



## Developing English Spelling Skills through TGT Cooperative Learning with Wordwall for Grade 4 Students

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### APA Citation:

Sadudeeprasertsut, O., Chomchaiya, C., & Jitsupa, J. (2025). Developing English spelling skills through TGT cooperative learning with Wordwall for grade 4 students. *Journal of English Language and Linguistics*, 6(3), 352-367. <https://doi.org/10.62819/jel.2025.1278>

**Received:** July 22, 2025

**Revised:** November 10, 2025

**Accepted:** November 11, 2025

### Abstract

This study aimed to (1) examine the effectiveness of instructional intervention on grade 4 students' English spelling performance, (2) compare the efficacy of the Teams-Games-Tournament (TGT) technique integrated with the Wordwall application against conventional teaching methods, and (3) evaluate students' satisfaction with the TGT–Wordwall instructional model. The sample comprised 32 grade 4 students enrolled at La-orutis Demonstration School, Suan Dusit University. Participants were selected via cluster random sampling and allocated equally into experimental ( $n = 16$ ) and control ( $n = 16$ ) groups. Instructional materials included lesson plans incorporating the TGT framework alongside Wordwall-based activities, standardized pre- and post-intervention spelling assessments, and a student satisfaction questionnaire. The experimental group outperformed the control group after instruction, and the difference was statistically significant, with post-test scores surpassing those of the control group (pre-test scores for the experimental group:  $M = 7.94$ ,  $SD = 3.36$ ; control group:  $M = 8.00$ ,  $SD = 6.01$ ). Furthermore, satisfaction ratings for the TGT–Wordwall approach were exceptionally high ( $M = 4.73$ ,  $SD = 0.16$ ), indicating strong positive reception among participants.

**Keywords:** English spelling, cooperative learning, primary education, TGT, Wordwall

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## Introduction

In the era of globalization, English functions as a vital tool for international communication, cooperation, and access to information. As a global lingua franca, English plays a pivotal role in sectors such as education, business, tourism, and diplomacy. In Thailand, proficiency in English is increasingly viewed as a strategic asset for enhancing national competitiveness and responding to global economic integration (Graddol, 2006).

English language education is embedded in Thailand's Basic Education Core Curriculum, which emphasizes the development of listening, speaking, reading, and writing skills (Ministry of Education, 2018). Vocabulary supports all language skills, and national indicators show persistent challenges, while prior studies identify limited vocabulary and weak spelling as common difficulties. These deficiencies not only hinder communication but also undermine students' confidence and academic performance (Brown, 2021). Accurate spelling is critical for effective written communication, as errors can obscure meaning and reduce clarity.

To enhance vocabulary learning outcomes, educators have increasingly adopted interactive and game-based instructional strategies. Studies have demonstrated that such methods can significantly boost student motivation, engagement, and retention (Noksuan, 2004; Rueangkaesem, 2004). Among the digital tools supporting this pedagogical shift is Wordwall, an educational platform launched in 2006 that enables teachers to design customized learning games. With over 88 million activities developed in 43 languages as of 2024, Wordwall offers a dynamic, learner-centered environment that fosters active participation and supports vocabulary acquisition (Wordwall, 2024). Studies have shown that Wordwall supports vocabulary development, reduces language anxiety, and creates a dynamic and enjoyable learning environment (Wisetnan, 2022). When paired with collaborative teaching techniques, such as the Teams-Games-Tournament (TGT) model, these tools may yield even greater outcomes in spelling instruction.

Therefore, this study aims to investigate the effectiveness of integrating cooperative learning, specifically the TGT technique, with the Wordwall application to enhance English word spelling skills among grade 4 students. The findings are expected to inform innovative and practical approaches for English language instruction at the primary level.

Although previous studies have investigated English spelling and cooperative learning, few have specifically combined the TGT method with the Wordwall application for grade 4 students. This study addresses this critical gap by examining the effects of this combined approach on students' spelling skills. Grounded in constructivist learning theory, TGT facilitates collaborative knowledge construction, while Wordwall enhances gamified engagement, thereby motivating active student participation.

## **Literature Review**

### *1. Spelling and Writing Skills*

English spelling refers to the arrangement of letters in accordance with established linguistic rules and patterns. Accurate spelling plays a vital role in effective written communication, contributing to both clarity and meaning (Demme Learning, 2023). According to Cook (1997), spelling proficiency involves three core skills: visual memory, phoneme–grapheme correspondence, and rule application. Bear et al. (2008) further assert that consistent practice combined with phonics instruction supports long-term spelling retention and overall writing development.

