Game- Based And Traditional Learning Environments: Comparative Study Of Oral Reading Fluency And Comprehension In English Among Primary School Learners

Dr. Navdeep Kaur[1], Mrs. Maninderpal Kaur[2]

[1] Assistant Professor, Department of Education, Guru Nanak Dev. University, Amritsar
[2] SRF, Department of Education, Guru Nanak Dev. University, Amritsar

Abstract
The current investigation examines comparative effectiveness of game based instructional strategies and traditional classroom teaching in enhancing language skills of learners from rural and urban contexts. Contemporary research emphasizes that interactive and game-oriented learning environments can increase learner engagement, intrinsic motivation, and cognitive involvement, thereby supporting language development at the foundational level (Gee, 2007; Hamari et al., 2016). This research comes under domain of experimental design. 200 students of 3rd grade were chosen from Punjab School Education Board (PSEB) schools of Gurdaspur district, Punjab. Schools were chosen randomly for conduct of investigation. Students were divided at random as well as equally in groups: one group got instruction using traditional teaching techniques, and an experimental group that was exposed to education through methodically planned game-based learning activities. Standardized instruments were administered to accordance with established literacy assessment practices (Rasinski et al., 2017). Descriptive and inferential statistical procedures applied to analyse collected data. ANOVA (Analysis of Variance) used to investigate impact for instructional method and locale. It has been found that learners taught through game-based instruction demonstrated significantly higher scores of comparisons to those taught through traditional approaches. Although no significant main effect of locale was observed independently, a significant interaction effect between instructional method and locale was identified, indicating differential instructional impacts across rural and urban settings. Overall, the study provides strong empirical support for inclusion of innovative learning strategies for primary classrooms. The findings underscore important implications for curriculum development, pedagogical practices, and the promotion of equitable literacy outcomes across diverse educational contexts.
Keywords: Game-based learning; Oral Reading Fluency; Reading Comprehension; Primary School Learners

1. INTRODUCTION

Schools function as essential societal structures where children's academic achievement, social development, and personality formation are systematically cultivated, thereby contributing significantly to the development of future human resources (Ikegbusi et al., 2021). The quality and effectiveness of schooling are largely influenced by the learning environment, the nature of instructional practices, and the pedagogical approaches employed by teachers to meet learners' intellectual, emotional, and social requirements (Marsh & Larson, 2014). From an educational psychology perspective, effective learning is most likely to occur when instructional objectives, classroom conditions, learner motivation, and teaching strategies are cohesively integrated (Omolo et al., 2020). Learning extends beyond the passive reception of information and represents an ongoing, interactive process shaped through learners' engagement with their physical surroundings, social

interactions, and instructional experiences (Saavedra & Opfer, 2012). The learning environment includes both physical dimensions, such as classroom layout, lighting, seating, learning materials, and technological resources, as well as psychosocial components, including teacher support, peer collaboration, and learner involvement (Marsh & Larson, 2014). When these elements are effectively structured, they foster comfort, participation, and meaningful communication, leading to improved academic performance and heightened learner motivation (Ikegbusi et al., 2021).

Within primary language education, the classroom environment and instructional methodology is important for learners' language acquisition abilities (Rasinski, 2017). Fluency in oral reading - encompassing accuracy, speed, and expressive reading—is critical foundational skill that directly supports comprehension processes (Kuhn et al., 2010). Reading comprehension itself involves complex cognitive operations through which learners actively derive meaning by integrating textual information with prior knowledge and instructional guidance (Snow, 2002). Consequently, teaching approaches that promote active learner engagement are vital for strengthening early literacy development.

Conventional teaching practices, often characterized by teacher dominance and memorization-based instruction, have been criticized for limiting opportunities for learner interaction and engagement, particularly in language classrooms (Prince, 2004). By contrast, the learning with games integrates curricular content for objectives, feedback systems, incentives (Deterding, 2011; Gee, 2007). Previous studies reveals that game-based learning strategy could positively influence language-related outcomes, including vocabulary development, reading fluency, and comprehension, by sustaining learners' attention and encouraging active participation (Vygotsky, 1978). Such strategies beneficial for primary education, where children respond favorably to interactive, experiential, and play-oriented learning experiences (Nicholson, 2015). Additionally, contextual variables such as locale—specifically rural and urban settings—may affect learning outcomes due to disparities in educational resources, linguistic exposure, and instructional opportunities (OECD, 2019). Examining whether innovative instructional methods operate similarly across these contexts is essential for advancing educational equity and inclusivity.

