# Leveraging Multimedia and Team-Games Tournament Cooperative Learning to Enhance English Vocabulary Acquisition of EFL Learners

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This study investigates the effectiveness of integrating multimedia and the Team-Games Tournament cooperative learning model (M-TGT) in enhancing English vocabulary acquisition and retention among Thai elementary school students. A true experimental design was employed with 64 Grade 4 students, randomly assigned to either an experimental group (M-TGT) or a control group (traditional instruction). A receptive and productive vocabulary knowledge battery test was administered at three intervals: pretest, immediate posttest, and delayed posttest. The study employed Mixed and Repeated Measures ANOVA to analyze differences in immediate English vocabulary acquisition and retention between M-TGT and traditional teaching methods, ensuring the validity of results through assumption testing. An independent samples t-test further examined differences in immediate vocabulary acquisition between the two groups. Additionally, perception analysis followed Kenpro (2021) to interpret Likert scale mean scores, providing clear insights into students' attitudes. The results revealed that the M-TGT group demonstrated significantly higher vocabulary acquisition and retention over time compared to the control group. Students' attitudes, assessed using a Five Degrees of Happiness Smiley Face Likert Scale, indicated overwhelmingly positive perceptions of M-TGT regarding receptive knowledge, productive knowledge, and long-term retention. These findings suggest that integrating multimedia with cooperative learning strategies fosters a more engaging and effective language learning environment. The study contributes to pedagogical advancements in EFL vocabulary instruction, advocating for interactive and competitive methodologies to enhance young learners' lexical development.

Keywords: vocabulary acquisition, multimedia, cooperative learning, Team-Games Tournament, English as a Foreign Language (EFL), instructional strategies

## INTRODUCTION

The acquisition of lexical items constitutes an indispensable pillar in the domain of language acquisition, particularly within the sphere of English as a Foreign Language (EFL) pedagogy. A robust lexical repertoire is not merely advantageous but imperative for linguistic competence, as it facilitates both receptive and productive modalities of language, encompassing orthographic and phonological expression with precision and fluency (Alqahtani, 2015; Alahmadi & Foltz, 2020).

Within the intricate framework of English language acquisition, the assimilation of vocabulary exerts a profound influence on the interdependent faculties of textual interpretation, compositional articulation, verbal articulation, and aural discernment. Notwithstanding its ineluctable importance, a considerable proportion of EFL learners, particularly those in the foundational stages of formal education, encounter substantial impediments in lexical retention and pragmatic deployment (Hashemzadeh, 2012; Patra et *al.*, 2022; Zhang et *al.*, 2025). Such deficiencies are frequently attributable to pedagogical paradigms that remain entrenched in antiquated, rote-based methodologies, bereft of dynamic, immersive, and cognitively stimulating mechanisms. Consequently, the refinement and optimization of vocabulary acquisition strategies among nascent language learners constitute a salient focal point of contemporary educational inquiry.

The conundrum of lexical acquisition pervades the landscape of EFL education on a global scale, manifesting acutely within the Thai pedagogical sphere. Regardless of sustained exposure to English, a significant proportion of learners grapple with the retention and adept deployment of novel lexemes. A principal obstacle resides in the paucity of extramural linguistic immersion, compounded by an entrenched dependence on rote memorization—an archaic pedagogical stratagem that eschews cognitive engagement and meaningful assimilation (Li, 2004; Schmitt, 2008; Milton, 2009; Tachom, 2021). Within Thailand, this predicament is further exacerbated by a dearth of interactive, semantically enriched learning ecosystems, which would otherwise cultivate profound lexical comprehension. Moreover, the didactic orthodoxy prevalent in numerous academic institutions remains ill-equipped to accommodate the heterogeneity of cognitive proclivities among learners, thereby marginalizing those whose needs diverge from conventional instructional paradigms. This challenge is often attributed to traditional instructional methods that may fail to effectively engage young learners or address their diverse cognitive needs.

A particularly impactful pedagogical paradigm involves the integration of the Team-Games Tournament (TGT), a collaborative instructional framework, with multimodal technological resources to cultivate a more immersive and stimulating scholastic environment. TGT emphasizes collective effort and friendly competition, motivating students to actively participate while supporting one another in achieving common goals (Syaifuddin et *al.*, 2020; Luo et *al.*, 2020). The use of digital media—such as audiovisual content, gamified interactive platforms, and advanced educational tools—further enhances student engagement by providing diverse modes of content delivery, catering to various learning preferences (Alexander, 2014; Jantakeeree, 2022; Li et *al.*, 2024). This approach makes vocabulary acquisition more accessible and enjoyable, especially for younger learners. While previous research has explored the individual effects of cooperative learning and digital tools on vocabulary development, the combined application of both methods in a single intervention remains largely unexplored in Thailand's EFL context. Integrating multimedia with TGT is expected to offer valuable insights into enhancing vocabulary learning and retention among Thai primary school students learning English as a foreign language. Based on the principles underlying the issue and its significance, the present study aims to investigate the English vocabulary learning of elementary school students, with a focus on both time-dependent achievement and knowledge retention, comparing traditional teaching methods with innovative teaching approaches, namely multimedia and team–games tournament (M-TGT), through the examination of two key research questions:

1. Did immediate English vocabulary acquisition differ between M-TGT and traditional teaching methods for elementary school students?