In the Thai educational context, learners frequently struggle with English spelling due to significant phonological and orthographic differences between Thai and English. Yodkhan (2020) highlighted that Thai students encounter challenges such as unfamiliar vowel combinations and inconsistent spelling rules. Jaitrong (2022) states that consonant clusters and silent letters pose particular difficulties, often requiring structured, repetitive practice to master.

A range of instructional strategies has been proposed to address these challenges, including phonics-based teaching, the use of flashcards, and contextualized vocabulary practice. Bear et al. (2008) emphasize that combining explicit rule instruction with authentic usage can significantly improve spelling accuracy and learner confidence.

### *2. Cooperative Learning*

Cooperative learning is a student-centered instructional approach grounded in constructivist learning theory, particularly the work of Vygotsky (1978), which emphasizes the importance of social interaction in cognitive development. Johnson and Johnson (1999) identified five essential components of effective cooperative learning: positive interdependence, promotive interaction, individual accountability, interpersonal skills, and group processing. These elements foster not only academic achievement but also critical soft skills such as empathy, communication, and teamwork.

One widely used cooperative learning strategy is the Teams-Games-Tournament (TGT) model, developed by Slavin (1995). This approach integrates small-group collaboration with academic competition, typically through game-based activities. TGT has been shown to increase student engagement, motivation, and achievement by creating a dynamic and inclusive classroom atmosphere. In Thailand, Mayom and Witchayapakon (2023) demonstrate that integrating TGT with instructional modules significantly improved Grade 4 students' English spelling abilities and increased learning satisfaction. Similarly, Natheakkarapath (2020) reports that the TGT technique enhanced academic performance and motivation among secondary school students through a fun and interactive learning process. These findings suggest that TGT supports both cognitive and affective domains of learning, making it a suitable strategy for diverse educational settings.

### *3. The Use of Wordwall in Language Instruction*

Wordwall is a digital platform designed to support interactive, game-based learning. It enables educators to create customized content through templates such as matching games, quizzes, word searches, and sentence rearrangement activities. These formats promote active learning, increase student motivation, and facilitate retention of key concepts (Wordwall, 2024).

Wordwall supports both online and offline instructional modes, enabling educators to monitor learning outcomes in real time. Empirical evidence has demonstrated its efficacy in enhancing vocabulary acquisition and writing accuracy. For instance, Wisetnan (2022) reports that the platform significantly increased student engagement while reducing language learning anxiety. Further findings by Chandra, Kun and Jureynolds (2024) highlighted its positive influence on the development of all four English language skills, with pronounced benefits in primary education contexts. Similarly, Zamzam (2024) observes notable improvements in students' vocabulary use and sentence construction following Wordwall-based instruction. By delivering immediate feedback and facilitating individualized learning pathways, the platform fosters self-directed learning and effectively reinforces core linguistic structures within a dynamic and learner-centered environment. In the Thai context, Jira et al. (2022) investigated the integration of online learning with gamification among undergraduate students. Their study revealed a high level of satisfaction with gamified learning ( $M = 3.84$ ,  $SD = 0.72$ ), suggesting that the use of gamification-based tools such as Wordwall can enhance motivation and engagement in both online and blended learning environments.

### *4. Synthesis and Research Gap*

Taken together, prior research indicates that spelling instruction benefits from structured practice, contextual learning, and student-centered strategies. Cooperative learning, particularly the TGT model, has been shown to enhance engagement and academic outcomes, while Wordwall provides an effective digital tool to support interactive and personalized instruction. However, although numerous studies have examined the individual benefits of TGT or Wordwall, limited research has explored the combined application of these two approaches specifically for English spelling development among Thai primary students. Addressing this gap, the present study investigates the effects of integrating the TGT technique with the Wordwall application on the spelling performance and learning satisfaction of grade 4 learners.

In this context, cooperative learning using the TGT technique combined with the Wordwall application represents an especially effective approach for promoting English spelling skills. The TGT technique fosters motivation and provides opportunities for practice through team-based competition, while Wordwall supports interactive learning and reinforces understanding of vocabulary and spelling patterns. Together, these approaches enhance students' knowledge, skills, and positive attitudes toward learning English and can be flexibly applied in various ways within elementary English classrooms.

