Experimental Group 1, the mean scores were low across all reading components. Pupils achieved a mean score of 20.34 in letter reading and 6.44 in read basic words. Higher-level skills showed even lower performance, with mean scores of 1.02 for both text oral reading accuracy and reading comprehension. The median score for both components was 0. For writing, the performance was limited with letter writing accuracy (M = 1.36) and text writing accuracy (M = .51). Additionally, Experimental Group 2 demonstrated higher scores in letter reading (M = 21.63) and read basic words (M = 25.12). Performance on the higher-level reading and writing tasks remained minimal, with median scores of 0 for text oral reading accuracy, reading comprehension, and text writing accuracy.

In the Control Group, pre-test scores were somewhat higher for letter reading (M = 37.30) and read basic words (M = 20.81). However, higher-order literacy skills remained weak, with text oral reading accuracy (M = 7.03) and text writing accuracy (M = .41). Despite of some variation across groups, the overall pre-test results suggest that pupils entered the intervention phase with broadly comparable literacy abilities, particularly in the more advanced reading and writing tasks.

Following the intervention, improvements were evident across most literacy domains in the experimental groups. In Experimental Group 1, letter reading increased from 20.34 at pre-test to 60.68 at post-test, while read basic words improved from 6.44 to 40.00. Similarly, Text Oral Reading Accuracy increased from 1.02 to 18.64, and letter writing accuracy rose from 1.36 to 61.02, with text writing accuracy reaching 21.69 at post-test.

Experimental Group 2 demonstrated a similar pattern of improvement. letter reading increased from 21.63 to 71.40, while read basic words rose from 25.12 to 57.44. Text oral reading accuracy improved markedly from 4.88 to 39.53, and reading comprehension increased from 2.09 to 30.58. Writing skills also improved, with letter writing accuracy rising from 15.81 to 64.65 and text writing accuracy increasing from 0 to 19.53.

In contrast, the Control Group showed smaller improvements. letter reading increased from 37.30 to 46.08, while read basic words rose from 20.81 to 27.03. Text oral reading accuracy increased only slightly from 7.03 to 8.51, and word writing accuracy improved marginally from 2.16 to 3.78, while text writing accuracy remained very low (.41 to .14). Generally, the descriptive results indicate that pupils who participated in the local games-based instruction suggested a greater improvement in both reading and writing literacy compared with those who received traditional instruction.

Pre-Post Changes in Literacy Skills Across Groups

To examine changes in literacy skills within each group, Wilcoxon signed-rank tests were conducted to compare pre-test and post-test scores for the seven literacy components as presented in Table 3.



Table 3. Pre–post changes in reading and writing literacy scores across groups based on Wilcoxon signed-rank tests

Literacy aspect	Exp 1 (n=59) Wilcoxon z	p	Exp 2 (n=43) Wilcoxon z	p	Control G (n=74) Wilcoxon z	p
Letter reading	5.51	< .001	5.46	< .001	2.82	.005
Read basic words	6.02	< .001	5.26	< .001	3.53	< .001
Text oral reading accuracy	5.81	< .001	5.33	< .001	1.18	.24
Reading comprehension	4.51	< .001	5.67	< .001	5.25	< .001
Letter writing accuracy	6.59	< .001	5.55	< .001	6.87	< .001
Word writing accuracy	6.18	< .001	4.97	< .001	2.73	.006
Text writing accuracy	5.71	< .001	5.5	< .001	-.59	.558

Source: Field data (2026)

Note: n = number of participants, p = p- value, Exp 1 = Experimental Group 1, Exp 2 = Experimental Group 2

As presented in Table 3, both experimental groups suggested statistically significant improvements across all literacy components ($z = 4.51$ – 6.59 , all $p < .001$). In Experimental Group 1, significant gains were observed in letter reading, read basic words, text oral reading accuracy, reading comprehension and all writing-related skills. Similarly, Experimental Group 2 demonstrated significant improvements across the same seven literacy domains, indicating consistent learning gains following the intervention.

In contrast, the control group showed significant improvements in only some literacy components, including letter reading, basic word reading, reading comprehension, letter writing accuracy, and word writing accuracy. However, no statistically significant improvements were observed in text oral reading accuracy or text writing accuracy among pupils in the control group. These results suggest that while some literacy development occurred in the control group, the improvements were relatively limited and did not extend to more complex literacy tasks such as continuous text reading and writing.