2. Did vocabulary retention develop over time more effectively with M-TGT?

3. What were the participants' perceptions of learning English vocabulary through the M-TGT method concerning receptive knowledge, productive knowledge, and knowledge retention?'

## LITERATURE REVIEW

### Vocabulary Knowledge

According to Nation (2013), vocabulary knowledge consists of multiple interrelated aspects that contribute to a learner's ability to understand and use words effectively. It is mainly divided into two categories—receptive and productive knowledge—covering three key domains: form, meaning, and use. This framework emphasizes the importance of not only recognizing and understanding words (receptive knowledge) but also the ability to use them effectively in communication (productive knowledge). In this context, Laufer and Goldstein (2004) define receptive vocabulary as the words learners can recognize and understand in context, such as while reading or listening, aligning with Nation's focus on comprehension. In contrast, productive vocabulary refers to the words learners can actively use in speaking or writing, highlighting Nation's emphasis on the ability to produce language effectively. Biemiller (2006) further emphasizes that vocabulary instruction should address both receptive and productive vocabulary, stressing the importance of using words appropriately in various contexts.

Moreover, Read (2000) focuses on the assessment of vocabulary knowledge, noting that vocabulary acquisition is not a linear process but involves both receptive and productive dimensions. In this regard, receptive vocabulary involves recognizing and understanding words when reading or listening, while productive vocabulary pertains to the ability to use words accurately in speaking and writing. Read extends Nation's framework by suggesting that effective vocabulary knowledge requires both the recognition (receptive) and use (productive) of words, with the depth of knowledge playing a crucial role in ensuring that learners can use words appropriately across different contexts. Read's work highlights the importance of measuring both receptive and productive dimensions to get a comprehensive view of a learner's vocabulary knowledge.

Schmitt (2000) further elaborates that breadth (the number of words known) and depth (the understanding of the meanings, nuances, and uses of words) are integral to vocabulary development. Receptive vocabulary is typically broader in scope, as learners first encounter a large number of words through reading and listening. However, productive vocabulary, which requires a deeper understanding of how words are used in different contexts, tends to develop more gradually and with greater complexity.

Research on vocabulary knowledge in Thai English as a Foreign Language (EFL) learners has largely centered on understanding the components and order of vocabulary acquisition. A notable study by Sukying and Nontasee (2022) explored the acquisition order of vocabulary knowledge aspects in Thai EFL learners. They found that, similar to learners in other contexts, Thai EFL learners tend to develop receptive vocabulary knowledge before productive vocabulary knowledge, and they also demonstrate a larger receptive vocabulary. However, while there has been a considerable focus on the cognitive aspects of vocabulary acquisition in the Thai context, there is a noticeable gap in studies investigating instructional strategies or innovative teaching methods to enhance vocabulary knowledge among Thai EFL learners. Research addressing explicit, contextual, or multimedia-based teaching methods remains limited, particularly in the context of Thai primary schools. The current literature suggests that there is room for further exploration into pedagogical strategies that can actively foster vocabulary acquisition and retention in Thai EFL learners, particularly through innovative and engaging instructional approaches

### Multimedia for Pedagogical Purpose

The use of digital tools, videos, and interactive applications can significantly enhance vocabulary learning. According to Plass and Jones (2005), multimedia learning allows students to experience vocabulary through multiple sensory channels, such as auditory, visual, and kinesthetic methods. By

integrating multimedia into vocabulary instruction, students can engage with new words in a variety of contexts, leading to better comprehension and retention. For instance, interactive games, animations, and videos can help students visualize and hear vocabulary used in real-life contexts, which aids in forming lasting mental representations of words. Moreover, multimedia tools can facilitate differentiated learning, providing more opportunities for students with diverse learning styles to grasp new vocabulary effectively. The study by Silverman and Hines (2009) found that multimedia-enhanced vocabulary instruction was more effective for English Language Learners (ELL) than traditional read-alouds. ELL children who were exposed to multimedia content learned more vocabulary words and caught up to their English-only peers. In contrast, non-ELL children showed no difference in vocabulary learning whether they watched the video or only participated in read-alouds. Also, multimedia instruction significantly improved vocabulary gains compared to text-only instruction. It also promoted better long-term retention, especially for learners with lower verbal working memory. Multimedia learning leverages dual coding and contextual support, enhancing both initial learning and retention. These benefits

persisted over time, highlighting the pedagogical advantages of multimedia for vocabulary acquisition (Alhazmi, 2024).

## Team-Games Tournament (TGT) Cooperative Learning

Incorporating competition-based strategies, such as the Team-Games Tournament (TGT), has proven to be effective in vocabulary acquisition. TGT involves students working in teams to compete in various activities related to the target vocabulary. According to Slavin (1995), this approach enhances motivation and makes learning vocabulary more engaging by adding a fun, competitive element. TGT fosters collaboration and peer support, where students help each other learn and apply new words. The competitive aspect of TGT also encourages active participation and reinforces vocabulary retention as students repeatedly use the words in meaningful contexts. This method has been shown to improve not only vocabulary knowledge but also student motivation and overall classroom dynamics (Nasution, 2018; Sunarti et al., 2019; Rihanah & Sudiyono, 2020; Julianto, 2024).

