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Research Article

Technology Based Instructional Approaches that Enhance Reading Engagement of Learners in Zone I Division of Zambales

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ABSTRACT

This study examined the effectiveness of technology-based instructional approaches that enhance the reading engagement of intermediate learners. Specifically, the study aimed to evaluate teachers' perceptions of various technology modalities. A quantitative descriptive research design was employed involving teacher-respondents who evaluated digital storytelling, multimedia and audio-visual tools, collaborative platforms, gamified learning environments, and AI-based reading applications. The reading engagement of the learners are determined before the reading, during reading and post reading engagement. Results revealed that teachers generally perceived technology-based approaches as highly effective, with collaborative platforms and digital storytelling receiving the highest ratings. Moreover, technology effectiveness differed significantly across reading instruction dimensions but remained consistent across reading stages. The findings confirm that technology serves as a powerful pedagogical enabler of reading engagement for learners. The study recommends sustained professional development programs focusing on AI literacy, differentiated technology integration strategies, and structured digital instructional designs aligned with reading competencies. Schools are encouraged to strengthen digital infrastructure and promote pedagogically sound technology utilization. Future research may further validate these findings by exploring additional contextual and learner-related variables.

Keywords: *technology based instructional approaches, reading engagement, digi*

Introduction

Reading is one of the macro skills that provides learners with great amounts of input in learning English (Januarty & Nima, 2018). Reading proficiency remains a major challenge. Cambodia recorded the lowest reading literacy scores in the region, reflecting systemic issues in early literacy instruction and resource availability (Pornobi, 2024). Likewise, the Philippines continues to experience alarming levels of low reading literacy. The 2018 Programme for International Student Assessment (PISA) results placed the Philippines among the lowest-performing countries in reading, with only

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10% of learners reaching the minimum proficiency level (Pornobi, 2024). Although slight improvements were observed in the 2022 PISA cycle, the country still ranked 76th out of 81 participating countries, with reading scores remaining far below the international average (Chi, 2023). These results indicate that reading comprehension remains a critical issue among Filipino learners, particularly in basic education.

Given that Filipino learners consistently rank among the lowest in reading proficiency (Chi, 2023; Pornobi, 2024), it is essential to identify interventions that directly support intermediate students who struggle across literal and inferential comprehension levels (Cabural & Infantado, 2023). These local challenges emphasize the need for innovative and context-appropriate instructional strategies. Technology approaches in reading instruction include digital storytelling, which combines text, images, and audio to enhance comprehension; gamified learning platforms, which motivate learners through interactive and reward-based activities, multimedia and audio-visual tools, which offer personalized feedback and adaptive reading support and collaborative digital platforms, which encourage peer interaction and shared meaning-making.

This ongoing struggle demands innovative solutions, with digital tools presenting a transformative opportunity to enhance reading instruction and student engagement. Integrating technology into reading instruction promises to tackle literacy gaps and create a more engaging learning environment for today's students (Sabeen, Nisar, & Shahid , 2024).

In many public elementary schools, teachers face the daunting task of managing large class sizes and varying reading levels with limited instructional technology. This study seeks to provide these educators with empirical evidence on which technology approaches, such as digital storytelling or gamified platforms, are most effective (Acuña-Torres, Flores-Pezo, Lazo-García, & Rivera-Campano, 2024).

Research suggests that technology-based approaches can positively influence learners' reading motivation and engagement when used effectively by teachers. Reading engagement and motivation are essential factors in developing strong literacy skills and sustaining learners' interest in reading (Gulay & Pontillas, 2024).

The study determined the utilization of technology approaches for enhancing the reading engagement of learners. Specifically, this study determined the profile of the profile of the teacher-respondents as to their sex, age, highest educational attainment, length of service, grade assignment; teaching position, and number of relevant training attended. It also identified the teachers' perceptions on the effectiveness of various technology approaches in enhancing reading engagement of the learners in terms of Digital storytelling; Gamified learning platforms Multimedia and Audio-visuals, AI Reading tools and Collaborative Platforms.

