Interactive Game–Based Spelling Supplementary Materials

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Vocabulary plays a pivotal role in language acquisition, and students' enjoyment of the learning process significantly influences their achievement. Spelling, in particular, extends beyond rote memorization; it is a fundamental skill that underpins both reading and writing proficiency. Mensah et al. (2022) define spelling as the conventional method of representing spoken words in written form, applicable specifically to alphabetic systems. It involves identifying the letters of a word, segmenting them into distinct syllables, and subsequently recombining them to enable accurate reading and pronunciation.

Despite its importance, spelling continues to pose persistent challenges for English language learners. To address these difficulties effectively, teachers must first analyze the nature of their students' spelling errors. Research highlights that such errors may be interlingually influenced arising from the interference of the learner's first language or intralingually driven, resulting from the complexities of the target language itself (Changkakoti & Goswami, 2021).

The prevalence of spelling-related difficulties remains a pressing concern in contemporary classrooms. Apolog et al. (2017) note that many students struggle to write effectively because they cannot spell words correctly. This challenge, which transcends generations, has become increasingly consequential for academic performance. As Cox (2014) emphasizes, structured instruction in spelling is indispensable for enabling students to read with fluency and write with precision.

Within this context, games have emerged as a pedagogical tool that enhances classroom learning and supports the development of spelling and vocabulary. Beyond traditional drill-based exercises, language games stimulate active participation, sustain learner engagement, and encourage authentic communication. Their effectiveness lies in the timing of practice, the quality of the activities, and the extent to which they create meaningful opportunities for language use.

Game-Based and Manipulative Approaches to Teaching Spelling

Spelling refers to the accurate arrangement of letters to form words. It is a transcription skill that underpins writing fluency and provides a foundation for broader language proficiency. Mastery of spelling contributes to the development of speaking, listening, reading, and writing skills, thereby reinforcing multiple dimensions of literacy (Apolog et al., 2017). As Hook and Jones (2009) argue, spelling fosters fluency and automaticity, which in turn facilitate reading comprehension and written expression. Moreover, spelling strengthens the link between sounds and letters, enabling learners to decode and encode words effectively. The acquisition of high-frequency sight words further enhances students' ability to read and write with confidence and accuracy.

Spelling, or orthography, is widely recognized as a neurologically

demanding sub-skill of writing, requiring the integration of phonological knowledge, morphological awareness, and orthographic rule systems (Xuan, 2014). Addressing spelling difficulties therefore calls for innovative and engaging instructional approaches. One promising strategy is the use of spelling games. For instance, Mensah et al. (2022) found that incorporating spelling games into primary education significantly improved pupils' spelling performance. Similarly, Aprillia (2018) demonstrated the effectiveness of Spelling Bee activities in enhancing vocabulary mastery. Through classroom action research, the study showed that these activities encouraged students to share ideas, develop word knowledge, and overcome difficulties in consulting dictionaries ultimately meeting established success criteria for learning outcomes.

Evidence from early childhood contexts reinforces these findings. Nurhayati (2018), in a study of kindergarten learners, reported that limited spelling ability often stemmed from unengaging activities, difficulties in pronouncing and spelling English words, and low learner motivation. By integrating interactive tasks and assessing progress through classroom observations and pre- and post-tests, the intervention yielded measurable improvements in both spelling proficiency and learner motivation.

Different types of spelling games can be integrated into classroom instruction. Crossword puzzles, for example, not only reinforce vocabulary and spelling but also develop problem-solving and critical thinking skills. Paul (2003) identifies crossword puzzles as a popular pedagogical tool that relies on known vocabulary and visual cues, while Hornby (1974, as cited in Bambang, 2013) describes them as structured word grids that enhance both word recall and reading comprehension.

Further extending this approach, Qamariah and Wahyuni (2018) introduced manipulative learning strategies, grounded in constructivist

theory, in their work with third-grade EFL students. By engaging learners through hands-on and visually stimulating materials, the method encouraged exploration and inquiry. Apolog et al. (2017) highlight that manipulatives facilitate active discovery of concepts, while Rosli et al. (2015) emphasize their multisensory nature, which promotes communication, builds learner confidence, and deepens conceptual understanding.

Collectively, research demonstrates that interactive, game-based, and multisensory approaches to spelling instruction not only enhance accuracy but also increase learner motivation and engagement in language learning (Hazaymeh & Khasawneh, 2024; Lago-Ferreiro et al., 2025; Diaudin et al., 2024). These findings underscore the pedagogical value of integrating spelling games as part of a broader literacy development strategy that benefits both early learners and more advanced students.