By keeping in mind, the current investigation emphasized to compare influences of learning through games and conventional instructional environment on fluency and reading comprehension among primary school students from rural and urban backgrounds. By adopting an experimental research framework and employing rigorous statistical techniques, the study aims in provide substantive sources which enriches growing body for literature on game-based pedagogical approaches and its effectiveness across diverse educational environments.

(a) LEARNING ENVIRONMENT AND READING SKILLS

The learning environment affects students' learning performance, specifically for enhancement of literacy competencies (Ambrose, 2010; Ikegbusi, 2021). Within English language classrooms, the learning environment extends beyond the physical classroom arrangement to include instructional methods, the quality of teacher–student interactions, access to appropriate learning materials, and the psychological atmosphere that fosters learner engagement and motivation (Marsh & Larson, 2014). A growing body of research indicates that well-structured learning environments positively affect language learning by encouraging active involvement, focused attention, and meaningful engagement with instructional content (Omolo et al., 2020).

Classroom setting is crucial for growth of reading skills (Usman & Madudili, 2019). Supportive instructional contexts enable learners to interact with texts, practice oral reading skills, and develop comprehension strategies through structured guidance and constructive feedback (Rasinski et al., 2017). Empirical studies further suggest that learning

environments incorporating interactive and learner-centered approaches, which increases motivation, participation—both of which are essential for effective literacy development at the primary stage. The perspective relies on prior findings highlighting the educational potential of innovative learning environments (Hamari, 2016). Reading skills comprise a range of interconnected competencies that allow learners to decode written symbols, read with fluency, and derive meaning from text (Snow, 2002). These competencies include word recognition, reading fluency, vocabulary development, and the use of comprehension strategies, all of which operate collectively to support successful reading (Kuhn et al., 2010). Reading proficiency is not only a core academic requirement but also a crucial means of acquiring knowledge across subject areas; students with inadequate reading skills often face persistent challenges in achieving academic success (Oyetunde, 2002).

Enhancement for reading skills are of critical importance, as early success in literacy has been shown to be a reliable indicator of subsequent academic achievement. and long-term educational outcomes (Snow, 2002). Initial reading instruction therefore occupies a pivotal place in process of learning, shaping student's attitudes, motivation, self-confidence toward reading activities (Usman & Madudili, 2019). Teachers' understanding of reading development and their ability to implement suitable instructional strategies significantly influence learners' transition from initial reading skill development to reading as a means of knowledge acquisition (Rasinski et al., 2017). Instructional approaches such as actively involve learners—particularly game-based learning—have been shown to enhance reading fluency and comprehension by providing opportunities for repeated engagement and timely feedback and meaningful language use (Gee, 2007; Deterding et al., 2011). When such approaches are embedded within a supportive learning environment, they contribute to improved literacy outcomes among primary learners across varied educational contexts (Veldkamp et al., 2020).

COMPONENTS OF READING SKILLS

- Oral Reading Fluency: Oral reading fluency denotes a reader's capacity to read continuous text aloud with accuracy, appropriate pace, and expressive intonation. It reflects the automatic recognition of words and facilitates smooth and effective comprehension during reading.
- Reading Comprehension: This refers to the process through which readers derive meaning from written material by integrating word identification, background knowledge, and cognitive strategies, allowing them to understand, interpret, and draw inferences from text (Snow, 2002).
- Phonological Awareness: It defines an individual's capacity of recognize, analyze, manipulate the sound patterns of spoken language, including awareness of phonemes. This skill forms a critical foundation for early reading acquisition and decoding development (Gillon, 2018).
- Decoding (Letters, Words, and Non-words): Decoding is the ability to convert written symbols into their corresponding sounds and accurately read letters, familiar words, and unfamiliar or non-words, demonstrating knowledge of phonics and efficient word recognition skills (Ehri, 2014).