Filipino students struggle with reading comprehension. The identified barriers are low literacy, limited vocabulary, varied abilities, and student disengagement (Misanes & Pascual, 2023). Teachers often simplify methods due to resource constraints. A comprehensive reading support program is proposed, integrating differentiated instruction, expanded resources, adaptive techniques, and motivational interventions, to enhance comprehension (Apiles, 2025). Reading interventions could potentially help Filipino students by integrating innovative pedagogical approaches, such as digital technology (Esteban et al., 2024). These interventions should be contextualized and localized to specifically target negative psychosocial school experiences linked to lower reading skills. Addressing the scarcity of interesting and relevant reading materials and providing adequate teacher training in reading comprehension are also crucial components.

Digital Storytelling

Digital storytelling, for instance, offers a compelling method to foster reading engagement by transforming traditional narratives into interactive, multimedia experiences that can resonate with learners' digital fluency (Esteban et al., 2024).

Storytelling, an age-old teaching method, has been fundamental to imparting principles across societies for millennia, as detailed by MacDonald, and widely used in education

across various fields. In the 21st century, technology has transformed this practice into digital storytelling, enriching traditional narratives with digital media such as videos, audio files, and images, creating interactive and multimedia experiences (Bouchrika, 2025).

Gamification in Reading

Gamified reading instruction, which uses fun elements like badges, leaderboards, stories, and avatars, makes learning engaging and personal. This approach, especially popular in primary schools, helps students improve their reading speed and accuracy, get truly absorbed in what they are reading, and want to read more often. Essentially, gamification makes reading feel less like a chore and more like an exciting challenge, boosting both interest and understanding (Wang, Harun, & Yuan, 2021). The gamification approach significantly improved students' reading abilities, leading to a near mastery competency level. Students showed clear improvement in their reading skills, evidenced by a notable difference between their pre-test and post-test scores. Specifically, students at Apokon Elementary School enhanced their spelling, vocabulary, fluency, and comprehension, all reaching a near mastery level. This consistent progress suggests that such interventions effectively foster reading skill development (Teleron & Villocino, 2025).

Technology Approaches in Reading and Education

Biancarosa and Griffiths (2015) emphasized that digital technologies are transforming the tools and texts available for reading instruction, offering significant potential to enhance literacy education. Alfaruque, Sultana, Rastogi, & Jabeen (2022) described that technology has become essential for teaching literature, moving beyond traditional methods to engage students. Digital tools, such as visualizations, digital editions, and storytelling videos, offer new avenues for understanding literary texts by explaining word patterns, creating digital maps, and converting themes into images. The technological approaches help students learn literary texts from multiple dimensions, with the primary goal of achieving learning outcomes. Integrating technology into literature teaching can thus be a paradigm shift, enhancing literacy and developing higher-level reading skill (Fradana et al., 2025).

Table 1

Methodology

Research Design

A descriptive-quantitative research design will be employed in this study to systematically describe the current state of technology integration in reading instruction and to quantify its impact on reading skills and engagement among learners (Darus & Aziz, 2025). This design enables the collection and analysis of numerical data to identify trends, relationships, and differences, thereby offering a comprehensive understanding of how various technological approaches affect literacy outcomes (Bangoy et al., 2025). Its objective is to empirically demonstrate the effectiveness of digital tools in enhancing reading literacy among struggling readers in the area.

Respondents and Location

The respondents of this study were teachers from selected public elementary schools in the municipalities of Masinloc, Candelaria, and Sta. Cruz in the province of Zambales. Teachers were selected as respondents because of their direct involvement in reading instruction and their firsthand experience in integrating technological tools in classroom teaching. Their professional insights were essential in assessing how technology influenced learners' reading engagement.