Effectiveness of Interactive Game-Based Spelling Supplementary Materials for Grade 4 Learners: A Case Study

The purpose of this study is to investigate the effectiveness of game-based learning in enhancing spelling acquisition among Grade 4 learners. By fostering a more interactive and engaging classroom environment, the study seeks to support a learning process that is both effective and enjoyable. Specifically, it aims to determine the level of spelling acquisition of Grade 4 learners across different stages of instruction, assess their performance through pre- and post-tests, and calculate the mean gain in spelling acquisition between these assessments. The study also seeks to examine whether a statistically significant difference exists in spelling performance before and after the intervention. In addition, it evaluates the

acceptability of interactive, game-based spelling supplementary materials for Grade 4 learners, with particular attention to content, language, layout, and format.

Methodology

This study employed a Design-Based Research (DBR) approach, which integrates practical insights from instructional design with research-based evidence. By combining these two sources of knowledge, DBR allows design interventions to be iteratively improved while also contributing to both local and generalizable theory (Christensen & West, 2013). The study was conducted in an elementary school in the District of Batan, Division of Aklan, Philippines, and involved 19 Grade 4 learners.

To evaluate the supplementary learning material, a validation team was convened, consisting of district and school learning resource coordinators alongside English and research coordinators. To ensure content validity, the researcher developed an 80-item test questionnaire, which was reviewed by three subject matter experts. Reliability was established through a pilot test with 30 Grade 4 students from another school. Item analysis, conducted using the Discrimination Index and Difficulty Index in MS Excel, retained only items with values between 0.30 and 0.70. In addition, a 16-item questionnaire adapted from the Department of Education's Alternative Delivery Mode Learning Resource Standards was used to evaluate the material in terms of content, instructional quality, print, design, and layout.

Prior to data collection, formal approval was obtained from the Office of Planning and Research, along with an endorsement from the School Head. Communication letters were duly signed by the researcher, adviser, and the Dean of the Graduate School–MAEd Program. A consent

letter was subsequently distributed to participants, outlining the purpose of the study and requesting voluntary participation.

The development of the game-based spelling supplementary material followed the Successive Approximations Model (SAM), which progresses through three phases: preparation, iterative design, and iterative development (Allen, 2012). During the development stage, the researcher created interactive spelling games intended to strengthen learners' spelling proficiency. In the implementation stage, a pre-test was conducted to establish baseline performance, followed by a post-test to measure the effectiveness of the intervention. Data were encoded and analyzed using the Statistical Package for Social Sciences (SPSS). The final materials were subjected to evaluation by district and school learning resource coordinators, as well as English and research coordinators, to confirm their quality and instructional relevance.

Ethical standards were rigorously observed throughout the research process. Informed consent was obtained from all participants, who were assured of their voluntary participation and their right to withdraw without penalty. The study safeguarded participants' privacy, confidentiality, and cultural sensitivities, and all collected data were anonymized and treated as strictly confidential, unless disclosure was legally mandated.

Findings

Table 1 presents the level of spelling acquisition of grade 4 learners.

The results indicate that the overall mean score for the level of spelling acquisition among Grade 4 learners was classified as "Moderate," with a mean of 7.27 and a standard deviation of 5.09. This suggests that while learners demonstrate a basic level of proficiency in spelling, substantial scope for improvement remains. The moderate performance

reflects their ability to correctly spell a number of words; however, persistent inconsistencies and errors were observed. Such difficulties may hinder the development of written communication skills and, more broadly, limit progress in literacy acquisition.

Table 1
Level of spelling acquisition of Grade 4 students

Level	Mean Score	Description	SD
Correct Stage (Level 5)	5.89	Low	4.76
Transitional Stage (Level 4)	6.42	Moderate	6.02
Phonetic Stage (Level 3)	6.79	Moderate	4.93
Semi Phonetic Stage (Level 2)	7.74	Moderate	5.86
Pre-Communicative Stage (Level 1)	9.53	High	5.47
Over All Mean	**7.27**	**Moderate**	**5.09**

Note: 12.00-15.00 Very High; 9.00-11.99 High; 6.00-8.99 Moderate; 3.00-5.99 Low; 0.00-2.99 Very Low

These findings are consistent with the study of Nurhayati (2018), which identified several factors contributing to low spelling ability among young learners. First, uninteresting or insufficiently engaging learning activities often fail to capture students' attention and sustain their interest in English. Second, the inherent complexity of English orthography presents challenges for learners, particularly in mastering irregular spelling patterns. Third, low levels of learner motivation limit the sustained effort and practice required for improvement in spelling tasks. Collectively, these factors highlight the importance of adopting more interactive, engaging, and motivational approaches such as game-based learning to strengthen spelling acquisition and, in turn, improve overall literacy outcomes.

Table 2 presents the level of spelling acquisition of Grade 4 learners in the pre-test and post-test following the use of interactive, game-based learning materials.