## METHOD

### Research Design

This study employed a true experimental design, specifically a pretest-posttest control group design, to examine the effects of integrating multimedia with the Team-Games Tournament (M-TGT) cooperative learning model on English vocabulary acquisition and retention. The use of random assignment ensured internal validity by controlling for potential confounding variables (Creswell, 2014). This design allowed for causal inferences, as differences in vocabulary acquisition and retention could be attributed to the instructional methods rather than external factors.
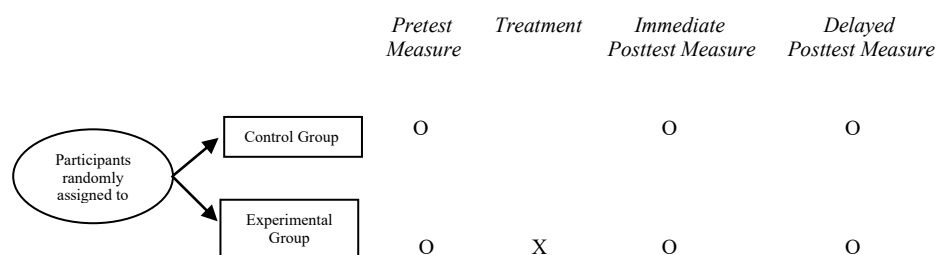


Figure 1
Pretest-posttest control group design

**Participants**

The present study involved 64 Grade 4 students enrolled in a Foundation English course during the second semester of the 2024 academic year at a public primary school in Bangkok. They were randomly assigned into two groups—a control group (n = 32) and an experimental group (n = 32)—using cluster random sampling to eliminate systematic differences prior to the intervention. To ensure homogeneity in language proficiency, a pretest was administered to assess students' proficiency levels before randomization. An independent $t$-test was conducted to compare the pretest scores between the experimental and control groups, revealing no significant difference, $t(62) = -.03$, $p = .93$. This confirms that both groups had similar proficiency levels before the intervention. Students were then categorized into high, intermediate, and low proficiency levels based on their academic achievement background, and randomization was conducted using computer-generated random numbers. The control group received traditional vocabulary instruction while the experimental group was instructed using Multimedia and Team-Games Tournament (M-TGT). The intervention spanned ten weeks, covering routine vocabulary as prescribed in the curriculum, including words with three syllables and six-syllable verb phrases.

**Instruments**

*Receptive & Productive Vocabulary Knowledge Battery Test*

A battery test of receptive and productive vocabulary aspects was designed to measure vocabulary learning in two groups of learners according to the diagnostic test format proposed by Sukying and Nontasee (2022) based on Nation (2013)'s multiple interrelated aspects that contribute to a learner's ability to understand and use words effectively. It is mainly divided into two categories—receptive knowledge, or the words learners can recognize and understand in context, such as while reading or listening) and productive knowledge, or the words learners can actively use in speaking or writing (Laufer and Goldstein, 2004; Biemiller, 2006)—covering three key domains: form, meaning, and use. The test consists of 20 items, divided into two sections, each containing 10 items. Section 1 assesses receptive knowledge using a 4-option multiple-choice format, incorporating a form recognition test (FRT) with 5 items to evaluate word recall through spelling. Learners must choose the correctly spelled word from options with similar or deviant spellings. The test also includes the standardized Receptive One Word Picture Vocabulary Test (ROWPVT) with 5 items following the format of Ingvalson et *al*. (2023). In this part, learners choose the correct image from four options that represent the meaning of a given stimulus word. Section 2 evaluates productive knowledge using short-answer question format, including grammatical function tests based on Webb (2005), which assess the ability to write words while aware of singular or plural form according to the number depicted in the provided image (e.g., an image of two hats =, an image of one handkerchief = ). Additionally, the Collocation Production Test (CPT) follows the approach of Nontasee & Sukying (2021), integrating images and text for better comprehension by young learners. For example, a prompt may display an image of a person feeling unwell with a thermometer showing 38°C and a sentence with a blank for the learner to fill in, such as: "I don't feel very well. I'll go to." The scores that participants earned were determined by the following criteria: For multiple-choice questions, 1 point was awarded for a correct answer and 0 points for an incorrect answer. For short-answer questions, participants were awarded 1 point if the spelling and meaning of the word matched the clues provided in the question correctly. Zero points were given if the spelling was incorrect and/or the word did not convey the correct meaning according to the assigned context. The content validity of the test was evaluated using the Item Objective Congruence (IOC) method, which was assessed by three experts with qualifications and experience in teaching English and learning assessment. The result was 1.00. Additionally, the discriminatory power ($p$-value ranging from .20-.80) and the difficulty index ($r$-value ranging from .20-.59) were analyzed through a try-out with students of the same educational level from one of other classrooms, excluding the experimental and control groups. The KR-20

analysis was used to calculate the internal consistency, yielding a coefficient of α = .80, indicating the test's reliability and retest ability.