## Research Objectives

This study investigated the development of English spelling skills using the Teams-Games-Tournament (TGT) cooperative learning technique combined with the Wordwall application for grade 4 students. The study was guided by the following three main objectives formulated to direct the research process:

1. To compare the English spelling writing skills of grade 4 students before and after instruction following the implementation of English spelling writing skill development using the Teams-Games-Tournaments (TGT) cooperative learning technique integrated with the Wordwall application.
2. To compare the English spelling writing skills of grade 4 students taught using the Teams-Games-Tournaments (TGT) cooperative learning technique integrated with the Wordwall application versus those taught through conventional teaching methods;
3. To examine the students' satisfaction after participating in cooperative learning instruction using the Teams-Games-Tournaments (TGT) technique combined with the Wordwall application.

## Hypotheses of the Study

1. The use of cooperative learning through the Teams-Games-Tournament (TGT) technique combined with the Wordwall application will improve students' English spelling skills more than before instruction.
2. Students who receive instruction using the TGT technique combined with the Wordwall application can significantly improve their English spelling retention compared to students in the control group.
3. Students' engagement in spelling activities will increase after instruction using the TGT technique combined with the Wordwall application.
4. Students' satisfaction with instruction using the TGT technique and Wordwall will be high and will positively influence their motivation in learning spelling.

## Methodology

This section presents the study design, data collection methods, statistical analysis procedures, and the validity and reliability of the research instruments used in this study.

### *1. Research Design*

This research is a quasi-experimental study using a non-equivalent control group pretest/posttest design. Clusters were defined as pre-existing classes, and cluster random sampling was used to assign classes to the experimental and control groups. Pretests and posttests were administered to measure English spelling performance, and a survey was conducted to assess learners' satisfaction after instruction using the TGT technique combined with Wordwall.

## *2. Population and Samples*

The population for this study consisted of primary school students from a school in Thailand. The sample included 32 Grade 4 students, divided into an experimental group (16 students) and a control group (16 students). Data were analyzed using descriptive statistics and independent samples t-tests to compare the groups. Parental consent, student assent, and institutional approval were obtained to ensure ethical compliance. The instructional intervention focused on the use of the Teams-Games-Tournament (TGT) technique combined with the Wordwall application to develop English spelling skills. Procedural details regarding class divisions and scheduling were minimized to emphasize the instructional innovation. Limitations of the study include the small sample size and non-randomized selection of participants, which may affect the generalizability of the findings.

## *3. Instrument(s) and Procedures*

The instructional process comprised three main stages, integrating the Teams-Games-Tournament (TGT) cooperative learning technique with the Wordwall application. Students were divided into teams to complete spelling-related tasks following the TGT model, engaging in competition and earning points. The Wordwall application served as an interactive digital tool that encouraged participation and enhanced learning motivation and achievement. An English spelling achievement test was developed to assess students' performance before and after the implementation of the instructional program. The researcher reviewed relevant theories and principles to construct a 40-item test composed of four types of items: (1) arranging scrambled letters to form correctly spelled words, (2) completing words with missing letters, (3) choosing the correct spelling from multiple-choice options, and (4) filling in blanks with appropriate words. Each correct response was scored as one point, yielding a total score of 20 points for the final version. The initial 40 items were reviewed by three experts for content validity and revised based on their recommendations. From forty drafted items, twenty were retained after item difficulty (p) and discrimination (r) analyses, and the final twenty-item test showed a reliability coefficient of .95 using the Kuder-Richardson Formula 20 (KR-20) to make the process transparent. The pilot test was conducted with 28 students from another branch of the same school, within the same curriculum and grade level, to verify item clarity and test reliability.

A post-instruction satisfaction questionnaire was also developed to assess students' attitudes toward cooperative learning using the TGT technique integrated with the Wordwall application. The questionnaire consisted of 18 items on a five-point Likert scale (very high to very low) and was divided into four aspects: content and instruction (5 items), perceived benefits (4 items), learning environment (4 items), and instructional media (5 items). Section two included open-ended questions that invited additional comments or suggestions. The questionnaire was reviewed by three experts for content validity and refined accordingly. The reliability analysis produced a Cronbach's alpha of .94, and item-total correlations ranged from .41 to .78, confirming strong internal consistency. Open-ended responses indicated that students enjoyed the lessons, appreciated the integration of technology, and felt motivated by learning through games. To minimize social desirability bias, all questionnaires were

completed anonymously, and students were informed that their responses would not affect their grades. At the conclusion of the experiment, all 16 students in the experimental group completed the questionnaire, resulting in a 100% response rate.