Regarding the visual comparison of reading performance, Figure 1 below presents the mean z-scores of reading skills across experimental and control groups. The analysis of the mean z -scores for reading skills was included to standardise the scores across reading components. By analysing the mean z-score facilitated a direct comparison of pupils' relative performance across different reading literacy domains.

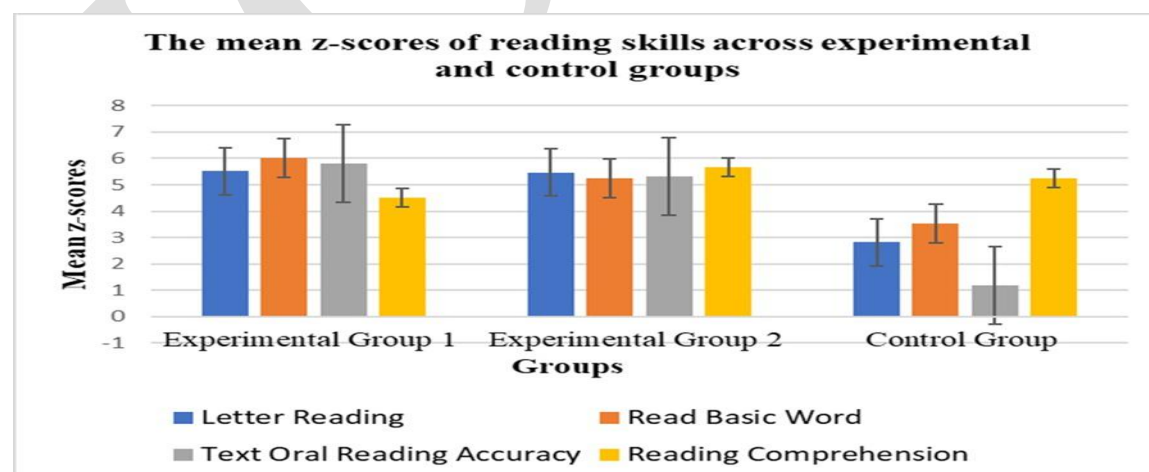


Figure 1. The mean z-scores of reading skills across experimental and control groups

Figure 1 illustrates the relative magnitude of improvements in reading-related literacy skills, including letter reading, read basic words, text oral reading accuracy, and reading comprehension. Both



experimental groups suggested substantially larger improvements compared with the control group, particularly in text oral reading accuracy and reading comprehension.

With regard to the visual comparison of the writing skills as shown in Figure 2, experimental groups shown larger improvements than the control group.