(b) GAME BASED LEARNING AND ORAL READING FLUENCY AND COMPREHENSION

It promotes the development of knowledge as well capacities with purposefully designed activities aligned with specific educational objectives (Grace, 2019; Adipat et al., 2021). Within educational settings, games are commonly described as activities governed by explicit rules that involve cognitive or physical challenges, fostering active learner participation and sustained engagement across the learning process (Webster, 2017). Owing to their interactive and motivating characteristics, games have increasingly been

incorporated into classroom instruction as a means of enriching educational achievement (Andrew, 2020).

A defining characteristic of learning through games is to involve cognitive, affective, behavioral, social domains simultaneously forms for engagement, all of which are crucial for successful language learning (Boyle et al., 2016). As many children are already familiar with gaming experiences outside school, classroom-based games are often perceived as enjoyable and relatable, which helps increase learners' motivation while reducing anxiety associated with academic tasks (Lee, 2020). This motivational benefit is particularly valuable in language classrooms, where learners frequently experience apprehension, fear of making mistakes, and low self-confidence during activities such as oral reading and comprehension exercises (Peterson, 2010). Reading represents a fundamental component of language learning and serves as a key determinant of educational success (Luciano, 2017; Snow, 2002). Oral reading fluency—characterized by accurate word recognition, appropriate reading speed, and expressive prosody—supports comprehension by reducing mental stress, permits them for concentration of meaning construction (Kuhn et al., 2010; Rasinski 2017). Comparatively, fluency and comprehension involve complex interaction of decoding abilities, vocabulary knowledge, inferential reasoning (Elleman & Oslund, 2019). Despite the central role of reading in academic development, instructional practices in many classrooms continue to rely predominantly on traditional approaches, including memorization, translation, and repetitive reading activities (Soysal, 2022). In a study, Klauda and Barber (2020) emphasized that successful oral reading fluency and understanding relies merely not on cognitive abilities, as well as of learners' motivation and engagement—elements that are frequently overlooked in conventional teaching methods.

Game-based learning presents a viable alternative by offering repeated exposure to reading tasks, immediate feedback, and meaningful communicative contexts (Gee, 2007; Hamari et al., 2016). Through interactive gameplay, learners often engage with reading activities indirectly while concentrating on problem-solving and goal completion, reflecting naturalistic language learning processes (Oxford & Gkonou, 2018). Furthermore, game-based environments help lower affective filters by fostering a low-stress atmosphere, thereby increasing learners' confidence and willingness to read aloud and comprehend texts (Lee, 2020). Game-based and gamified instructional approaches lead to significantly better reading fluency and comprehension outcomes than traditional instructional methods (Kapp et al., 2014; Veldkamp et al., 2020). By combining cognitive challenge with enjoyment, game-based learning encourages sustained practice, learner autonomy, and deeper text processing, making it especially effective for primary school learners acquiring foundational literacy skills.

c) Theoretical Framework of the Study

The current investigation has its roots in integrated theoretical framework that draws upon Constructivist Learning Theory, Sociocultural Theory, Flow Theory, and the Automaticity Theory of Reading to explain that it engages learners in interactive learning experiences. Consistent with Constructivist Learning Theory, this approach highlights that knowledge is actively constructed through purposeful participation and meaningful engagement, problem-solving rather than passive reception of information, a process effectively facilitated through game-based instructional activities (Piaget, 1972; Gee, 2007). Sociocultural Theory further explains that learning is socially mediated and occurs through interaction, dialogue, and scaffolding within students' proximal development, all of which are inherent features of collaborative game-based environments (Vygotsky, 1978). From a motivational perspective, Flow Theory posits that optimal learning is achieved when there is an appropriate equilibrium between task challenge and learner skill, leading to increased focus and sustained concentration as well as intrinsic motivation—conditions that are

naturally created through structured game mechanics such as goals, feedback, and progressive difficulty (Csikszentmihalyi, 1990). Finally, the Automaticity Theory of Reading posits that fluent reading develops when word recognition becomes automatic, freeing cognitive resources for comprehension; game-based reading activities promote repeated, enjoyable exposure to text, thereby strengthening decoding automaticity and supporting comprehension processes (LaBerge & Samuels, 1974). Collectively, these theoretical perspectives offer conceptual framework for explaining effectiveness of gamification in enhancing early reading skills.