#### *4. Data Collection*

This study employed a Non-Equivalent Control Group Pre-test Post-test Design (Srisa-ard, 2000, p. 131) to investigate the effectiveness of the Teams-Games-Tournament (TGT) cooperative learning technique integrated with the Wordwall application on students' English spelling proficiency. Data collection with the sample groups was conducted from July to September 2024, and the process was systematically organized into three main phases:

**Phase I: Preparatory Stage** In the preparatory stage, the researcher conducted a comprehensive review of foundational knowledge regarding the development of English spelling skills through the Teams-Games-Tournament (TGT) cooperative learning technique integrated with the Wordwall application. Detailed lesson plans were developed for 10 instructional sessions, each lasting 50 minutes, totaling 40 instructional hours. Each session followed a structured sequence of activities, including pre-test administration, vocabulary discussion, reading and spelling practice, card-based exercises, team-based Wordwall games (Anagram, Hangman, Spelling, and Wordsearch), and post-test administration. Although the Wordwall platform does not follow a fixed version, it is continuously updated online with new features. To ensure fidelity of implementation, the researcher, with six years of teaching experience, monitored all sessions using checklists embedded in the lesson plans and systematic observation, evaluating adherence to the TGT structure, proper use of Wordwall, team organization, and scoring procedures.

**Phase II: Pre-Test Administration** During this phase, students in both the experimental ( $n = 16$ ) and control ( $n = 16$ ) groups completed a 20-item pre-test to assess baseline English spelling proficiency. The groups were pre-assigned according to existing classroom arrangements using Cluster Sampling, as the school had two classes of equal size (16 students each) that could not be reassigned. The pre-test items were identical to those of the post-test; however, practice effects were minimized because each of the four Wordwall games employed distinct vocabulary categories with non-repeating words.

**Phase III: Instruction, Posttest, and Satisfaction Survey** During the instructional phase, students engaged in the 10-session plan described above, with fidelity monitored continuously. Upon completion of the instructional period, students completed the 20-item post-test, identical to the pre-test, to evaluate improvements in spelling proficiency. The experimental group also completed an 18-item satisfaction questionnaire assessing content and instruction, perceived benefits, learning environment, and instructional media, along with open-ended questions for qualitative feedback. All questionnaires were completed anonymously, and students were informed that responses would not affect their grades. Data from pre- and post-tests were analyzed statistically to compare learning achievement, while descriptive statistics summarized satisfaction results. Open-ended responses indicated that students enjoyed the lessons, appreciated the integration of technology, and were motivated by the game-based activities.

### 5. Data Analysis

This study employed descriptive statistical methods, including the calculation of mean, standard deviation, and independent samples t-tests, to analyze the differences in English spelling achievement between two experimental groups. Data obtained from the pre-test and post-test, as well as from the post-instruction learner satisfaction questionnaire regarding the development of English spelling skills through the cooperative learning technique Teams-Games-Tournament (TGT) integrated with the Wordwall application, were analyzed using the SPSS program. These analyses were conducted to fulfill the research objectives and comprehensively address the research questions.

## Results

The results of the data analysis were presented according to the following procedures: (1) to compare the English spelling skills of Grade 4 students before and after instruction using the cooperative learning technique Teams-Games-Tournament (TGT) integrated with the Wordwall application; (2) to compare the English spelling skills of Grade 4 students taught through the TGT cooperative learning technique combined with the Wordwall application versus those taught through conventional methods; and (3) to examine students' satisfaction following instruction using the TGT cooperative learning technique integrated with the Wordwall application.