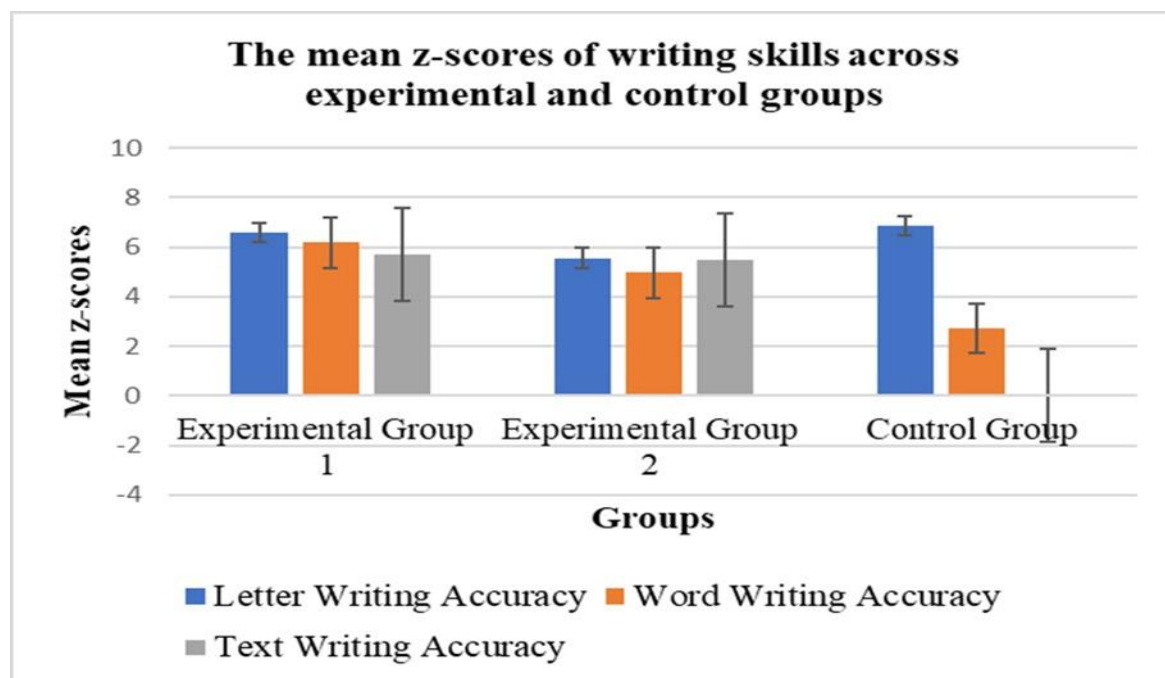


Figure 2. The mean z-scores of writing skills across experimental and control groups

Figure 2 presents the corresponding patterns for writing-related literacy skills, including letter writing accuracy, word writing accuracy, and text writing accuracy. Again, the experimental groups showed consistently larger improvements than the control group across all writing domains. These visual patterns are consistent with the statistical results, suggesting that the integration of local games into English instruction was associated with stronger literacy gains among pupils in the experimental groups.

Effect Sizes of Literacy Improvements

To assess the practical significance of the observed differences (see table 4 and Figure 3), effect sizes (ϵ^2) were calculated for the Kruskal–Wallis tests comparing the three groups. The results are presented in Table 3. At the pre-test stage, effect sizes were generally small or negligible, indicating that differences between the groups were relatively limited prior to the intervention.

However, at the post-test stage, larger effect sizes were observed across several literacy components, suggesting substantial improvements associated with the intervention. In particular the components that shown the large effect size include text oral reading accuracy ($\epsilon^2 = .25$), word writing accuracy ($\epsilon^2 = .34$), and text writing accuracy ($\epsilon^2 = .44$). These results indicate that the intervention had a strong impact on higher-order literacy skills involving connected-text reading and writing.

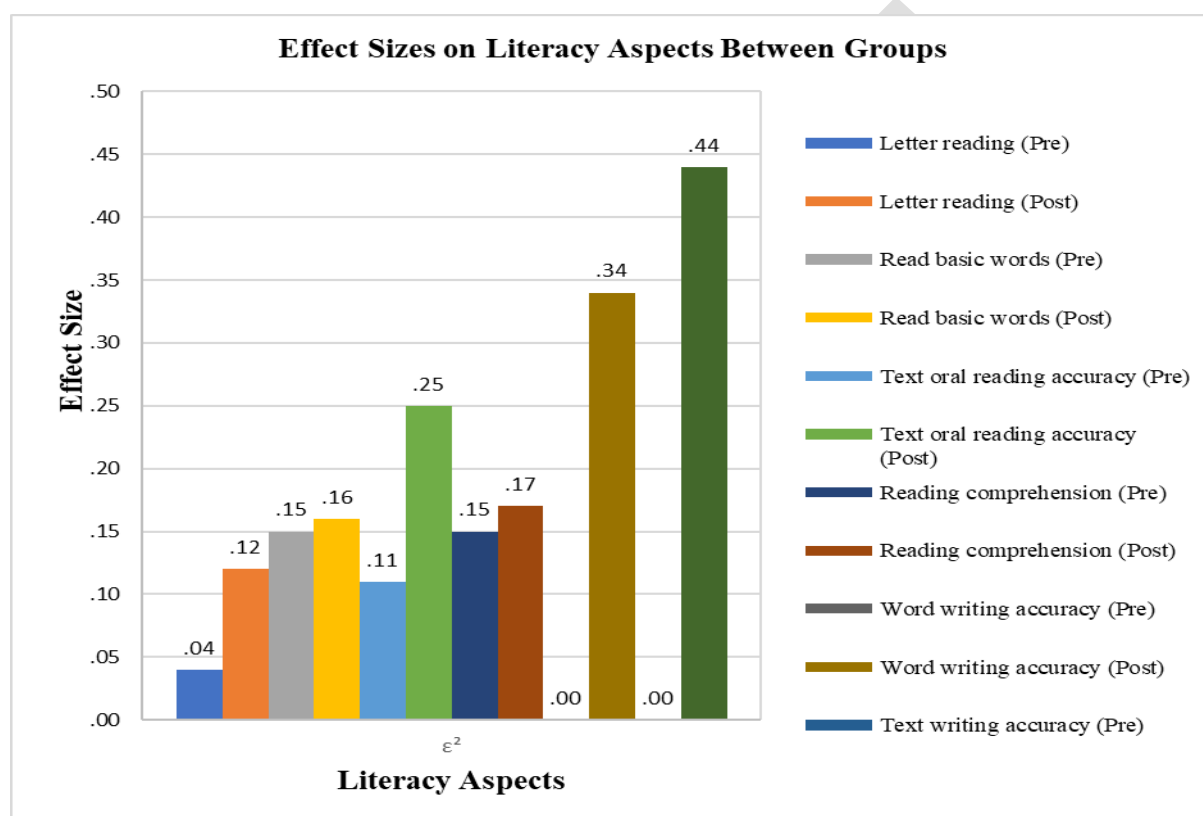
Table 4. Kruskal–Wallis test effect size results for literacy skills at pre-test and post-test