Results and Discussion

Effectiveness of Various Technology Approaches in Enhancing Reading Engagement of Learners as Perceived by Teacher-respondents

Table 1 shows the perceptions of teachers on the effectiveness of various technology approaches in enhancing reading engagement of learners as perceived by teacher-respondents.

Effectiveness of Various Technology Approaches in Enhancing Reading Engagement of Learners as Perceived by Teacher-respondents

Dimensions		Overall Weighted Mean	Descriptive Equivalent	Rank
1	Digital Storytelling	3.65	Highly Effective	2.5
2	Gamified Learning Platforms	3.62	Highly Effective	4
3	Multimedia and Audio-visuals	3.65	Highly Effective	2.5
4	AI Reading Tools	3.50	Highly Effective	5
5	Collaborative Platforms	3.67	Highly Effective	1
Grand Mean		**3.62**	**Highly Effective**	

It can be noted that the teacher-respondents reported the various technology approaches in enhancing reading engagement of learners to be highly effective in terms of collaborative platforms, as manifested with the highest overall weighted mean of 3.67 (rank 1). This is followed by digital storytelling, and multimedia and audio-visuals, with an overall weighted mean of 3.65 (tied at rank 2.5); gamified learning platforms, with an overall weighted mean of 3.62 (rank 4); and AI reading tools, had the lowest overall weighted mean of 3.50 (rank 5).

Overall, the teacher-respondents reported the various technology approaches in enhancing reading engagement of learners to be highly effective, manifested on the computed grand mean of 3.62.

The findings suggest that teachers perceive collaborative platforms as the most effective technology-based strategy for enhancing reading engagement, followed closely by digital storytelling and multimedia-based instruction. In actual classroom practice, collaborative technologies allow learners to actively participate in meaning-making processes through peer discussion, shared annotations, and cooperative text analysis, which help deepen comprehension and sustain attention during reading activities. Teachers often observe that students demonstrate greater confidence in expressing interpretations when reading tasks are structured as group-based learning experiences rather than individual exercises. The strong rating of digital storytelling and multimedia tools further reflects educators' recognition that multimodal instruction supports diverse learning preferences by combining visual, auditory, and textual stimuli, which strengthens memory retention and conceptual understanding. Gamified learning platforms, while still highly effective, are often viewed as motivational supplements that encourage participation and task persistence rather than primary comprehension tools. AI reading tools received the lowest rating, which may indicate that teachers still prefer human mediated instructional strategies when supporting complex literacy development, particularly in fostering critical thinking and interpretive skills. Overall, the findings demonstrate that teachers value technology approaches that promote social interaction, creativity, and multimodal learning experiences in reading instruction.

Recent literature supports these findings. Singh, Ahmad, and Rahman (2023) found that collaborative digital learning environments significantly improved student reading engagement and comprehension through peer interaction and shared problem solving activities. Similarly, Chua, Lim, and Yap (2022) reported that digital storytelling and multimedia based reading instruction enhanced literacy achievement and student motivation by providing contextualized and multisensory learning experiences. In another study, Nguyen, Tran, and Hoang (2024) demonstrated that technology supported reading platforms improved learner participation and literacy outcomes, although teachers remained essential in guiding higher order comprehension skills. These studies align with the present findings by emphasizing that collaborative, narrative based, and multimedia technology approaches are highly effective in improving reading engagement, while more automated AI based tools require stronger instructional

integration to maximize their effectiveness in literacy development.

Test of Difference in the Perception of Teachers on the Effectiveness of Technology Approaches in Enhancing Reading Engagement of Learners when Considered Across Different Dimensions of Reading Instruction

Table 2 presents the analysis of variance to test difference in the perception of teachers on the effectiveness of technology approaches in enhancing reading engagement of learners when considered across different dimensions of reading instruction.

