The Effect of Card-Game-Based Instruction on Vocabulary Knowledge and Student Engagement in Primary School EFL Students

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Received: March 3, 2026 Accepted: April 10, 2026 Online Published: September 24, 2026

doi:10.5430/wjel.v16n6p585 URL: https://doi.org/10.5430/wjel.v16n6p585

Abstract

This study examined the effect of card-game-based instruction on vocabulary acquisition and student engagement among Thai primary school EFL learners. Using a mixed-methods research design, 30 fifth graders were assigned to an experimental group that received vocabulary instruction through card games and a control group that received traditional instruction. Vocabulary knowledge was tested before and after the intervention, and three months later, and engagement was examined through questionnaires and semi-structured interviews. The quantitative results showed that the experimental group performed significantly better than the control group on both the immediate and delayed posttests, providing evidence of the positive effect of game-based instruction on vocabulary learning and retention. These higher delayed posttest scores indicated that students were better able to retain the vocabulary learned during instruction for longer; this increase does not suggest any further learning occurring after the intervention itself. Qualitative findings also indicated an increase in behavioural and emotional engagement. Specifically, students actively participated, enjoyed the learning activities, and remained motivated throughout. Card games, which are filled with dynamics, competition, and interaction, contribute to effective vocabulary learning. In general, the results offer compelling evidence that card-game-based teaching is an effective method for enhancing vocabulary acquisition, retention, and learner engagement. The research highlights the need to incorporate game-assisted learning into language-teaching classes. Further research should explore cognitive engagement and sustained outcomes at various levels of proficiency and in different learning contexts.

Keywords: vocabulary acquisition, student engagement, card-game-based instruction, vocabulary retention, Thai EFL learners

1. Introduction

Vocabulary is a fundamental element of language proficiency and an essential requirement for successful communication, understanding, and production across the four language skills. Vocabulary learning is vital in all ESL classes, but it is also one of the most difficult aspects of teaching English as a Foreign Language (EFL). Compared with grammar or the four macro-skills, vocabulary has been systematically neglected in most language classrooms over the years (Akdogan, 2017), and hence L2 learners have not developed sufficient vocabulary. Over the last few years, however, vocabulary studies have shifted scholarly attention towards effective vocabulary teaching and retention, with a renewed focus on strategies that move beyond rote learning towards contextualised, engaging, and cognitively feasible approaches (Chowdhury et al., 2024; Dodigovic, 2018; Matwangsaeng & Sukying, 2023).

Recently, there has been significant interest in game-based learning for vocabulary instruction. Educational games can foster a fun, low-anxiety learning environment, thereby increasing learner motivation and engagement (Gozcu & Caganaga, 2016). Well-designed games, when dovetailed with classroom practices, encourage active engagement, cooperation, and meaningful language use (Butler, 2017; Wichadee & Pattanapichet, 2018), thereby furthering communicative and learner-centred pedagogies.

Another popular teaching approach, flashcards, reinforces memorisation through repetition and visual aids, enabling both receptive knowledge (recognition and understanding) and productive knowledge (accurate registration and use) (Yowaboot & Sukying, 2022). However, standalone word lists and minimal engagement may hinder deeper lexical processing and memory consolidation.

Unlike flashcards, which are commonly used for individual vocabulary review through repetition and form-meaning connections, card games incorporate rule-based interaction, turn-taking, and communicative tasks that require learners to actively process and use vocabulary. They address the need for active vocabulary engagement through peer interaction, contextualised word use, and the negotiation of meaning (Derakhshan & Khatir, 2015). Their adjustable nature enables high-level personalisation of difficulty and content to meet learners' needs, thus facilitating differentiated education (Kickmeier-Rust et al., 2011). Card games have been found to improve attention, motivation, and memorisation while reducing anxiety, which many experience with traditional methods of vocabulary learning (Asgari & Mustapha, 2011;

Khan, 2022), especially at the primary level.

Despite extensive research on aspects of digital game-based learning, comparatively little empirical evidence has been gathered on the outcomes of implementing card games, specifically in an EFL context, and on physical gameplay experiences, particularly in resource-constrained contexts. The current investigation aims to bridge this gap by examining the extent of vocabulary learning, retention, and motivation among primary school EFL learners through playing card games. Thus, it adds to the growing literature on game-based pedagogy and provides practical, cost-effective implications for language teachers.

1. What is the effect of card-game-based instruction on enhancing Thai primary school students' vocabulary knowledge and retention?
2. How does card-game-based instruction influence Thai primary school students' engagement in vocabulary learning?