Literacy Aspect	Test	χ^2 (with ties)	ϵ^2	Magnitude
Letter reading	Pre	8.94	.04	Small
Letter reading	Post	22.77	.12	Medium
Read basic words	Pre	28.55	.15	Medium
Read basic words	Post	29.16	.16	Medium
Text oral reading accuracy	Pre	21.67	.11	Medium


Table 4 (Continued). Kruskal–Wallis test effect size results for literacy skills at pre-test and post-test

Literacy Aspect	Test	χ^2 (with ties)	ϵ^2	Magnitude
Text oral reading accuracy	Post	44.98	.25	Large
Reading comprehension	Pre	27.85	.15	Medium
Reading comprehension	Post	31.77	.17	Medium–Large
Word writing	Pre	1.92	.00	Negligible
Word writing	Post	60.60	.34	Large
Text writing	Pre	1.39	.00	Negligible
Text writing	Post	77.39	.44	Large

Source: Field data (2026).


Figure 3. Effect sizes of literacy aspects

Differential Effects of Local Games Across Literacy Skill Levels

This section addresses the second research question, which examined the effectiveness of local games in enhancing basic, intermediate, and advanced reading and writing skill levels. The analysis compared the outcomes of the two experimental groups, each of which integrated a different local game, with those of the control group at the pre-test and post-test stages. Kruskal–Wallis tests with Bonferroni-adjusted pairwise comparisons were conducted to compare Experimental Group 1 (Exp2), Experimental Group 2 (Exp2), and the control groups (see Table 5) at both pre-test and post-test across the seven literacy components.

At pre-test, the letter reading scores did not differ significantly across the three groups. Regarding post-test, both experimental Group 1 and Experimental Group 2 showed higher scores than the control group, indicating improvements on basic reading performance after intervention. Similar patterns were observed in basic word reading, where both experimental groups showed marked gains and clearly outperformed the control group following the intervention. At the text level, substantial improvements were also evident. In text oral reading accuracy, both experimental groups demonstrated notable enhancements in reading performance, further confirming the effectiveness of



local games in supporting more complex reading processes. Reading comprehension, a key indicator of higher-order literacy skills, showed significant gains as well, with Experimental Group 2 in particular displaying noticeable improvement in post-test results.

Table 5. Bonferroni post-hoc comparisons for literacy outcomes (n=176)