2. REVIEW OF RELATED LITERATURE

Previous concerned studies constitute a critical component of empirical research, as it situates the present study within established theoretical, methodological, and empirical traditions. By systematically examining prior research, a literature review traces the evolution of scholarly knowledge in a given field, identifies methodological trends, and uncovers unresolved issues that warrant further investigation. Within educational research, an examination of prior studies allows to locate instructional strategies as well of recognize innovative pedagogical practices that contribute to improved learning outcomes. The present review critically synthesizes research for this instructional strategy, of specific influence to early literacy growth and progress.

a) GAME BASED LEARNING AND LITERACY INSTRUCTION

As an instructional approach, game-based learning blends curricular objectives with structured play, problem-solving, and competition. Drawing on constructivist and sociocultural perspectives, GBL emphasizes active learner participation, experiential engagement, and social interaction as essential mechanisms for knowledge construction (Gee, 2007). Games offer meaningful and authentic learning contexts that promote repeated practice, immediate feedback, and intrinsic motivation—conditions that are especially beneficial for fluency or comprehension.

Karadag (2015) conducted a mixed-method investigation to examine teachers views for inculcation of learning by games and activities at primary-level writing instruction or reading development. This investigation involved 189 participants and employed questionnaires and semi-structured interviews following a 12-week intervention. Findings indicated strong positive perceptions of GBL, with participants highlighting increased learner engagement, improved instructional quality, and more effective integration of literacy skills. The study concluded that game-based instructional strategies foster learner-centered environments that support early literacy development (Karadag, 2015). In a broader review, Ismaizam et al. (2016) analyzed research trends in game-based learning across multiple disciplines, focusing on instructional tools and learning outcomes. Their synthesis of 21 empirical studies demonstrated that GBL consistently enhances learner motivation, engagement, and knowledge retention. The authors noted that the effective integration of academic content with game mechanics facilitates deeper cognitive processing. These findings are particularly relevant to reading instruction, where sustained engagement and repeated interaction with texts are essential for improving reading fluency with comprehension (Ismaizam et al., 2016).

b) GAME BASED LEARNING AND FLUENCY IN READING WITH COMPREHENSION

Fluency and comprehension are multifaceted cognitive processes involving decoding accuracy, reading rate, vocabulary knowledge, and higher-order thinking skills. It has been observed from previous literature that game-based learning environments could positively

influence reading comprehension by enhancing learner motivation and providing contextualized reading experiences.

Liao et al. (2018) carried out an experimental investigation to assess its effect on primary students' engagement of game-based reading and writing environment in reading activities, performance, furthermore, interest as well. Findings revealed that learners in game-based environment achieved more gain scores, demonstrated greater participation in reading activities, and expressed increased interest in reading. The study also reported improvements in self-regulation and positive learner perceptions, indicating that GBL supports both cognitive and affective dimensions of reading development (Liao et al., 2018). Similarly, Namaghi, Moghaddam, and Elahe Rad (2024) investigated the influence of interactive game-based activities for Iranian students. Using an experimental design, this study compared traditional instructional methods with interactive approaches. The gains in reading comprehension for learners exposed to game-based activities. The researchers attributed these improvements to heightened engagement, sustained attention, and increased motivation fostered by interactive games (Namaghi, 2024).

Fluency functions as important aspect between word recognition and comprehension. Despite its importance, fluency has received relatively limited attention in game-based learning research. Benoit (2017) examined influences of curriculum related to games on vocabulary development among middle school English language learners. This study indicated greater levels for learner engagement. and motivation in game-based classrooms. The findings suggest that when combined with explicit instruction, game-based approaches may support vocabulary development, which indirectly affects oral reading (Benoit, 2017). Sabbagh, Ghany, and Amany (2023) indicated substantial improvements across language domains, with reading skills showing an 80% improvement following the implementation of gamified instruction. The authors attributed these gains to increased motivation, repeated exposure to reading materials, and meaningful interaction with texts embedded in game-based activities. Although conducted at the tertiary level, this investigation depicts advantages of gamified approaches to increase fluency, comprehension through structured and engaging practice (Sabbagh et al., 2023).

c) RATIONALE FOR THE PRESENT STUDY

A synthesis of the reviewed literature indicates that game-based learning positively influences learner motivation, engagement, and reading-related outcomes. Empirical evidence across diverse educational contexts consistently demonstrates that GBL enhances reading comprehension, participation, and interest in reading (Karadag, 2015; Liao et al., 2018; Namaghi et al., 2024). However, several significant research gaps persist.