2. Literature Review

2.1 Vocabulary Knowledge

Vocabulary knowledge is the foundation of language proficiency; it is the ability to understand input, talk about it, and express yourself accurately. However, vocabulary knowledge is not just the sense in which someone can recognise a word. It includes broad knowledge of a word's form, meaning, and use in context (Nation, 2022; Nation & Coxhead, 2022; Nontasee & Sukying, 2023). Richards (1976) identified aspects of lexical knowledge that are multidimensional: spoken and written forms; grammatical behaviour; collocations; frequency; stylistic register; sense relations and associative networks. Nation (2022) used this framework to combine these elements into three overarching areas: form, meaning, and use, with productive and receptive knowledge in each.

Knowledge of the form dimension includes a word's spoken and written forms and its morphological structure. The meaning dimension entails knowledge of the form-meaning relationship, related concepts, and relations to other words or fillers. The use dimension includes grammatical and collocational patterns as well as contextual constraints. Finally, a key point is that vocabulary learning assumes that these dimensions are integrated within the mental lexicon, where words are systematically organised and interconnected (Milton, 2009).

Lexical development in early childhood encompasses a variety of aspects, most notably the distinction between receptive and productive vocabulary knowledge. Vocabulary knowledge is typically divided into receptive and productive components. Receptive vocabulary comprises words that learners can identify and understand when listening or reading (Sukying, 2025). In contrast, productive vocabulary involves accurate retrieval of words and their appropriate use when speaking or writing (Sukying, 2025). However, receptive knowledge is more easily practised through exposure to input (Matwangsaeng & Sukying, 2023; Min & Sukying, 2026; Nation, 2022), whereas productive mastery requires deeper processing that maintains context control. Research indicates that several deep, meaningful encounters, often as many as 16, are necessary for durable word learning (Nation, 2022). Therefore, effective vocabulary instruction should systematically promote both receptive and productive development through repeated, contextually rich exposure.

2.2 Card-Game-Based Vocabulary Learning

Intentional vocabulary learning, especially with word cards or flashcards, is among the most empirically supported techniques for vocabulary development (Elgort, 2011; Nation, 2022). Intensive flashcard study fosters correct form-meaning associations and enables durable retention by encouraging focused attention, distributed practice, and retrieval practice, all essential mechanisms in the consolidation of long-term memory. As Nation (2022) noted, well-designed flashcard learning shows immediate mastery and good retention several weeks later. While it has become fashionable to speak of decontextualised learning (Judd, 1978), learner-based note studying is certainly not pedagogically unproblematic. Instead, it supplements incidental learning by accelerating initial vocabulary acquisition and consolidating core knowledge (Nation, 2013). In separating this more nuanced debate, empirical studies have shown that a combination of explicit learning with contextualised use leads to stronger and more durable vocabulary gains (Elgort, 2011; Yowaboot & Sukying, 2022).

Therefore, these principles build directly on Card-Game-Based Learning (CGBL), which embeds specific vocabulary items within structured game mechanics (e.g., matching, categorising, or sentence construction) and is an extension of the flashcard methodology (Hwang & Wang, 2016; Vos et al., 2011). CGBL does not discard the cognitive benefits of repetition and retrieval; rather, it adds interaction, collaboration, and competition to the learning experience. Incorporating physical card manipulation further enhances multisensory and embodied learning, while peer engagement enables meaning negotiation and leads to deeper processing (Webb, 2007). These features align with involvement load theory, which holds that vocabulary retention increases when tasks entail higher need, search, and evaluation (Laufer & Hulstijn, 2001).

Research shows that CGBL facilitates both short-term learning and long-term retention through repeated, meaningful encounters with target vocabulary (e.g., exposure) (Lukas et al., 2020; Sheridan & Markslag, 2017). Furthermore, its adaptable design allows differentiation by proficiency level (Kickmeier-Rust et al., 2011). Such a low-anxiety, socially engaging context fosters students' development of receptive and productive vocabulary when negotiated conversation practices in the community of learners are implemented, thereby creating supportive conditions for higher motivation and communicative confidence (Butler, 2017).