Variable	Type of Test	F (2, 173)	p-value	Significant Bonferroni Comparisons (Mean Rank Difference, 95% CI)
Letter reading	Pre	4.66	< .001	CG vs Exp1: 25.03 [4.63, 45.42]
	Post	12.93	< .001	CG vs Exp1: -26.17[-46.21, -6.13]; CG vs Exp2: -44.85 [-66.87, -22.83]
Read basic words	Pre	16.86	< .001	Exp2 vs Exp1: 46.67 [25.60, 67.74]; Exp3 vs Exp1: 34.60 [16.26, 52.94]
	Post	17.3	< .001	Exp2 vs Exp1: 30.49 [7.99,52.99]; CG vs Exp 2: -52.27 [-73.79, -30.75]
Text oral reading accuracy	Pre	12.22	< .001	CG vs Exp 1:30.61 [15.38, 45.83]; CG vs Exp 2: -63.47 [-83.30, -43.63]
	Post	29.92	< .001	Exp 2 vs Exp 1: 39.96 [19.22, 60.70]; CG vs Exp 2: -63.47 [-83.30, -43.63]
Reading comprehension	Pre	16.37	< .001	CG vs Exp 1: 35.47 [20.10, 50.84]; CG vs Exp 2: 23.81 [6.93, 40.70]
	Post	19.18	< .001	Exp 2 vs Exp 1: 56.46 [34.41, 78.50]; CG vs Exp 2: -34.00 [-55.08, -12.92]
Letter writing accuracy	Pre	21.59	< .001	Exp 2 vs Exp 1: 41.15 [21.98, 60.31]; CG vs Exp1: 41.68 [25.00, 58.36]
	Post	4.56	.012	CG vs Exp 1: -22.48 [-43.42, -1.54]
Word writing accuracy	Pre	0.96	.386	None
	Post	45.83	< .001	CG vs Exp 1: -62.62 [-79.41, -45.84]; CG vs Exp 2: -50.17 [-68.61, -31.73]
Text writing accuracy	Pre	0.69	.503	None
	Post	68.57	< .001	CG vs Exp 1: -58.24 [-72.59, -43.88]; CG vs Exp 2: -64.04 [-79.81, -48.27]

Note: Exp1 = Experimental Group 1, Exp 2= Experimental Group 2, CG = Control group.

Moreover, the positive effects of local games extended beyond the reading to writing skills. That is to say, letter writing accuracy also differed significantly across the groups at post-test, with both experimental groups outperforming the control group. This suggests that the intervention supported the development of foundational writing abilities. Although word writing accuracy showed no significant differences among groups at the pre-test stage, post-test results revealed higher scores among the experimental groups, reflecting gains observed following the intervention period. Similarly, text writing accuracy demonstrated impressive improvements, with both experimental groups significantly outperforming the control group in the post-test. Overall, the findings highlight the potential of local games to strengthen basic, intermediate, and advanced reading and writing skills. The results suggest that integrating local games into literacy instruction can create an engaging learning environment that supports broader literacy development among Standard Three pupils.

DISCUSSION, CONCLUSION, and RECOMMENDATIONS

This study investigated the English literacy performance of primary school pupils following a five-month intervention that integrated the Tanzanian local games into English instruction. Specifically, the games *rede* and *ruka kamba* were incorporated into structured English language activities aimed at supporting the development of pupils' reading and writing skills through play-based learning. The study addressed two research questions: (1) What is the effect of a structured intervention integrating *rede* and *ruka kamba* on the development of English literacy skills? and (2)



Does the effectiveness of local game-based instruction vary across different levels of literacy skill complexity?

In relation to the first research question, the findings indicated that pupils who participated in the local games-based intervention achieved better literacy outcomes than those who received traditional instruction. At pre-test, pupils in both experimental and control groups demonstrated low levels of literacy performance, particularly on more complex reading and writing tasks. At post-test, however, pupils in both experimental groups performed better than those in the control group across the assessed literacy components. These findings suggest that the structured integration of *rede* and *ruka kamba* into English instruction contributed to improved overall literacy performance.

The differences between pre-test and post-test performance may be related to the opportunities for active participation, repeated practice, and social interaction provided by the intervention. The literacy tasks embedded within the familiar local games, allowed pupils to practice English through structured and interactive activities rather than relying on conventional classroom exercises. These findings are consistent with previous studies showing that play-based and game-supported approaches can enhance learner engagement, motivation, and cognitive involvement in literacy learning, particularly among young learners and second-language learners (Kangas et al., 2023; Nicolopoulou et al., 2015; Plass et al., 2020). The use of familiar activities may also have supported pupils' participation by providing a familiar social and learning environment in which they could engage with English.

The fidelity of implementation further strengthens the interpretation of the intervention findings. The intervention achieved an implementation fidelity level of 87.8%, while classroom observations indicated that teachers implemented most of the prescribed instructional behaviours either fully or partially. This consistency suggests that the intervention was delivered largely as intended reducing the likelihood that substantial differences in instructional delivery accounted for the observed group differences (Kingsbery et al., 2025; Mori et al., 2025). Nevertheless, fidelity data alone cannot establish which individual features of the intervention produced the observed improvements. Possible mechanisms include repeated practice, peer interaction, learner engagement, movement, and collaborative language use. Further is needed to determine the relative contribution of these mechanisms to pupils' literacy development (Gee, 2003; Mayer, 2021).