Table 2

Level of spelling acquisition in pre-test and post-test

Level of Spelling Acquisition	Pre-Test			Post-Test		
	Mean	Description	SD	Description	Description	SD
Correct Stage (Level 4)	5.89	Low	4.76	13.21	Very High	2.42
Transitional Stage (Level 3)	6.42	Moderate	6.02	13.32	Very High	2.40
Phonetic Stage (Level 3)	6.79	Moderate	4.93	13.11	Very High	2.33
Semi-Phonetic Stage (Level 2)	7.74	Moderate	5.86	12.79	Very High	2.20
Over All Mean Score	**6.71**	**Moderate**	**5.21**	**13.11**	**Very High**	**2.25**

Note: 12.00-15.00 Very High; 9.00-11.99 High; 6.00-8.99 Moderate; 3.00-5.99 Low; 0.00-2.99 Very Low

The results reveal that the overall level of spelling acquisition skills was initially assessed as "Moderate" (M = 6.71, SD = 5.21). However, a marked improvement was observed following the integration of interactive, game-based learning materials, with learners' spelling acquisition abilities increasing to a "Very High" level (M = 13.11, SD = 2.25) in the post-test. These findings underscore the effectiveness of interactive, game-based resources in enhancing spelling proficiency and demonstrate their potential as a practical instructional strategy for improving literacy outcomes.

This result is consistent with the findings of Mensah et al. (2022), who administered pre-tests to assess pupils' baseline knowledge of spelling prior to an intervention involving a series of spelling games. Their study showed that such games enabled pupils to acquire new words more easily, leading to significant improvement in spelling performance in the post-test. Collectively, these findings affirm that game-based learning interventions can substantially strengthen spelling skills and contribute to greater learner engagement and success.

Table 3 presents the acceptability level of the developed interactive, game-based spelling supplementary materials, assessed in terms of content,

instructional quality, print features, and design and layout.

Table 3

Level of acceptability of the interactive game-based spelling supplementary material

Acceptability	Mean	Description	SD
Content	4.94	Very Highly Acceptable	0.08
Instructional Quality	4.79	Very Highly Acceptable	0.31
Prints	4.89	Very Highly Acceptable	0.27
Design and Layouts	4.83	Very Highly Acceptable	0.28
Over All	**4.86**	**Very Highly Acceptable**	**0.24**

Note: 4.51-5.00 Very Highly Acceptable; 3.51- 4.50 Highly Acceptable; 2.51-3.50 Acceptable; 1.51-2.50 Fairly Acceptable; 1.00-1.50 Barely Acceptable

Following evaluation by the validating team, the interactive game-based supplementary material was rated "very highly acceptable" (M = 4.86, SD = 0.24). This high level of acceptability was consistent across all dimensions assessed, including content (M = 4.94, SD = 0.08), instructional quality (M = 4.79, SD = 0.31), print features (M = 4.89, SD = 0.27), and design/layout (M = 4.83, SD = 0.28). The consistently strong ratings across these categories demonstrate that the material meets, and in some areas exceeds, the standards established by the Department of Education for instructional resources.

Table 4

Mean gain of the spelling acquisition in the pre and post-tests performance

Spelling Acquisition Test	Mean	Mean Gain
Pre-Test	6.71	6.39
Post Test	13.11	

The increase in spelling acquisition skills from a pre-test mean score of 6.71 to a post-test mean score of 13.11, yielding a mean gain of 6.39 may be attributed to the strategic design and implementation of the interactive, game-based learning material developed for this study.

Table 5

Significant difference in the pre and post-tests using the Wilcoxon-Signed Rank Test

Spelling Acquisition Test	Mean Rank	Z	p-value
Pre-Test Post Test	0 10	-3.824*	0.000

*p<0.05, significant@5% level of significance

Table 5 presents the results of the Wilcoxon Signed-Rank Test, which examined the difference in spelling performance of Grade 4 learners between the pre-test and post-test. The analysis revealed a statistically significant difference (Z = -3.824, p = 0.000), indicating marked improvement in spelling acquisition following the integration of the interactive, game-based supplementary material. These findings corroborate those of Javillo (2023), who likewise reported significant gains in learners' spelling performance, with higher post-test scores confirming the positive impact of targeted interventions on spelling proficiency.

Recommendation

The interactive game-based spelling supplementary material developed in this study yielded positive outcomes, demonstrating a substantial improvement in learners' spelling proficiency. Importantly, the resource aligns with the standards set by the Department of Education for effective instructional materials, confirming that game-based interventions can simultaneously meet educational quality benchmarks and function as an innovative strategy for enhancing literacy skills. Taken together, these results highlight the value of interactive learning tools as a meaningful contribution to ongoing efforts to strengthen student learning outcomes.

In light of these findings, it is recommended that Grade 4 learners be provided with increased opportunities to engage in game-based learning activities, particularly through peer collaboration and group-based tasks that

foster both social interaction and academic growth. Teachers are encouraged to integrate the developed game-based spelling supplementary material into the English curriculum and to allocate dedicated instructional time for its use. Furthermore, investments in the design and development of similar interactive learning resources for other grade levels and subject areas are strongly encouraged, building on the demonstrated effectiveness of this approach in improving spelling acquisition.

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