*TTM-Based and M-TGT-Based Lesson Plans*

To implement the intervention with participant groups, two distinct instructional frameworks were designed: a traditional teaching approach and an M-TGT-integrated instructional model. Both lesson plans were meticulously structured following curriculum and pedagogical principles, encompassing: (1) defined learning outcomes, (2) content covering language functions, structures, vocabulary, and culture, (3) instructional activities, (4) learning materials, and (5) assessment methods. The vocabulary content comprised 20 target words, extracted from two Ministry of Education-approved textbook lessons. One lesson focused on fundamental nouns (≤3 syllables), while the other featured commonly used phrasal verbs (≤6 syllables). The primary divergence between the two instructional models was in the learning activities. The control group was taught vocabulary through traditional methods—identified via interviews with in-service teachers—including the grammar-translation method, direct method, audio-lingual method, vocabulary lists, flashcards, textbook exercises, memorization, and contextual learning. Conversely, the experimental group received instruction through an integration of Multimedia and TGT activities. Due to the policy restrictions that prevent younger learners in many public schools from using communication tools or devices in the classroom, which could lead to inappropriate use, hinder focus, and cause emotional issues (Post Reporters, 2024), including the educational institution involved in this research, the researcher was convinced to apply a blended approach to learning media by combining handmade materials and digital media, with the researcher, in the role of the teacher, being responsible for implementing these learning tools. Thus, multimedia in this study referred to teacher-created instructional materials combining handmade resources (e.g., paper-based and printed materials) with digital tools, particularly *Canva*—a user-friendly graphic design application enabling the creation of visually appealing instructional materials (e.g., presentations, posters, and worksheets). These materials were then incorporated into competitive classroom games to reinforce vocabulary learning. Students were divided into heterogeneous teams, ensuring a balanced mix of abilities, with 2-3 high-achieving learners per group assisting lower-achieving peers through collaborative knowledge exchange. The study employed four games, categorized based on receptive and productive vocabulary knowledge:

*Receptive Knowledge Games (RKGs)*

Puzzle Decoder: Word puzzles requiring analytical thinking.

Word Scramble Game: Rearranging jumbled letters into correct words.

Crossword: Completing a grid using vocabulary-based clues.

*Productive Knowledge Game (PKG)*

Picture and Writing Words: Connecting images to correctly spelled words, applying grammatical rules (e.g., noun plurality), and filling in blanks with contextually appropriate words.

Additional digital tools were incorporated to optimize learning experiences, including online stopwatch: a free web-based tool used for timing activities, randomizing numbers/names, and forming groups, accessible via desktops and mobile devices, and YouTube Educational Content: video-based materials (e.g., songs, instructional videos, news clips, vlogs) curated to enhance engagement with the target vocabulary. All instructional plans underwent content validity verification by three subject matter experts in English language instruction and curriculum development. The analysis yielded a content validity index (IOC) of 1.00, confirming the instructional materials' suitability for research implementation.

*Perception Questionnaire for Younger Learners*

Identifying the optimal response, as defined by Bell (2007), from the children acting as evaluators, requires a trustworthy well-designed tool to guarantee their evaluation of actual prior involvements with respect to the question posed. Formerly, the evaluation of young learners' experiences after participating in certain activities commonly relied on the traditional Smiley Face Likert Scale, known as smileyometer (Read et *al*., 2002), which roughly depicted human facial expressions across five levels, ranging from Very Satisfied (the happiest face) to Very Unsatisfied (the least happy face). However, several factors influence young learners' decisions to avoid selecting negative responses altogether. One key reason is their *optimistic mindset*, particularly when engaging in activities designed to be enjoyable, such as games. Another factor is *social desirability bias*, where children aim to present themselves in a favorable light and avoid disappointing adults (Oerke & Bogner, 2011), often providing answers they believe adults want to hear. Additionally, *acquiescence bias* plays a role, as young learners, lacking the critical thinking maturity of adults, may perceive agreeing or selecting positive responses as the "correct" or "safe" choice (Danner et *al*., 2015). Furthermore, *demand characteristics* can influence responses, as children may consciously or unconsciously adjust their answers based on their perception of the researcher's expectations—assuming that positive responses are preferred (McCambridge et *al*., 2012). Another contributing factor is *satisficing*, where children choose the easiest answer—often the highest rating—to avoid overthinking. This can exhibit as straight-lining behavior, where they repeatedly select the same response to complete the questionnaire quickly. Finally, the *experience framing effect* leads to a lack of negative evaluations, as young learners may not see the necessity of identifying flaws in what they are assessing or may consider all aspects acceptable. In light of these factors, the five degrees of happiness smiley face Likert scale in Table 1, as suggested by Hall et *al*. (2016), was applied to this study for quantitative questions in evaluations.

This rating scale questionnaire presented the following key characteristics:

1. Used only positively valenced facial expressions across five descending levels, avoiding sad or neutral faces. When all faces depict smiles and varying degrees of happiness, children are more likely to use the full range of scores, leading to more diverse and accurate data.

2. Designed to be engaging and child-friendly, incorporating colorful cartoon images or dramatized emojis as improving the graphical aesthetic to encourage children to fully utilize the rating scale.

3. Reduced response bias, such as overly positive or extreme responses (e.g., always selecting the highest score), by encouraging children to use the entire rating scale.

4. Considered the evaluation context, particularly for experiences intended to be enjoyable and engaging, such as game-based learning or child-centered technology use.