2.3 Theoretical Frameworks

2.3.1 Constructivist Learning Theory

Constructivist Learning Theory holds that knowledge is actively constructed through experience, interaction, and reflection rather than

passively received (Piaget, 1972; Vygotsky, 1978). From this perspective, learning is a process of constructing meaning, and a newcomer's knowledge is built by integrating what they learn into their existing cognitive structures (Wenger, 1998). In language learning, constructivism likewise emphasises the centrality of learners, interaction, and collaboration. Card games align with these principles by fostering negotiation for meaning, peer interaction, and cooperative problem-solving. They support students within their zone of proximal development in vocabulary and language skills (Vygotsky, 1978) by providing real-time feedback through gameplay and empowering students to work collaboratively. In this way, CGBL emulates constructivist learning by providing experiential, collaborative, and meaningful opportunities for learners to shape and use vocabulary knowledge (Butler, 2017; Derakhshan & Khatir, 2015).

2.3.2 Dual Coding Theory

According to Dual Coding Theory (Paivio, 1990), organising information in both verbal and visual forms has a dual effect: improving comprehension and facilitating recall. Learners who connect linguistic input (word forms and meanings) with non-verbal imagery (pictures, icons, colours) develop dual encoding systems that support stronger recall (Paivio, 1990). In CGBL, words can be presented through both oral (reading, speaking, or listening) and visual (cards, symbols, and images) representations. This multisensory integration further strengthens memory and retrieval (Paivio, 1990). Studies confirm that multimodal vocabulary-learning techniques (e.g., flashcards, picture card games) significantly enhance students' recall of receptive and productive vocabulary knowledge (Teemueangsai et al., 2025; Yowaboot & Sukying, 2022). Thus, CGBL reflects an enactive form of dual coding by engaging both linguistic and perceptual modes for encoding, retrieval, and long-term retention.

2.3.3 Cognitive Load Theory

Cognitive Load Theory (Sweller, 1994, 2011) focuses on working memory capacity and the role of instructional design in supporting cognitive processing. The theory differentiates between intrinsic load (task complexity), extraneous load (poorly designed materials), and germane load (effortful thinking for learning). In vocabulary instruction, cognitive load is also a key factor in mitigating overload and building a schema. CGBL strikes a balance by incorporating multimodal and interactive elements to direct attention and aid comprehension. The structure of gameplay reduces extraneous cognitive load through explicit goals and feedback, while repetition and categorisation increase germane cognitive load by supporting schema formation. In addition, peer interactions and access to input on peer productions support intrinsic load, enabling learners to focus on building their store of lexical information (Sweller, 2011). In this way, CGBL maximises learners' cognitive resources for automating vocabulary knowledge.

2.3.4 Student Engagement in Vocabulary Learning

Student engagement is a key predictor of successful L2 vocabulary acquisition, as it shapes learners' attention, effort, persistence, and willingness to use new words. In SLA research, engagement supports noticing, processing, and retention of language input, all of which are essential for durable vocabulary learning (Schmitt, 2019). More engaged learners tend to retain vocabulary longer and apply it more accurately in communication.

Engagement is commonly conceptualised as a multidimensional construct comprising behavioural, emotional, and cognitive dimensions (Fredricks et al., 2004). Behavioural engagement refers to visible participation, such as concentrating on tasks, responding to questions, practising target vocabulary, and persisting with activities. Emotional engagement concerns learners' affective responses, including enjoyment, interest, confidence, and reduced anxiety. Positive emotions strengthen motivation and sustain participation. Cognitive engagement involves mental investment in learning, such as using memory strategies, linking new vocabulary to prior knowledge, monitoring progress, and applying vocabulary in meaningful contexts.

Research indicates that instructional approaches such as task-based and game-based learning can enhance engagement and improve vocabulary outcomes. Interactive features such as goals, feedback, challenge, and repetition encourage active participation and deeper processing, leading to stronger retention and use of vocabulary (Plass et al., 2015; Teemueangsai et al., 2025).

3. Methods

3.1 Participants and Setting

The present study employed a mixed-methods research design to investigate the impact of card-game-based vocabulary learning on Thai primary school students' vocabulary gains, knowledge retention and involvement. Learner engagement was examined from two perspectives: behavioural and emotional engagement, assessed through classroom observations and an engagement questionnaire. Vocabulary knowledge was thus measured short-term (immediate posttest) and long-term (delayed posttest) by contrasting scores on the pretest, immediate posttest and delayed posttest. The participants were 30 fifth-grade Thai EFL students (age = 11) from a public primary school in the northeast region of Thailand.