First, in India, there are less evidence of empirical investigation, particularly at primary school level. Second, much of the existing literature focuses on digital game-based learning, with limited attention to classroom-based and low-tech game strategies that are more feasible in resource-constrained school settings. Third, the majority of studies target secondary or higher education learners, leaving early-grade learners underrepresented. New Education Policy (NEP, 2020) underscores the relevance of strengthening foundational literacy, numeracy skills, during pre-primary stage to improve long-term academic outcomes and reduce dropout rates (Government of India, 2020). In alignment with these national priorities, there is an urgent requirement for systematic investigation examining relevance for innovative techniques for improving primary school students' skills in India. This investigation seeks of complete research gaps through empirically analysed effects of game-based learning on early reading skills, thereby offering contributions to both theoretical understanding and practical implementation in early literacy education.

STATEMENT OF THE PROBLEM

Game- Based and Traditional Learning Environments: Comparative Study of Oral Reading Fluency and Comprehension in English among Primary School Learners

DELIMITATIONS OF THE STUDY

1. The study was delimited to the Gurdaspur city only.
2. The study was delimited to Urban and Rural schools of Gurdaspur city only.
3. The study was delimited to Primary School learners of 3rd grade only.
4. This study was confined to Oral Reading Fluency and Comprehension skill in English of 3rd grade only.

OBJECTIVES OF THE STUDY

1. To study the effect of Game- based and traditional learning environments on Oral Reading Fluency and Comprehension in English among 3rd grade students.
2. To study the Oral Reading Fluency and Comprehension skill in English of 3rd grade students taught through Game based learning with respect to locale.
3. To study the interaction between treatment and locale on the gain scores of Oral Reading Fluency and Comprehension in English among 3rd grade students.

HYPOTHESES OF THE STUDY

1. There exists no significant difference in the mean gain scores of Oral Reading Fluency and Comprehension in English among 3rd grade students taught through Game based and traditional learning environments.
2. There exists no significant difference in the mean gain scores of Oral Reading Fluency and Comprehension in English among 3rd grade students taught through Game based learning with respect to locale.
3. There exists no interaction between treatment and locale on the mean gain scores of Oral Reading Fluency and Comprehension in English among 3rd grade students.

3. METHODOLOGY

3. A) MEASURES

A reading skills assessment tool was specifically developed by the researcher to measure learners' fluency and comprehension in reading aligned with the 3rd class curriculum recommended by PSEB (Punjab School Education Board). The instrument was initially composed of 35 items, which were subsequently subjected to expert review to establish content relevance and clarity. Based on the feedback received during the validation process, the tool was finalized with a total of 20 items.

For the design of instructional games and classroom learning activities employed in the study, the researcher adapted guidelines from *Games-Based and Interactive Learning Activities for Early Years* developed by UNICEF in collaboration with Ministry of Education and Youth, 2016). This manual outlines a systematic framework for implementing game-based instructional practices aimed at strengthening foundational literacy skills and fostering interactive learning environments. The principles and strategies presented in the manual informed the selection, adaptation, and development of game-based activities integrated into the lesson plans for the present study.

i)DEVELOPMENT AND STANDARDIZATION OF ORAL READING FLUENCY AND COMPREHENSION TEST

After deciding the content and expert validation, a Reading Skills Test was systematically developed for assessing oral reading fluency and comprehension skill among 3rd grade learners. Preliminary version of the instrument comprised 35 multiple-choice items, which were constructed in accordance with the prescribed learning outcomes for Grade III English. The items were intended to assess essential reading sub-skills, including word recognition, sentence-level understanding, reading accuracy, and comprehension of brief passages.

The preliminary form of the test was implemented on a sample of 30 students of 3rd grade chosen among schools affiliated with Punjab School Education Board (PSEB) in the Gurdaspur district. Before the administration of the test, uniform instructions were clearly explained to the students to ensure consistency in test-taking conditions. Students' responses were scored using a predefined scoring scheme to maintain objectivity in evaluation.