Table 1
The five degrees of happiness smiley face Likert scale (Hall et *al*., 2016)

| Emoji | Score | Attitude | Description |
|---|---|---|---|
|  | 5 - Extremely Happy (Wow!) | I loved it the most; felt excited, thrilled, and deeply impressed. | The experience or activity received outstanding feedback, and I perceived it as one of the best they have encountered. |
|  | 4 - Very Happy (Happy) | I felt very good and highly satisfied with the experience. | I had a positive experience, though there may still be aspects that did not excite them to the fullest. |
|  | 3 - Moderately Happy (Okay, Neutral Happy) | I found the experience okay, with no issues, but not particularly exciting. | It indicates that I did not see the experience as the best, but also did not identify any major drawbacks. |
|  | 2 - Slightly Happy (Not very fun) | I felt somewhat disengaged or disliked certain aspects. | Some areas may need improvement, such as difficulty level or the activity's appeal. |
|  | 1 - Minimally Happy (Just Happy) | I still felt okay but was not impressed or particularly engaged. | Consideration should be given to aspects that made me feel less involved, such as complexity or overall engagement. |

To serve the research questions, the questions were designed to elicit students' attitudes towards learning through innovative methods, focusing on outcomes related to both receptive and productive knowledge over time, including retention effects.

**Data Collection**

Data collection for this study was carried out using a receptive and productive vocabulary knowledge battery test administered at three intervals: pretest, immediate posttest, and delayed posttest. The test was identical for both the experimental and control groups across all intervals. However, for the second and third assessments, the order of test items was varied to reduce the possibility of pretest covariate effects. The delayed posttest was administered four weeks after the immediate posttest. One week following the delayed posttest, participants' attitudes were assessed using a perception questionnaire created by the researcher, with the assistance of other teachers at the school who facilitated the data collection. This approach was intended to minimize any potential bias or influence from the researcher. The purpose of the attitude survey was clearly explained to participants as being solely for the evaluation of their perceptions towards learning through innovative teaching methods and had no impact on their regular course grades. The questionnaire employed the Five Degrees of Happiness Smiley Face Likert Scale to assess attitudes. The researcher read each question aloud to ensure clarity and allowed students to select the response that best represented their feelings. No personal identifiers were required on the survey to maintain anonymity.

**Data Analysis**

To examine the research questions, the data analysis in this study utilized Mixed and Repeated Measures ANOVA to investigate differences in immediate English vocabulary acquisition between M-TGT and traditional teaching methods, as well as vocabulary retention over time. Prior to

conducting the analysis, several assumptions for ANOVA were tested to ensure the validity of the results. First, normality of the data was assessed using the Shapiro-Wilk test for pretest, immediate posttest, and delayed posttest scores to ensure the data followed a normal distribution. Second, sphericity was examined using Mauchly's test to verify the assumption that the variances of the differences between all possible pairs of conditions are equal. Lastly, independence of observations was ensured, as each participant's scores in each test condition were considered independent of others. An independent samples *t*-test was conducted to examine the differences in immediate English vocabulary acquisition between the control group and the experimental group. This analysis aimed to assess whether there were significant differences in the vocabulary acquisition scores between the two groups after the intervention. The perception analysis followed Kenpro (2021), who proposed that the interpretation of Likert scale mean scores is based on the premise that a mean score of 3.0 represents a neutral attitude, while scores below 3.0 indicate a negative attitude and scores above 3.0 indicate a positive attitude. Accordingly, the classification of attitudes is as follows: 1.0 – 2.4 (Negative), 2.5 – 3.4 (Neutral), and 3.5 – 5.0 (Positive). This approach enhances the accuracy of analysis and minimizes ambiguity in interpretation. In the context of the present study, a mean score of 1.0 – 2.4 indicates an unhappy attitude, 2.5 – 3.4 reflects an undecided attitude, and ≥3.5 represents a happy attitude.

## FINDINGS

The research questions, "Did immediate English vocabulary acquisition differ between M-TGT and traditional teaching methods for elementary school students?" and "Did vocabulary retention develop over time more effectively with M-TGT?" were addressed by first analyzing the data using an Independent Samples *t*-test to assess the differences in vocabulary acquisition scores between the two groups, as shown in Table 2. Following this, the researcher conducted a Mixed ANOVA and a Repeated Measures ANOVA (Table 3) to explore the interaction effects between teaching methods and time. Lastly, to examine the changes in vocabulary acquisition within each group over different testing periods (Table 4).

Table 2

Independent Samples *t*-test results comparing pretest and immediate posttest scores between experimental and control groups (N=64)

| Test | Group | *M* | *SD* | *t* | Sig. |
|------|-------|-----|------|-----|------|
| Pretest | Experimental Group | 6.19 | .56 | -.03 | .97 |
|  | Control Group | 6.22 | .62 |  |  |
| Immediate Posttest | Experimental Group | 11.66 | .42 | 4.73 | .00 |
|  | Control Group | 8.44 | .52 |  |  |

*\*p < .001*

Table 2 presents the results of the Independent Samples *t*-test comparing the pretest and immediate posttest scores between the experimental and control groups. For the pretest, the mean scores for the experimental group (*M* = 6.19, *SD* = .56) and the control group (*M* = 6.22, *SD* = .62) were nearly identical, with no significant difference (*t* = -.03, *p* = .97). However, when comparing the immediate posttest scores, the experimental group showed a significantly higher mean score (*M* = 11.66, *SD* = .42) compared to the control group (*M* = 8.44, *SD* = .52), with a significant *t*-value of 4.73 (*p* = .00). This indicates that the experimental group outperformed the control group in immediate English vocabulary acquisition.