The magnitude of the observed differences also provides important evidence in relation to the first objective. Pre-test effect sizes were negligible to small, whereas post-test analyses showed medium to large effects across the assessed literacy domains. Particularly strong effects were observed in text oral reading accuracy and reading comprehension. This pattern suggests that the intervention was associated with meaningful differences in literacy performance that extended beyond basic recognition skills. These findings are consistent with research suggesting that game-based learning can produce stronger learning outcomes when game activities are deliberately aligned with the specific instructional objectives (Mayer, 2021; Plass et al., 2020).

With regard to the second specific objective, the study examined the effectiveness of local games in enhancing basic, intermediate, and advanced reading and writing skills. The findings showed that the effects of the intervention differed across various literacy components. Improvements were observed in foundational skills, connected-text reading and writing, and higher-order skills such as reading comprehension and text writing. This variation suggests that the effectiveness of local games should not be assessed solely in terms of overall literacy performance but also in relation to the complexity of the specific literacy skills being targeted.

At the basic level, the intervention targeted skills such as letter-reading knowledge, read basic words, and letter writing accuracy. Pupils initially demonstrated weaknesses in these areas. The repeated practice provided through the games may have helped pupils consolidate their foundational literacy knowledge. Because the activities gave pupils repeated opportunities to respond and practice, they could strengthen basic literacy skills while participating in meaningful and interactive classroom activities. This finding is consistent with previous research showing that game-based learning can



provide opportunities for repeated practice while sustaining pupils' engagement in learning (Kangas et al., 2023; Plass et al., 2020).

At the intermediate level, the intervention involved skills requiring pupils to move beyond isolated letters and words towards connected language use. Text oral reading accuracy, for example, requires pupils to coordinate word recognition, decoding, fluency, and oral language processing. The relatively strong effects observed for this component may reflect the opportunities for repeated oral language practice created by the interactive nature of the games. Peer participation may have provided additional opportunities for pupils to hear and produce English during activities. Such opportunities are important in second-language contexts where exposure to English may be limited outside the classroom.

The findings for advanced literacy skills were particularly notable. The reading comprehension and text writing accuracy require pupils to integrate several linguistic and cognitive processes. Reading comprehension involves constructing meaning from connected text, whereas text writing requires pupils to generate, organize, and express ideas in written language. The experimental groups showed substantial improvement in these areas, with strong effects observed for reading comprehension and text writing accuracy. This pattern suggests that the intervention provided opportunities for pupils to engage with English beyond basic decoding and word-level recognition and to use language in more complex ways.

The stronger effects observed for some advanced skills contrast with meta-analytic findings reported by Kim et al. (2019), which showed larger effects for foundational literacy skills and smaller effects for reading comprehension and oral language outcomes. The difference may be partly explained by contextual and pedagogical factors. Many interventions examined by Kim et al. involved digital or skills-focused games, whereas the present study employed culturally familiar, non-digital games. *Rede* and *ruka kamba* incorporated social interaction, movement, repetition, and collaborative participation. These features may have created opportunities for extended language use, interaction, and meaning-making, which are relevant to the development of more complex literacy skills.

Differences between the two experimental groups across several literacy components provide further insight into the second objective. Although both games produced better outcomes than the control condition, their effects were not identical across all skills. This pattern suggests that game structure and the demands of the embedded literacy tasks may influence the type of learning it supports. The differences in movement, turn-taking, repetition, sequencing, and peer interaction may create different opportunities for practicing reading and writing processes. This interpretation is consistent with research emphasizing the importance of aligning game characteristics and instructional activities with specific learning objectives (Mayer, 2021; Plass et al., 2020).

The findings can also be interpreted through a sociocultural perspective. The cultural familiarity of *rede* and *ruka kamba* may have facilitated pupils' participation because pupils understood the basic activities and social associated with the games. This familiarity could have allowed pupils to devote greater attention to the English literacy tasks embedded within the activities. The games may also have functioned as culturally meaningful mediational tools that enabled pupils to interact with peers, receive assistance, and practice language collaboratively. Such processes are consistent with sociocultural perspective on learning, which emphasize participation, interaction, scaffolding, and culturally mediated activity (Rogoff, 2003).