**Table 1**

*The Comparison of Grade 4 Students' English Spelling Skills between the Pre-test and Post-test, Indicating Significant Improvement through the TGT Technique Integrated with the Wordwall Application*

| Sample             | Pretest |          | Posttest    |          | <i>t</i>    | <i>p</i> | Cohen<br>'s d | 95%   | 95%       |
|--------------------|---------|----------|-------------|----------|-------------|----------|---------------|-------|-----------|
|                    | NO.     | <i>M</i> | <i>S.D.</i> | <i>M</i> | <i>S.D.</i> |          |               | CI    | CI        |
|                    |         |          |             |          |             |          |               | Lower | Upper     |
| Experimental group | 16      | 7.94     | 3.36        | 16.63    | 3.03        | -14.56   | .000          | 2.71  | 7.43 9.95 |

Note. CI = 95% confidence interval of difference; Max score = 20 items

According to Table 1, the comparison of English spelling proficiency of the Experimental Group ( $N = 16$ ) before and after the development of English spelling skills through the cooperative learning technique Teams-Games-Tournament (TGT) integrated with the Wordwall Application revealed that the mean score increased from  $7.94 \pm 3.36$  before instruction to  $16.63 \pm 3.03$  after instruction. A dependent paired-samples t-test indicated a statistically significant improvement,  $t (15) = -14.56$ ,  $p < .001$ , with a very large effect size (Cohen's  $d = 2.71$ ) and a 95% confidence interval for the difference of 7.43–9.95, demonstrating substantial enhancement in English spelling skills following the intervention.

**Table 2**

*Comparative Results of English Spelling Skills before Instruction among Grade 4 Students*

| Sample             | Number | Pretest  |             | <i>t</i> | Sig. |
|--------------------|--------|----------|-------------|----------|------|
|                    |        | <i>M</i> | <i>S.D.</i> |          |      |
| Experimental group | 16     | 7.94     | 3.36        | -0.04    | .49  |
| Control group      | 16     | 8.00     | 6.01        |          |      |

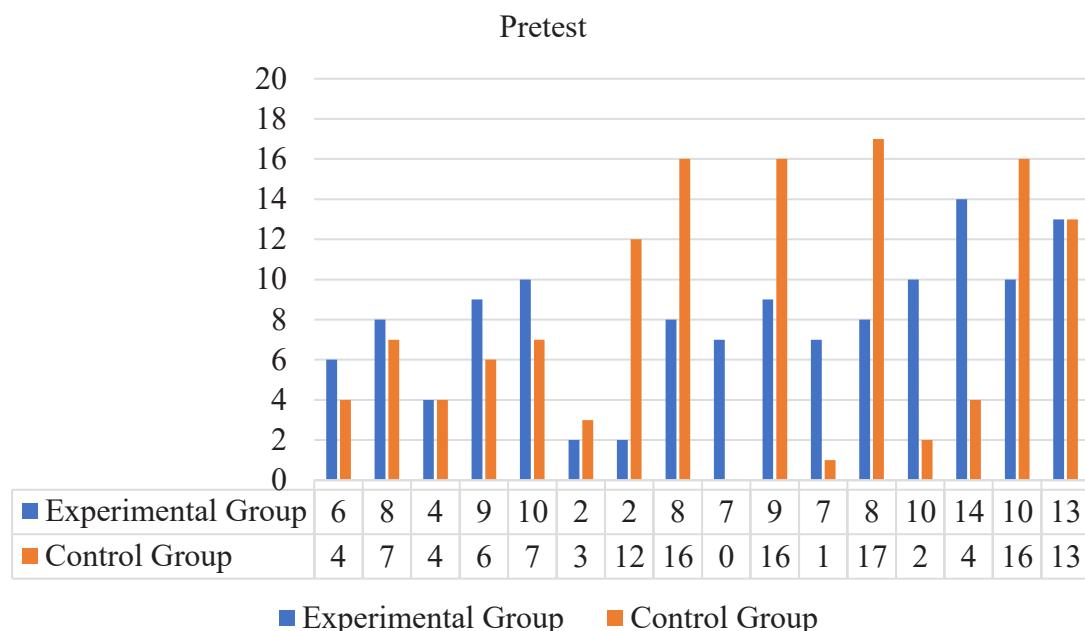
Table 2 presents a comparative analysis of pre-instruction English spelling proficiency between the experimental and control groups. The experimental group ( $n = 16$ ), which engaged in spelling instruction through the Teams-Games-Tournament (TGT) cooperative learning technique integrated with the Wordwall application, achieved a mean pre-test score of 7.94 ( $SD = 3.36$ ). The control group ( $n = 16$ ), taught via conventional methods, recorded a mean pre-test score of 8.00 ( $SD = 6.01$ ). The control group exhibited a higher standard deviation than the experimental group, indicating more variability in students' pretest performance. An independent samples *t*-test assuming unequal variances yielded a *t*-value of -0.04 and a significance level of  $p = .49$ , indicating no statistically significant difference in English spelling proficiency between the groups prior to the intervention.