Analysis of students' responses and initial item performance led to the identification of items that did not meet acceptable standards of clarity and difficulty level. As a result, five items were eliminated, and several others were revised to enhance their precision, suitability, and alignment with the cognitive abilities of primary learners. Following these modifications, the revised version of the Reading Skills Test consisted of 30 items, which were retained for further use in the study.

ii) ITEM ANALYSIS

The adequacy and effectiveness of any educational test depend largely on the quality of its constituent items (Garrett, 1981). To ensure scientific and objective selection of items, item analysis was carried out on the second draft of the test. For this purpose, the test was administered to a larger sample of 50 students of 3rd grade studying at Punjab School Education Board (PSEB) Gurdaspur. The total scores obtained by the students were arranged in descending order. In accordance with classical test theory, the upper 27% (high-scoring group) and lower 27% (low-scoring group) were identified for item analysis. The number of correct responses in the high group (R^H) and the low group (R^L) were calculated for each item. These values were employed to calculate the Discrimination Index (DI) and Item Difficulty Value (DV). The index of item difficulty represents the percentage of students who answered a particular item correctly. Items with lower difficulty values are considered more challenging, while those with higher values are regarded as easier. For instance, a DV of 0.25 signifies that only 25% of students responded correctly, while a DV of 0.90 implies that 90% of students answered the item correctly. The evaluation of difficulty values was guided by Ebel's criteria, which recommend retaining items of moderate difficulty for optimal measurement (Ebel & Frisbie, 1991). The discrimination index reflects an item's ability to differentiate between high and low achievers. According to Blood and Budd (1972), discrimination is the extent to which an item distinguishes superior performers from inferior ones. Ebel's (1991) classification standards were used to evaluate items based on their discrimination indices (see Table 1).

TABLE- 1 STANDARDS FOR DISCRIMINATING VALUE

Discriminating Value	Item Evaluation
≥ 0.40	Very good item
0.30-0.39	Reasonably good but subject to improvement
0.20-0.29 Marginal	Marginal items need improvement
≤ 0.19	Poor items, either rejected or modified

Items with negative or zero discrimination values were rejected irrespective of their difficulty level, as such items fail to contribute meaningfully to test validity. Based on the combined evaluation of difficulty values and discrimination indices, 20 items

demonstrating acceptable psychometric properties were retained for the final draft of the Reading Skills Test.

iii) RELIABILITY OF THE TEST

Reliability denotes the degree to which test results remain consistent and dependable over repeated administrations (Zeller & Carmines, 1980). It measures a construct with minimal error. In the present study, internal consistency reliability of the Reading Skills Test—encompassing oral reading fluency and comprehension—was established with Cronbach's alpha coefficient, accepted reliability measure in educational and psychological tests (Mohajan, 2017). The calculated Cronbach's alpha 0.88 demonstrates high degree of internal coherence, indicating that the test items are uniform and assess the same underlying construct. According to Nunnally and Bernstein (1994), reliability coefficients above 0.80 are considered highly satisfactory for research purposes. Thus, the test was found psychometrically reliable.

iv) VALIDITY OF THE TOOL

Validity refers to the extent to which a test effectively measures the construct it is intended to assess (Anastasi & Urbina, 1997). To establish face validity, the test items were examined by experts and teacher educators specializing in English language teaching and educational assessment, and their feedback was used to enhance lucidity, applicability, and conformity to the learning goals. Content validity ensured through a systematic review of the 3rd grade Punjab School Education Board English textbook along with supplementary instructional materials. Appropriate weightage was assigned to various content areas and reading sub-skills. Expert judgment further confirmed that the items adequately represented the domain of fluency in reading with comprehension.

For establish construct validity, test was designed in accordance with theoretical foundations of reading development and aligned with the learners' developmental level. The use of simple language, clear instructions, appropriate time limits, and a well-organized test format contributed to accurate measurement of the intended constructs. As reliability is a necessary condition for validity (Field, 2005), the high reliability coefficient further supports the validity of the test. Thus, through systematic procedures of expert validation, content alignment, empirical item analysis, and reliability estimation, the Reading Skills Test was established as a valid and reliable instrument for assessing oral reading fluency and comprehension among primary school learners.