The multidimensional assessment used in the study further clarifies the pattern of effects across literacy levels. The assessment distinguished between letter sounds, basic word reading, text oral reading accuracy, reading comprehension, letter writing accuracy, word writing accuracy, and text writing accuracy. Examining these components separately revealed that the magnitude of the intervention effects differed according to the specific literacy process being assessed. The stronger effects for some higher-order skills may reflect the greater opportunities the games provided for extended language use, social interaction, and meaning-making.



Taken together, the findings related to the second objective indicate that local games were associated with improvements across different levels of literacy complexity, although the magnitude of the effects varied across individual skills. The variation appears to be related not only to the level and nature of the literacy skills involved but also to the structure of the game and the linguistic and cognitive demands of the associated tasks. Thus, the findings support the need to examine local games in relation to the specific literacy skills they are intended to develop, rather than treating game-based instruction as a uniform intervention.

Contribution of the Research

The findings of this study provide empirical evidence that the structured integration of Tanzanian local games can improve English literacy outcomes among Standard Three pupils in rural public primary schools. In particular, the use of *rede* and *ruka kamba* was associated with improved literacy performance. The intervention was associated with statistically significant and educationally meaningful gains across the assessed literacy domains. Significantly, the strongest effects were not limited to foundational skills but also extended to more complex areas such as oral reading accuracy, reading comprehension, and text writing accuracy. This pattern suggests that culturally familiar games can provide opportunities for pupils to engage with English through repeated practice, social interaction, and meaningful language use in interactive learning contexts.

The findings also offer a broader perspective on educational innovation in resource-constrained educational settings. They show that local cultural practices need not be viewed as barriers to formal learning; instead, they can be drawn upon as meaningful resources for classroom instruction. Familiar play activities can be transformed into structured learning experiences that build on pupils' existing cultural knowledge while introducing new academic content. This asset-based perspective is consistent with sociocultural approaches to learning, which emphasize the role of social interaction, cultural tools, and learners' existing experiences in the development of knowledge and skills (Rogoff, 2003). The study therefore provides a contextually grounded contribution to the growing literature on game-based learning and early literacy development.

Limitations of the Research

This study has five limitations that should be considered when interpreting the findings. First, the study was conducted in a single district, Chamwino District, in Dodoma Region, Tanzania. The study population was drawn primarily from the Gogo community. Therefore, the findings may not be generalisable to other learning contexts with different sociocultural, linguistic, and educational characteristics. Any transfer of the findings to such contexts should therefore be made with caution. Second, the study focused on rural public primary schools and a specific sample of participants, which may limit the representativeness of the findings within Tanzania more broadly. Caution is therefore needed when extending the findings to urban schools or other educational settings. Moreover, the study involved only Standard Three pupils and English language teachers, limiting the applicability of the findings to other educational levels and groups of educational stakeholders.

The study was also limited by the duration and scope of the intervention. Because the study did not include a sufficiently long follow-up period, it was not possible to determine whether the observed gains were sustained over time. Furthermore, the study focused on reading and writing skills and did not assess listening or speaking. This limitation restricts the extent to which the findings can be interpreted as evidence of overall English language proficiency. Future research could address these limitations by using larger and more diverse samples, including participants from different educational levels and sociocultural contexts, extending the intervention period and follow-up, and examining all four English language skills.

Conclusions

In conclusion, this study demonstrates that integrating culturally familiar local games, particularly *rede* and *ruka kamba*, into English literacy instruction can support improved reading and writing outcomes among rural Tanzanian primary school learners. The results revealed marked and statistically significant gains in pupils' literacy performance, particularly in oral reading, reading



comprehension, and text writing, while the high implementation fidelity (87.8%) provides further support for the consistency of the intervention delivery. These gains indicate that local games can support the development of literacy skills beyond basic letter and word recognition. Generally, the findings suggest that non-digital game-based instruction offers a practical, low-cost, and contextually relevant approach to strengthening early English literacy in resource-constrained settings. However, further research involving more diverse sociocultural contexts and longer follow-up periods is needed to determine the broader applicability and long-term effects of this approach.

Recommendations

Based on the findings, teachers, education policymakers and curriculum developers should consider the integration of local games useful for developing English literacy skills, particularly in resource-constrained rural schools. Teachers should align the game activities with specific reading and writing skills. Moreover, the professional development and locally relevant instructional materials should also be strengthened to support effective implementation and adaptation of game-based activities. In addition, further research should be conducted to examine the local game-based English approach across diverse sociocultural contexts and over longer follow-up periods to determine the sustainability and broader applicability of the observed literacy gains.