Table 3
Results of Mixed and Repeated Measures ANOVA regarding the effectiveness of the
M-TGT methods on vocabulary knowledge

| Test | Source | *SS* | df | *MS* | *F* | Sig. |
|---|---|---|---|---|---|---|
| Tests of Within-Subject Effects | Test | 1506.37 | 1 | 753.18 | 213.84 | .00 |
| | Test*Group | 102.87 | 1 | 51.43 | 14.60 | .00 |
| | Error (Test) | 436.75 | 62 | 3.52 | | |
| Tests of Between-Subject Effects | Intercept | 18310.54 | 1 | 18310.54 | 1027.93 | .00 |
| | Group | 198.04 | 1 | 198.04 | 11.11 | .00 |
| | Error | 1104.40 | 62 | 17.81 | | |

*$p < .001$

The Mixed ANOVA in Table 3 examined the effects of teaching methods (M-TGT vs. traditional) on vocabulary learning across different time points. The between-subjects analysis revealed a significant main effect of group, $F(1,62) = 11.11$, $p = .001$, indicating that the experimental group (M-TGT) significantly outperformed the control group overall. The intercept effect, $F(1,62) = 1027.93$, $p < .001$, was also significant, reflecting the general impact of vocabulary instruction across both groups. The within-subjects analysis showed a significant main effect of time, $F(1,62) = 213.84$, $p < .001$, confirming that students' vocabulary knowledge improved over time regardless of the teaching method. Additionally, there was a significant interaction effect between time and group, $F(1,62) = 14.60$, $p < .001$, suggesting that the experimental and control groups followed different learning trajectories, with the M-TGT group showing greater improvements. To further examine the progression of vocabulary learning over time, a Repeated Measures ANOVA was conducted on within-group effects. The results confirmed that vocabulary performance significantly changed across time points, as indicated by the main effect of time, $F(1,62) = 213.84$, $p < .001$. This suggests that participants' vocabulary retention improved over time. The significant Test*Group interaction, $F(1,62) = 14.60$, $p < .001$, further supports that the experimental group retained vocabulary more effectively compared to the control group. These findings collectively suggest that M-TGT was more effective than traditional methods in promoting both immediate vocabulary acquisition and long-term retention.

The results regarding participants' perceptions of learning English vocabulary through the M-TGT method are presented in Table 4, which provides an overview of their attitudes across three aspects: receptive knowledge, productive knowledge, and knowledge retention. Following this, a detailed breakdown of participants' attitudes toward each specific aspect is presented in Table 5-7, with descriptive content analysis provided below each corresponding table. The subsequent sections elaborate on these findings in greater detail.

Table 4
Overview of students' attitude in three aspects (n=32)

| Aspects of Attitude | *M* | *SD* | Attitude |
|---|---|---|---|
| Receptive Knowledge | 4.33 | .79 | happy |
| Perceptive Knowledge | 4.41 | .68 | happy |
| Knowledge Retention | 4.54 | .68 | happy |
| Overall Mean (*SD*) | 4.43 | .71 | happy |

Table 4 presents the means (*M*) and standard deviations (*SD*) for three aspects of attitude towards learning English vocabulary: Receptive Knowledge (*M* = 4.33, *SD* = .79), Perceptive Knowledge (*M* = 4.41, *SD* = .68), and Knowledge Retention (*M* = 4.54, *SD* = .68), with all aspects reflecting a generally positive attitude of "happy." The Overall Mean (*SD*) of 4.43 (.71) indicates that, overall, participants reported a high level of satisfaction and happiness across all aspects of their learning experience.

Table 5
Students' attitude regarding receptive knowledge during the M-TGT activity (n=32)

| Questions | *M* | *SD* | Attitude |
|---|---|---|---|
| 1. How happy are you when you find short, easy English words that are spelled correctly? | 4.39 | 1.02 | happy |
| 2. How happy are you when you find long, difficult English words that are spelled correctly? | 4.00 | .98 | happy |
| 3. How happy are you when you can remember more short, easy English words and long, difficult English words? | 4.44 | .76 | happy |
| 4. How happy are you when you can correctly choose pictures that match short, easy English words that the teacher assigns? | 4.72 | .63 | happy |
| 5. How happy are you when you can correctly choose pictures that match both short, easy and long, difficult English words that the teacher assigns? | 4.16 | .77 | happy |
| Overall Mean (*SD*) | 4.33 | .79 | happy |

Table 5 shows the students' attitudes regarding receptive knowledge during the M-TGT activity. The participants reported high levels of happiness across all questions, with the mean scores ranging from 4.00 to 4.72. Specifically, the highest mean score was for the question "How happy are you when you can correctly choose pictures that match short, easy English words that the teacher assigns?" (*M* = 4.72, *SD* = 0.63), while the lowest was for "How happy are you when you find long, difficult English words that are spelled correctly?" (*M* = 4.00, *SD* = 0.98). The overall mean score was 4.33 with a standard deviation of .79, indicating that, on average, students were happy with their ability to engage with short and long English words during the activity. While students were generally happy with their ability to identify English words and match them with images, the lowest mean score was reported for "How happy are you when you find long, difficult English words that are spelled correctly?" (M = 4.00, SD = 0.98). This suggests that while the students appreciated the learning process, they found it somewhat more challenging to engage with longer, more complex vocabulary.