3.b) SAMPLE AND SAMPLING DESIGN

Pre-test, post-test evaluations were used for the groups to this quantitative experimental research design. The sample consisted of 200 students, with 100 learners from rural schools and 100 from urban schools, randomly selected from four schools affiliated with the Punjab School Education Board (PSEB) in the Gurdaspur district. Participants were divided in two groups. Prior to intervention, formal approval was obtained from the respective school authorities. While the control group was instructed using conventional teaching techniques, the group under treatment was taught through games and activities. Learning outcomes were analysed on students' performance in assessments.

3.c) STATISTICAL ANALYSIS

Analysis involved means, S.D., t-tests, two-way ANOVA to determine treatment effects and interactions with respect to locale and parental education levels.

RESULTS & DISCUSSIONS

HYPOTHESIS – 1

"There exists no significant difference in the mean gain scores of Oral Reading Fluency and Comprehension in English among 3rd grade students taught through Game based learning and traditional learning method".

TABLE 1.1 SHOWING MEAN GAIN SCORE, SD, AND T- VALUE OF EXPERIMENTAL AND CONTROL GROUP WITH RESPECT TO ORAL READING FLUENCY AND COMPREHENSION IN ENGLISH

Group/Method	N	Mean	S.D.	df	t-test	M-W test	p-value	Remarks
Experimental Group	100	14.10	4.46	198	26.80	3454	< .001	Highly significant at 0.001 level
Control Group	100	3.24	1.76					

Highly significant at 0.001 level***

Table 1.1 presents a comparison of the mean gain scores of students exposed to two different instructional approaches: the Experimental Group, which was instructed using Game-Based Learning (GBL), and the Control Group, which received traditional classroom instruction. The findings reveal that learners in the Experimental Group (N = 100) demonstrated substantially greater improvement, obtaining a higher mean gain score (M = 14.10, SD = 4.46), whereas the Control Group (N = 100) recorded a considerably lower mean gain score (M = 3.24, SD = 1.76).

The results of the independent-samples t-test confirmed that the difference in mean gain scores between the two groups was statistically significant, $t(198) = 26.80$, $p < .001$. The extremely low p-value indicates a strong instructional effect in favor of the Experimental Group. These outcomes clearly indicate that the implementation of game-based learning was significantly more effective in enhancing students' oral reading fluency and reading comprehension than conventional teaching methods. Accordingly, the stated null hypothesis—*"There exists no significant difference in the mean gain scores of Oral Reading Fluency and Comprehension in English among 3rd grade students taught through Game-Based Learning and traditional Learning Method"*—is rejected. Overall, the results provide strong empirical support for the effectiveness of game-based learning as an instructional strategy for improving reading-related competencies among primary school learners.

HYPOTHESIS – 2

"There exists no significant difference in the mean gain scores of Oral Reading Fluency and Comprehension in English among 3rd grade students taught through Game based learning with respect to locale".

TABLE 1.2 SHOWING MEAN GAIN SCORE, SD, AND T- VALUE OF EXPERIMENTAL AND CONTROL GROUP OF ORAL READING FLUENCY AND COMPREHENSION IN ENGLISH WITH RESPECT TO LOCALE

Variable	Locale	N	Mean	SD	t-test	M-W test	p-value	Remarks
Oral Reading Fluency and Comprehension Skill	Rural	100	10.29	6.78	0.46	4862	> 0.05	Not Significant
	Urban	100	10.71	6.09				

Significant at 0.05 level**

Table 1.2 compares gain scores of 3rd-grade students receiving Game-Based Learning (GBL) instruction, according to their locale (rural versus urban). The results indicate that rural students (N = 100) gained M = 10.29 (SD = 6.78), whereas urban students (N = 100) attained more score, which was M = 10.71 (SD = 6.09).

Moreover, it can be analysed that rural and urban students' mean gain scores was not statistically significant, t(198) = 0.46, p > .05. Similarly, the Mann–Whitney U test yielded consistent results (U = 4862, p > .05), confirming that parametric and non-parametric analyses produced convergent findings. These results suggest that locale did not exert a significant influence on the gain scores among students exposed in game-based learning. Accordingly, null hypothesis explicit "There exists no significant difference in the mean gain scores of Oral Reading Fluency and Comprehension in English among 3rd grade students taught through Game-Based Learning with respect to locale" is accepted.