Funding

No funding was received from any individual or institution for this research.

Ethics and Conflict of Interest

As the authors of this article, we have adhered to the ethical guidelines throughout the research process, and there are no conflicts of interest among us. The authors declare that this manuscript is original, has not been published or submitted elsewhere, and that all authors approved its final version. The research complied with ethical principles and there are no conflicts of interest among the authors.

Author Contribution

All authors contributed equally to the research. All authors read and approved of the final manuscript.

Data Availability

The data that support the findings of this study are available on request from the corresponding author.

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APPENDICES

Appendix A: Normality testing using Shapiro-Wilk test

Group	n	W	p-value	Interpretation
Exp1	59	.895	< .001	Violated
Exp2	43	.856	< .001	Violated
Control G	74	.944	.003	Violated
Exp1	59	.685	< .001	Violated
Exp2	43	.887	< .001	Violated
Control G	74	.864	< .001	Violated
Exp1	59	.639	< .001	Violated
Exp2	43	.628	< .001	Violated
Control G	74	.848	< .001	Violated
Exp1	59	.578	< .001	Violated
Exp2	43	.895	< .001	Violated
Control G	74	.928	< .001	Violated
Exp1	59	.999	1	Met
Exp2	43	.830	< .001	Violated
Control G	74	.863	< .001	Violated
Exp1	59	.510	< .001	Violated
Exp2	43	—	—	Zero variance
Control G	74	.501	< .001	Violated
Exp1	59	.652	< .001	Violated
Exp2	43	.569	< .001	Violated
Control G	74	.822	< .001	Violated
Exp1	59	.977	.316	Met
Exp2	43	.970	.322	Met
Control G	74	.984	.488	Met
Exp1	59	.923	.001	Violated
Exp2	43	.963	.178	Met
Control G	74	.960	.019	Violated
Exp1	59	.867	< .001	Violated
Exp2	43	.971	.345	Met
Control G	74	.873	< .001	Violated
Exp1	59	.753	< .001	Violated
Exp2	43	.952	.069	Met
Control G	74	.913	< .001	Violated
Exp1	59	.910	< .001	Violated
Exp2	43	.962	.167	Met
Control G	74	.938	< .001	Violated
Exp1	59	.928	< .001	Violated
Exp2	43	.866	< .001	Violated
Control G	74	.84	< .001	Violated
Exp1	59	.906	< .001	Violated
Exp2	43	.811	< .001	Violated
Control G	74	.514	< .001	Violated



Appendix B: Homogeneity testing for pre-test using levene's test with Brown Forsythe modification

Variable	Test Type	df1	df2	p-value	Homogeneity
	Levene's (Brown–Forsythe)	2	173	.001	No
LR Pre	Levene's (Brown–Forsythe)	2	173	< .001	No
RBW Pre	Levene's (Brown–Forsythe)	2	173	.003	No
TORA Pre	Levene's (Brown–Forsythe)	2	173	< .001	No
RC Pre	Levene's (Brown–Forsythe)	2	173	< .001	No
LWA Pre	Levene's (Brown–Forsythe)	2	173	.519	Yes
WWA Pre	Levene's (Brown–Forsythe)	2	173	.540	Yes
TWA Pre					

Note: LR=Letter reading, RBW=Read basic words, TORA = Text oral reading accuracy, RC = reading comprehension, LWA = Letter writing accuracy, WWA = Word writing accuracy, TWA = Text writing accuracy

Appendix C: Homogeneity testing for post-test using Levene's test with Brown Forsythe modification

Variable	Test Type	df1	df2	p-value	Homogeneity
	Levene's (Brown–Forsythe)	2	173	.013	No
LR_Post	Levene's (Brown–Forsythe)	2	173	.010	No
RBW_Post	Levene's (Brown–Forsythe)	2	173	< .001	No
TORA_Post	Levene's (Brown–Forsythe)	2	173	.346	Yes
RC_Post	Levene's (Brown–Forsythe)	2	173	.059	Yes
LWA_Post	Levene's (Brown–Forsythe)	2	173	< .001	No
WWA_Post	Levene's (Brown–Forsythe)	2	173	< .001	No
TWA_Post					