**Table 3**

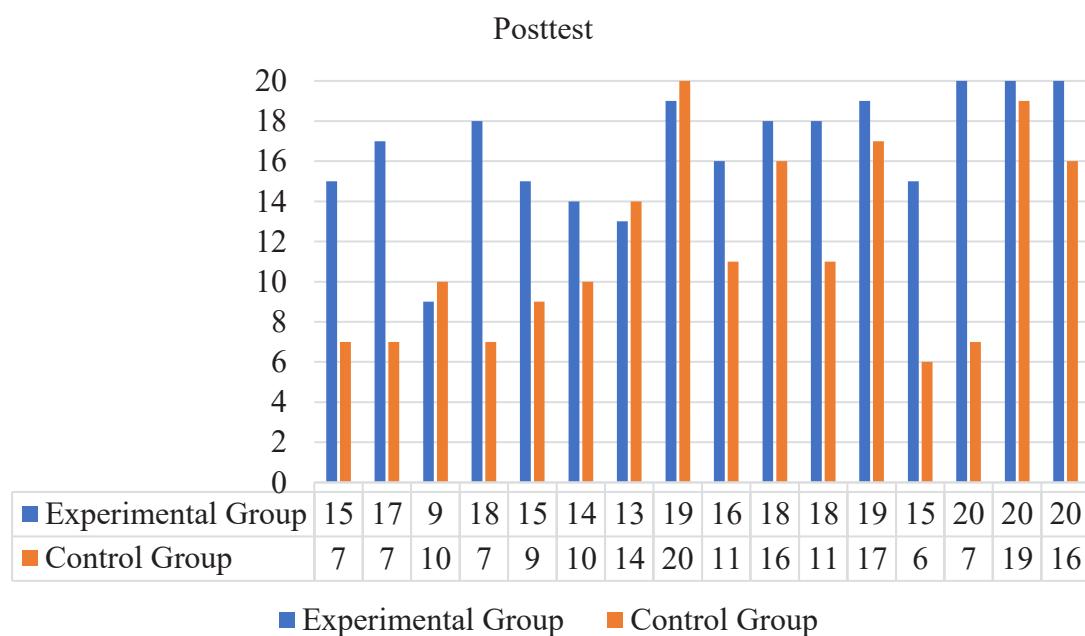
*Comparative Results of English Spelling Skills after Instruction among Grade 4 Students*

| Sample             | Number | Posttest |             | <i>t</i> | Sig. |
|--------------------|--------|----------|-------------|----------|------|
|                    |        | <i>M</i> | <i>S.D.</i> |          |      |
| Experimental group | 16     | 16.63    | 3.03        | 3.55     | .00  |
| Control group      | 16     | 11.69    | 4.67        |          |      |

Table 3 presents the analysis of learning achievement. The experimental group, comprising 16 students who received instruction through the Teams-Games-Tournament (TGT) cooperative learning technique integrated with the Wordwall application, achieved a mean post-test score of 16.63 ( $SD = 3.03$ ). In comparison, the control group, also consisting of 16 students who underwent conventional instruction, attained a mean post-test score of 11.69 ( $SD = 4.67$ ). An independent samples *t*-test comparing the post-test scores between the two groups yielded a *t*-value of 3.55, with a significance level of  $p < .01$ . These findings indicate that the English spelling proficiency of the experimental group was significantly higher than that of the control group at the 0.05 level of significance. The results presented in Tables 2 and 3 can be summarized in Tables 4 and 5 as follows.

**Table 4***Comparison of Pre-test Scores between the Experimental and Control Groups*

The histograms of the pre-test scores for both the experimental and control groups showed approximately symmetric distributions, with no notable outliers or ceiling/floor effects. This indicates that the students in both groups had similar English spelling proficiency before the intervention.

**Table 5***Comparison of Post-test Scores between the Experimental and Control Groups*

The histograms of the post-test scores revealed a marked improvement in the experimental group. Most students in the experimental group achieved high scores clustered near the top of

the scale, whereas the control group's scores were more widely distributed. These visual results support the quantitative findings, showing that the experimental group outperformed the control group after the intervention.