HYPOTHESIS – 3

"There exists no interaction between treatment and locale on the mean gain scores of Oral Reading Fluency and Comprehension in English among 3rd grade students"

TABLE 1.3 SHOWING SUMMARY TABLE OF TWO-WAY ANOVA OF TREATMENT AND LOCALE ON ORAL READING FLUENCY AND COMPREHENSION SKILL IN ENGLISH LANGUAGE

Sources of Variance	Sum of Squares	df	Mean Sum of Squares	F	Significance
Treatment (A)	18240.32	1	18240.32	704.43	.000
Locale (B)	112.84	1	112.84	654.660	.000
Locale * Treatment (AxB)	48.67	1	48.67	4.280	.002
Error	5076.44	196	25.89		
Total	23478.27	199			

To investigate whether an interaction effect existed between treatment type (Game-Based Learning vs. Conventional Teaching Method) and locale (Rural vs. Urban) on the mean gain scores in Reading Comprehension among 3rd-grade students, ANOVA was used. It indicated a statistically significant primary effect of instructional method, F (1, 196) = 704.43, $p < .001$, demonstrating that students who participated in Game-Based Learning showed markedly greater learning gains than those instructed through traditional teaching approaches. Furthermore, the results revealed a significant main effect of locale, F (1, 196) = 654.66, $p < .001$, indicating a meaningful difference in mean gain scores between learners from rural and urban settings.

Crucially, the analysis also showed interaction effect, which is significant statistically, between treatment and locale (A × B), F (1, 196) = 4.28, p = .002. This finding indicates that the effectiveness of the instructional method on Reading Comprehension varied depending on whether students were from rural or urban settings. Consequently, it states that "There exists no interaction between treatment and locale on the mean gain scores of Oral Reading Fluency and Comprehension in English among 3rd grade students" is rejected. The significant interaction suggests that both instructional methods on students' Comprehension achievement is moderated by learners' locale.

4. DISCUSSION OF FINDINGS

The present investigation provides compelling empirical evidence for advantages of learning through games increases students' achievement in English of 3rd class learners. The significantly higher mean gain scores achieved by students exposed to GBL, corroborate earlier research indicating these instructional techniques enhances engagement, motivation, and deeper cognitive processing during literacy learning (Gee, 2007; Hamari et al., 2016). The substantial t-value and highly significant p-level observed

in the study highlight the strong instructional advantage of GBL in developing foundational reading skills, which are critical at the primary level.

Furthermore, the absence of a statistically significant distinction between students of different contexts gain scores within GBL group suggests that game-based learning functions as an equitable instructional approach capable of minimizing contextual differences in outcomes. These results are parallel to previous studies reporting learner-centered and interactive pedagogies can reduce the achievement gap associated with socio-geographical factors (Prensky, 2011; Hwang et al., 2015). However, the significant interaction effect between treatment and locale observed in the two-way ANOVA indicates that the magnitude of GBL's effectiveness varied across rural and urban settings. This interaction suggests that while GBL benefits learners across contexts, its impact is moderated by environmental or infrastructural aspects, like availability of teaching-learning material, prior experience of digital tools, and classroom implementation fidelity (Clark et al., 2016; Connolly 2012). Collectively, the findings underscore pedagogical strength of GBL while highlighting the nuanced role of contextual variables in shaping learning outcomes.

5. EDUCATIONAL IMPLICATIONS

The study's results and conclusions have significant educational practice for primary-level literacy instruction. Educators should integrate structured, curriculum-aligned games into regular classroom practices to foster active participation and sustained learner motivation (Deterding et al., 2011). Given that GBL was effective across both rural and urban contexts, it may serve as a powerful tool for promoting inclusive and equitable learning opportunities in diverse school settings, particularly in regions where traditional instructional approaches have yielded limited gains.

Moreover, the significant interaction between instructional method and locale implies the need for context-sensitive implementation of game-based strategies. Teachers, curriculum designers, and policymakers should ensure that adequate training, technological support, and pedagogical scaffolding are provided, especially in rural schools, to maximize the instructional benefits of GBL (UNESCO, 2021; Kebritchi et al., 2017). At the policy level, the results advocate for the inclusion of game-based pedagogies in primary education frameworks and teacher education programs, emphasizing their role in strengthening early reading skills. Ultimately, the study reinforces the potential of GBL as a flexible and successful teaching method capable of transforming reading instruction and supporting foundational literacy development among primary school learners.

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