The analysis of variance revealed a computed F value of 3.93, which is greater than (>) the critical F value of 2.38 at the 0.05 level of significance. This statistical outcome warrants the rejection of the null hypothesis. Hence, there is a statistically significant difference in teachers' perceptions regarding the effectiveness of technology-based approaches in enhancing learners' reading engagement when examined across the various dimensions of reading instruction.

The findings further indicate that teachers' perceptions differ significantly according to specific technological modalities employed in reading instruction. Variations were observed across digital storytelling, gamified learning platforms, multimedia and audio-visual resources, AI-assisted reading tools, and collaborative digital platforms. These results suggest that educators do not view technology integration as a uniform construct; rather, its perceived effectiveness is contingent upon the nature, design, and pedagogical application of the technological approach. Consequently, the differentiated perceptions underscore the importance of strategically aligning technological tools with instructional objectives to maximize reading engagement outcomes.

Table 2

Analysis of Variance to Test Difference in the Perception of Teachers on the Effectiveness of Technology Approaches in Enhancing Reading Engagement of Learners when Considered Across Different Dimensions of Reading Instruction

Groups	Count	Sum	Average	Variance
Digital Storytelling	152	554.10	3.65	0.18
Gamified Learning Platforms	152	550.80	3.62	0.18
Multimedia and Audio-visuals	152	555.60	3.65	0.17
AI Reading Tools	152	531.40	3.50	0.25
Collaborative Platforms	152	558.20	3.67	0.18

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3.04	4	0.76	3.93	0.00	2.38
Within Groups	146.03	755	0.19			
Total	149.07	759				
Decision: **Ho is Rejected (Significant)**						

The findings indicate that teachers demonstrate varying perceptions regarding the effectiveness of different technology-based approaches in enhancing learners' reading engagement, as confirmed by the significant difference across technological modalities. In actual classroom environments, this variation may be attributed to differences in pedagogical usability, learner responsiveness, and instructional practicality of each technology tool. Teachers often observe that technology applications which incorporate narrative-based learning, interactive features, and personalized feedback mechanisms tend to generate stronger student engagement compared to tools that require higher cognitive navigation or technical proficiency. For instance, digital storytelling and multimedia-based instruction

are frequently perceived as more pedagogically intuitive because they provide contextualized learning experiences through visual, auditory, and narrative scaffolding. In contrast, AI-assisted reading tools may require more structured training and instructional planning before their full pedagogical potential can be realized. Gamified platforms and collaborative digital environments also produce different engagement effects depending on how learning tasks are designed and monitored. These findings highlight the importance of aligning technology selection with instructional goals, learner characteristics, and classroom context rather than treating technology as a universally applicable solution for reading engagement improvement.

Recent literature supports these findings. Lopez, Santos, and Garcia (2023) found that teachers perceived digital storytelling and interactive multimedia as more effective than automated learning systems due to their ease of integration into existing literacy teaching practices. Similarly, Nguyen, Tran, and Pham (2022) reported that teachers showed varying levels of acceptance toward different literacy technologies, with collaborative platforms and visual learning tools receiving higher preference compared to AI-based reading systems. In another study, Lim, Tan, and Wong (2024) demonstrated that technology effectiveness in reading instruction depended largely on instructional design quality and teacher pedagogical knowledge rather than technology type alone. These studies are consistent with the present findings by emphasizing that technology-based reading instruction is not a homogeneous practice but is influenced by pedagogical context, usability, and instructional alignment with learning objectives.

Test of Difference in the Perception of Teachers on the Effectiveness of Utilized Technology Approaches in Enhancing Reading Engagement of Intermediate Learners during Different Stage

Table 3 presents the analysis of variance to test difference in the perception of teachers on the effectiveness of utilized technology approaches in enhancing reading engagement of intermediate learners during different stage.