## Table 6

*The Results of the Study on Students' Satisfaction with Instruction using the Cooperative Learning Technique Teams-Games-Tournament (TGT) Integrated with the Wordwall Application*

| Satisfaction Assessment List | Evaluation Results |             | Satisfaction Level |
|------------------------------|--------------------|-------------|--------------------|
|                              | <i>M</i>           | <i>S.D.</i> |                    |
| Content and Instruction      | 4.65               | 0.28        | Very high          |
| Benefits from activities     | 4.54               | 0.41        | Very high          |
| Learning environment         | 4.90               | 0.25        | Very high          |
| Teaching and Learning Media  | 4.81               | 0.35        | Very high          |
| Total average                | 4.73               | 0.16        | Very high          |

Table 6 presents the analysis of student satisfaction following instruction using the Teams-Games-Tournament (TGT) cooperative learning technique integrated with the Wordwall application. Overall satisfaction was rated as "very high" ( $M = 4.73$ ,  $SD = 0.16$ ). Among the individual components, the learning environment received the highest rating ( $M = 4.90$ ,  $SD = 0.25$ ), followed by instructional media ( $M = 4.81$ ,  $SD = 0.35$ ). The content and instructional methods were rated at 4.65 ( $SD = 0.28$ ), while perceived learning benefits scored 4.54 ( $SD = 0.41$ ). These results indicate consistently positive responses across all assessed dimensions, suggesting that students held highly favorable perceptions of the TGT–Wordwall instructional model for enhancing English spelling proficiency.

A short qualitative summary of the open-ended questionnaire responses further supports these findings. Many students expressed enjoyment and engagement in the learning process. For example, one student stated, "I enjoyed playing the games while learning at the same time" (anonymized), and another commented, "I felt happy when playing with my friends" (anonymized). However, a few students were more neutral regarding the cognitive benefits, as one noted, "I did not think the games made me smarter" (anonymized). Overall, the qualitative feedback demonstrates that students generally responded positively to the TGT–Wordwall activities, particularly in terms of engagement and social interaction.

## Discussion

*1. The use of cooperative learning through the Teams-Games-Tournament (TGT) technique combined with the Wordwall application will improve students' English spelling skills more than before instruction.*

The findings of this study indicate that the use of the Teams-Games-Tournament (TGT) cooperative learning technique combined with the Wordwall application significantly improved students' English spelling skills compared to before instruction. This can be attributed to several factors. The structured, game-based nature of TGT-Wordwall allowed students to practice

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spelling in an interactive and enjoyable manner, fostering motivation and engagement. Peer interaction within cooperative groups enabled students to discuss and correct each other's spelling, promoting deeper cognitive processing. The repetitive tasks and immediate feedback provided by Wordwall also facilitated retrieval practice, supporting better retention and recall of spelling patterns. These results align with prior studies emphasizing the benefits of combining cooperative learning with educational technology to enhance language skills (Wisetsanan & Wisutkul, 2023; Chantho, 2022; Kaewsings, 2021).

*2. Students who receive instruction using the TGT cooperative learning technique combined with the Wordwall application can significantly improve their English vocabulary retention compared to before instruction.*

Students who received instruction using the TGT-Wordwall approach demonstrated significant improvement in vocabulary retention compared to before instruction. The game-based tasks provided multiple opportunities for retrieval practice, which strengthens memory and recall. Social reinforcement within the cooperative groups encouraged students to actively participate in recalling and using new vocabulary. These mechanisms, supported by theoretical perspectives on cooperative learning, feedback, and retrieval practice, explain why students could retain vocabulary more effectively after instruction.

*3. The implementation of cooperative learning using the TGT technique combined with the Wordwall application can be conducted effectively and promotes student engagement in the classroom.*

The implementation of cooperative learning using TGT combined with Wordwall was effective in promoting student engagement. The competitive yet collaborative structure encouraged peer interaction, discussion, and collaborative problem-solving, creating a stimulating and interactive learning environment. The immediate feedback from Wordwall activities further maintained attention and motivation, reducing cognitive load by structuring learning into manageable tasks. These findings demonstrate that the TGT-Wordwall approach not only supports skill development but also fosters active participation and collaborative learning.