Table 6
Students' attitude regarding productive knowledge during the M-TGT activity (n=32)

| Questions | *M* | *SD* | Attitude |
|---|---|---|---|
| 6. How happy are you when you can correctly spell short, easy English nouns and carefully add -s to pluralize them? | 4.59 | .50 | happy |
| 7. How happy are you when you can correctly spell short, easy English verbs and pay attention to subject-verb agreement (singular/plural)? | 4.16 | .92 | happy |
| 8. How happy are you when you can correctly spell long, difficult English verbs and pay attention to subject-verb agreement (singular/plural)? | 4.63 | .49 | happy |
| 9. How happy are you when you can correctly spell short, easy English words that match the meaning in the picture and the given text? | 4.28 | .68 | happy |
| 10. How happy are you when you can correctly spell long, difficult English words that match the meaning in the picture and the given text? | 4.38 | .79 | happy |
| Overall Mean (*SD*) | 4.41 | .68 | happy |

Table 6 presents the students' attitudes regarding productive knowledge during the M-TGT activity. The participants showed positive attitudes towards their ability to correctly spell English words and apply grammar rules, with mean scores ranging from 4.16 to 4.63. The highest mean score was for the question "How happy are you when you can correctly spell long, difficult English verbs and pay attention to subject-verb agreement?" (*M* = 4.63, *SD* = 0.49), while the lowest was for "How happy are you when you can correctly spell short, easy English verbs and pay attention to subject-verb agreement?" (*M* = 4.16, *SD* = 0.92). The overall mean score was 4.41 with a standard deviation of .68, indicating that, on average, students were happy with their productive knowledge during the activity. The lowest rating in the productive knowledge category was for "How happy are you when you can

correctly spell short, easy English verbs and pay attention to subject-verb agreement?" (M = 4.16, SD = 0.92), indicating a slightly lower level of satisfaction when applying spelling and grammatical rules to easier words.

Table 7
Students' attitude regarding knowledge retention after attending the M-TGT activity (n=32)

| Questions | *M* | *SD* | Attitude |
| --- | --- | --- | --- |
| 11. How happy are you when you still remember how to spell the short, easy English words you learned? | 4.66 | .65 | happy |
| 12. How happy are you when you still remember how to spell the long, difficult English words you learned? | 4.44 | .76 | happy |
| 13.How happy are you when you still remember what the short, easy English words you learned mean? | 4.56 | .67 | happy |
| 14. How happy are you when you still remember what the long, difficult English words you learned mean? | 4.75 | .44 | happy |
| 15. How happy are you when you still remember when to add or not add -s in words and can use the words you've learned to communicate clearly with others? | 4.31 | .86 | happy |
| Overall Mean (*SD*) | 4.54 | .68 | happy |

Table 7 presents the students' attitudes regarding knowledge retention after attending the M-TGT activity. The participants reported high levels of happiness in their ability to remember both the spelling and meanings of the English words they had learned, with mean scores ranging from 4.31 to 4.75. The highest mean score was for the question "How happy are you when you still remember what the long, difficult English words you learned mean?" (*M* = 4.75, *SD* = .44), while the lowest was for "How happy are you when you still remember when to add or not add -s in words and can use the words you've learned to communicate clearly with others?" (*M* = 4.31, *SD* = .86). The overall mean score was 4.54 with a standard deviation of .68, indicating that, on average, students were happy with their knowledge retention after the activity.

As observed in the breakdown of attitudes (Tables 5-7), there were variations in the students' engagement with different types of vocabulary. For instance, students expressed higher satisfaction with the retention of meanings for long, difficult words (M = 4.75) compared to their ability to apply grammar rules (M = 4.31). These emerging differences highlight the varying levels of ease with which students retained and applied vocabulary in different contexts.

**DISCUSSION**

This study aims to investigate English vocabulary learning among elementary school students, focusing on both time-dependent achievement and knowledge retention.                    It compares traditional teaching methods with innovative approaches, such as multimedia and the Team-Games Tournament (M-TGT) method. The discussion of the research findings will be organized in accordance with the research questions posed as follows.

Did immediate English vocabulary acquisition differ between M-TGT and traditional teaching methods for elementary school students?

The results from the ANOVA analysis revealed that the M-TGT (Multimedia Team-Games-Tournament) method had a significant positive effect on students' vocabulary learning, outperforming traditional methods. Specifically, the significant main effect of the group factor highlighted the superior performance of the experimental group, demonstrating that M-TGT is more effective in vocabulary acquisition and retention than conventional teaching strategies. Additionally, the interaction effect between time and group further illustrated that students in the M-TGT group showed greater improvement and retention over time compared to the control group. This suggests that the M-

TGT method offers not just immediate benefits but also enhances long-term vocabulary retention, which is a key component of language learning.

These findings align with recent studies that have examined the effectiveness of the Team-Games-Tournament (TGT) method in language learning. For instance, Rihanah and Sudiyono (2020) and Dewi and Nasution (2024) found that the TGT method significantly improved vocabulary mastery among students, highlighting its effectiveness in enhancing vocabulary acquisition. Playful learning activities, such as word games and collaborative learning, have been shown to promote vocabulary acquisition among young learners (Newton & Nation, 2020), especially young learners acquire vocabulary through multiple channels, including direct instruction, incidental learning, and interaction with peers and teachers (Elgort, 2011). According to Slavin (1995), this approach enhances motivation and makes learning vocabulary more engaging by adding a fun, competitive element. TGT fosters collaboration and peer support, where students help each other learn and apply new words. The competitive aspect of TGT also encourages active participation and reinforces vocabulary retention as students repeatedly use the words in meaningful contexts. This method has been shown to improve not only vocabulary knowledge but also student motivation and overall classroom dynamics (Nasution, 2018; Sunarti et *al*., 2019; Julianto, 2024).