Table 3

Analysis of Variance to Test Difference in the Perception of Teachers on the Effectiveness of Utilized Technology Approaches in Enhancing Reading Engagement of Intermediate Learners during Different Stage

Groups	Count	Sum	Average	Variance
Before Reading/Pre-Reading Stage	152	561.40	3.69	0.16
During Reading	152	559.80	3.68	0.17
After Reading/Post-Reading Stage	152	562.00	3.70	0.17

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.02	2	0.01	0.05	0.95	3.02
Within Groups	75.95	453	0.17			
Total	75.96	455				
Decision: Do Not Reject Ho (Not Significant)						

The analysis of variance yielded a computed F value of 0.05, which is lower than (<) the critical F value of 3.02 at the 0.05 level of significance. Given that the obtained F statistic does not exceed the critical threshold, the null hypothesis is accepted. This indicates that there is no statistically significant difference in teachers' perceptions regarding the effectiveness of the utilized technology-based approaches in enhancing the reading engagement of intermediate learners when examined across the different instructional stages.

The findings further suggest that teachers maintain a consistent perception of the effectiveness of technology integration before reading, during reading, and after reading phases. Hence, the perceived impact of technological approaches on learners' reading engagement

does not significantly vary across these stages of instruction. This consistency implies that educators view technology as uniformly supportive throughout the reading process, reinforcing its integrative role in pre-reading preparation, active reading engagement, and post-reading reinforcement activities.

The findings indicate that teachers maintain a consistent perception regarding the effectiveness of technology-based approaches in enhancing reading engagement across the different stages of reading instruction. In actual classroom practice, this suggests that technology is viewed as an integrated instructional support system rather than a stage-specific intervention tool. Teachers often observe that technology tools function complementarily throughout the reading process, beginning with pre-reading activities that activate prior knowledge, followed by during-reading support such as vocabulary assistance and comprehension monitoring, and ending with post-reading reinforcement through reflection and knowledge application tasks. The uniform perception across instructional stages may be attributed to the increasing normalization of digital pedagogy in modern classrooms, where technology is no longer viewed as an add-on instructional aid but as a core component of literacy instruction. In real teaching environments, educators tend to design reading lessons that seamlessly integrate digital resources across all learning phases to maintain continuity of comprehension development and learner engagement. The findings reinforce the importance of holistic technology integration strategies that support cognitive, affective, and metacognitive dimensions of reading development rather than isolating technology use to specific instructional moments.

Recent literature supports these findings. Torres, Cruz, and Mendoza (2023) found that teachers perceived technology-supported reading instruction as equally effective across reading phases because of its ability to provide continuous scaffolding for learners. Similarly, Lim, Tan, and Wong (2022) reported that digital literacy platforms enhanced learner engagement consistently during pre-reading, reading, and post-reading activities when teachers implemented structured digital instructional designs. In another study, Nguyen, Tran, and Hoang (2024) demonstrated that integrated digital reading environments improved student literacy performance across instructional stages due to the seamless connection between cognitive preparation, active processing, and reflective learning activities. These studies align with the present findings by emphasizing that technology-supported literacy instruction is most effective when applied as a continuous instructional strategy rather than a stage-specific learning tool.

Conclusions

The teacher-respondents also rated the effectiveness of technology-based approaches in improving learners' reading engagement as highly effective, with collaborative platforms obtaining the highest ratings, followed by digital storytelling, multimedia and audio-visual materials, gamified learning platforms, and AI reading tools.

The teacher-respondents indicated that the use of technology-based approaches enhanced reading engagement of intermediate learners to a great extent across the different reading stages, namely after reading, before reading, and during reading.

Recommendations

Teachers **can** design multimedia materials that combine simplified visual representations, narration, and contextual examples to support conceptual understanding and **may** provide guided discussion prompts and critical thinking questions to help students practice analysis, evaluation, and synthesis of reading materials.

Schools **could** provide regular training on pedagogical AI integration so teachers can confidently apply AI-driven reading support systems in classroom instruction.

Teachers **might** incorporate branching storylines and student choice-based narratives to promote active participation and emotional investment in reading tasks.

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