*4. Students' satisfaction following instruction using the cooperative learning technique Teams-Games-Tournament (TGT) integrated with the Wordwall application*

Students' satisfaction following instruction using the TGT-Wordwall approach was very high ( $M = 4.73$ ,  $SD = 0.16$ ), reflecting positive perceptions across the learning environment, instructional media, content and teaching methods, and perceived learning benefits. Qualitative feedback from open-ended questionnaires indicated that students generally enjoyed the game-based and collaborative aspects of learning. For example, one student stated, "I enjoyed playing the games while learning at the same time" (Student A, anonymized), and another noted, "I felt happy when playing with my friends" (Student B, anonymized). Some students, however, were neutral regarding cognitive benefits: "I did not think the games made me smarter" (Student C, anonymized). Overall, these results suggest that the TGT-Wordwall model creates an engaging and enjoyable learning environment, consistent with research showing that interactive

technologies enhance satisfaction, motivation, and learning outcomes (Anantasuk, 2022; Sangsuvarn, 2022; Garrison & Anderson, 2003; Puentedura, 2013).

## **Limitations and Practical Challenges (integrated across all four areas)**

Despite these positive outcomes, several limitations should be considered. The study was conducted with a small sample in a single school, limiting generalizability. Potential teacher effects and practice effects from using the same pre/post instruments may have influenced results. Young participants may also have provided socially desirable responses in satisfaction ratings. Furthermore, the study did not include long-term follow-up or retention tests, limiting understanding of the durability of learning gains. Practical challenges, such as access to digital devices and internet connectivity, may affect consistent implementation, and some students required additional guidance with game-based learning. Future research should address these factors by using larger and more diverse samples, including long-term retention measures, and investigating mechanisms such as retrieval practice, immediate feedback, and social reinforcement in more depth.

## **Conclusion**

The Teams-Games-Tournament (TGT) technique combined with the Wordwall application improved spelling outcomes by enhancing social interaction, collaboration, and sustained skill practice. Initial unfamiliarity with digital tools was successfully addressed through brief orientation, supporting both learners' confidence and digital literacy. This combination further increased student engagement and motivation, providing an interactive, game-based environment in which vocabulary and spelling skills were acquired naturally. Immediate feedback from Wordwall promoted reflective learning and continuous improvement. The integrated approach represents a pedagogically sound and flexible strategy for enhancing English spelling proficiency. While results are promising, limitations such as sample size and initial unfamiliarity with digital tools should be considered. Therefore, cautious implementation is recommended, including pilot scaling and teacher training, to ensure effective and sustainable adoption. Overall, this study demonstrates that gamified cooperative learning can effectively enhance spelling in young EFL learners while fostering positive learning attitudes and essential 21st-century competencies.

## **Recommendations**

### *1. Implications*

The findings of this study offer several practical implications for enhancing English language instruction at the primary level. Integrating the Wordwall application into classroom activities presents a promising strategy for improving students' English proficiency while simultaneously developing digital literacy. Educators can design engaging, cognitively demanding tasks such as word-matching games and spelling exercises that effectively promote spelling and writing skills.

Despite the limited scope of cooperative activities in this study, the Teams-Games-Tournament (TGT) technique demonstrates flexibility, supporting not only academic achievement but also the

holistic development of social and emotional competencies, including collaboration, responsibility, and group cohesion. While limited access to digital devices may pose challenges, Wordwall activities can be adapted into printable formats paired with TGT to ensure broader accessibility.

To maximize effectiveness, schools are encouraged to plan for long-term acquisition of digital resources and provide targeted professional development for educators. Collectively, these findings underscore the potential of combining cooperative learning strategies with educational technology to create inclusive, engaging learning environments that support language development in primary education.

## 2. Further Studies

Future research is recommended to expand upon these findings. Replication with larger, randomized samples is advised to strengthen the generalizability of results. Longitudinal studies should be conducted to assess the retention of spelling skills over time. Comparative studies exploring different instructional techniques alongside Wordwall can identify the most effective strategies for enhancing learners' English spelling and overall language skills. Investigating the use of Wordwall with diverse learner groups, including students with learning disabilities or non-native English speakers, can determine its broader applicability. Additionally, integrating Wordwall into online learning environments should be explored, particularly considering the growing prevalence of remote education. Factors such as technical infrastructure, parental support, and students' attitudes toward digital learning should also be examined to guide effective implementation and maximize educational benefits.

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