Did vocabulary retention develop over time more effectively with M-TGT?

As for applying multimedia to English classrooms, Plass and Jones (2005) contend that multimedia learning allows students to experience vocabulary through multiple sensory channels, such as auditory, visual, and kinesthetic methods. By integrating multimedia into vocabulary instruction, students can engage with new words in a variety of contexts, leading to better comprehension and retention. Also, Teng (2022) pointed out the importance of audiovisual input in vocabulary learning and retention. Supportably, this finding confirms that multiple types of input, rather than a single type, promote vocabulary learning success, since they aid in the creation of mental images that illustrate connections or offer a holistic understanding. This aligns with the dual coding theory (Paivio, 1986), which suggests that combining verbal and visual elements enhances memory retention. Moreover, Ramezanali and Faez (2019) emphasized that when multimedia is paired with other instructional approaches, it significantly enhances learners' vocabulary knowledge retention, which aligns with the positive impact observed in the M-TGT approach. This is further supported by Rahimi and Allahyari (2019), who demonstrated that multimedia-assisted explicit vocabulary learning strategy (VLS) instruction contributed to vocabulary size and retention. Additionally, multimedia-based instruction, particularly through video clips and interactive graphics, led to higher vocabulary retention scores than text-only methods (Alhazmi, 2024) since it engages students through interactive and innovative teaching methods, which foster deeper understanding and long-term retention (Enikanolaye, 2021). The findings from the study of Puspitarini & Hanif (2019) highlight the limitations of traditional lecture methods, where students struggle with engagement and motivation. They emphasize the importance of engaging students through dynamic, interactive methods that move beyond passive learning, such as multimedia and team-based activities, to improve motivation and learning outcomes. Therefore, integrating multimedia into vocabulary teaching strategies could further strengthen students' learning experiences.

What were the participants' perceptions of learning English vocabulary through the M-TGT method concerning receptive knowledge, productive knowledge, and knowledge retention?'

The positive attitudes towards vocabulary learning observed in the students further corroborate the quantitative findings. Students expressed consistent happiness across different aspects of vocabulary learning—receptive knowledge, productive knowledge, and knowledge retention. This supports previous findings by Husein et *al*. (2024), who noted that multimedia-based instruction significantly increased engagement and motivation among primary school students, leading to faster vocabulary

acquisition. Additionally, Teng (2022) found that students learning through multimedia formats reported greater satisfaction and motivation.

These learners' perception likely contributed to the increased motivation and engagement observed in the experimental group. As previous research has shown, positive attitudes towards learning can lead to better performance and higher levels of retention. The data from this study suggests that when students are engaged and have a positive attitude towards their learning methods, they are more likely to retain and apply the new vocabulary they have acquired.

Further supporting these results, Van Wyk (2011) found that the Teams-Games-Tournament (TGT) method not only enhanced teamwork skills but also increased student engagement and motivation by incorporating elements of competition and collaboration. Similarly, Salam et *al.* (2015) investigated the impact of TGT in secondary school mathematics classrooms in Bangladesh and found that students who participated in TGT-based instruction developed more positive attitudes towards learning and demonstrated higher motivation compared to those taught using traditional methods. These findings align with the present study's results, confirming that TGT not only supports vocabulary learning outcomes but also cultivates positive attitudes towards the learning process.

**CONCLUSION AND SUGGESTIONS**

This study examined the effectiveness of the M-TGT method in improving English vocabulary acquisition and retention, comparing it to traditional teaching methods. The results indicated that the M-TGT method led to substantial improvements in both immediate vocabulary knowledge and long-term retention, especially in the experimental group. Notably, the interaction between the teaching method and time significantly favoured the experimental group, showing that the M-TGT approach not only enhanced immediate vocabulary performance but also supported better retention over time. This suggests that interactive and collaborative elements embedded within the M-TGT method were pivotal in fostering vocabulary learning. The students' positive attitudes towards learning receptive, productive, and retained knowledge in this study strongly suggest that the M-TGT method is an effective and engaging approach to vocabulary instruction. These attitudes not only reflect students' enjoyment of the learning process but also their increased confidence in using and retaining the vocabulary they have learned. Educators and researchers may consider integrating similar interactive and competitive methods to foster a positive learning environment that enhances vocabulary learning and retention.

Based on the findings, educators are encouraged to incorporate the M-TGT method into their teaching practices to foster better vocabulary acquisition and retention. The use of games and teamwork not only enhances motivation but also creates a supportive learning environment where students can actively engage with the material. Researchers are encouraged to explore further applications of the M-TGT method in other areas of language learning and to examine its long-term effects on language development. Future studies could also investigate how different student demographics respond to M-TGT and whether its effectiveness varies across different types of vocabulary (e.g., academic versus conversational). Integrating M-TGT into classroom instruction can provide students with a more dynamic and interactive way of learning vocabulary. Educators should consider using this method regularly, especially for younger learners, as it fosters both competitive and collaborative learning. Future studies could explore the M-TGT method's impact on other language skills such as listening, speaking, or reading. Additionally, examining how the method affects different types of learners, including those with varying levels of prior knowledge, would be valuable. Institutions considering the adoption of M-TGT for vocabulary instruction should provide professional development for teachers to effectively implement this strategy and assess its impact on student outcomes.

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