All participants had been learning English as a second language for about five years. The students were taught only by Thai EFL teachers. None had experience learning English from native or non-native teachers, nor much exposure to English outside the classroom, so they were linguistically homogeneous for a controlled comparison. The participants were randomly assigned to two groups: the experimental group (n = 15), which received card-based vocabulary instruction, and the control group (n = 15), which received teacher-centred instruction. The use of random assignment helped minimise selection bias and ensured that the groups were equivalent in age, proficiency, and learning experience. All participants and their parents or guardians were provided oral information regarding the objectives, procedure, and right to confidentiality of the research. All participants and their guardians provided written informed consent in

accordance with ethical research standards. Participation was voluntary, and students were told they could withdraw from the study at any time without academic penalty.

3.2 Instruments

3.2.1 Form-Recognition Test

The Form-Recognition Test assessed participants' word recognition and spelling skills. It included 15 multiple-choice items in which a target word was presented, followed by distractors that were the most prevalent spelling errors. Participants were asked to choose the accurately spelled form. This task measured pupils' ability to deal with the word form (e.g., orthographic representation) and compete for resources in vocabulary recognition and writing. The use of the multiple-choice test ensured objectivity, facilitated administration, and enabled rapid scoring.

3.2.2 Form-Recall Test

Form-Recall Test: Form-orthography is the correct spelling of words in text. Fifteen test items were scrambled words that students had to reorder to form a correct English word. Every article was found to contain all of the letters required for the correct spelling. This required students to have productive form knowledge, to focus on orthographic detail, and then reconstruct (unseen) lexical items from memory. The structure of the exercise promoted retrieval effort and enhanced processing of lexical forms.

3.2.3 Meaning-Recognition Test

The Meaning-Recognition Test also investigated receptive knowledge of word meanings. It consisted of 15 multiple-choice test items with an English target word followed by four Thai meanings. The respondents were to choose the meaning closest to the English word in the offline context. This task tested whether learners could distinguish similar semantic meanings and recall proper lexical relations. The MC format enabled a quick and objective scoring procedure and good coverage of target vocabulary in a short time.

3.2.4 Meaning-Recall Test

The Meaning-Recall Test measured participants' active word meaning knowledge, which is the ability to produce a word's meaning through L2-L1 translation. Fifteen English words were displayed for students to write in Thai, along with their meanings. This activity assessed the potential to recall and express word meanings without a cue, indicating higher levels of lexical proficiency in both languages and of bilingual vocabulary retrieval. The translation measurement format was statistically robust for measuring the salient half of the L2 (Thai) material for all L2 semantically mediated lexical retrieval in an EFL setting.

3.2.5 Engagement Questionnaire

The Engagement Questionnaire was developed to measure participants' behavioural and emotional engagement in card-game vocabulary learning tasks. This instrument was designed to assess the extent to which students engaged, interacted, and responded vibrantly during their learning. The instrument used was a modified version of the questionnaire originally designed by Teemueangsai et al. (2025) and calibrated for the Thai primary school context of EFL learners.

The questionnaire had two dimensions, behavioural and emotional Engagement, which include 12 items. The constructs are each operationalised by six items that measure relevant engagement criteria: participation, attentiveness or effort; collaboration; and enjoyment and satisfaction. The items were rated on a 5-point Likert scale, ranging from 1 (Never/Strongly Disagree) to 5 (Always/Strongly Agree), depending on the item. This allowed respondents to assess how accurately each statement reflected their experiences with vocabulary lessons based on a card game.

Students were provided with detailed explanations in plain Thai before treatment administration. The Thai version of the questionnaire was given to the voluntary participants. They were informed that the questionnaire was designed to find out what they thought and did when learning new English words from card games. They were also assured that there were no "correct" answers and that their accurate responses would be used strictly for research purposes.

3.2.6 Semi-Structured Interview

To gain a deeper understanding of learners' beliefs about and experiences with card-game-based vocabulary learning, qualitative semi-structured interviews were conducted alongside quantitative data collection. The semi-structured interviews aimed to explore participants' affective and behavioural engagement, encompassing positive experiences (enjoyment), initiative participation (emotion), focus (attention), involvement with others (collaboration), and attitudes towards learning English through card games. This methodology allowed for the collection of rich, contextualised data which spoke to more than just participants' voices regarding numerical findings (Burns, 2009; Han & Hyland, 2015).

3.3 Data Collection

All four vocabulary measures, Form-Recognition Test (FRT), Form-Recall Test (FRT), Meaning Resources in the form of Recognition Test (MRT) and Meaning Recall Test, were piloted for validity and reliability before the main study. In addition, three specialists in English Language Teaching reviewed the instrument to ensure its content validity. Internal consistency reliability coefficients were acceptable: Form-Recognition (.85), Form-Recall (.80), Meaning-Recognition (.87) and Meaning-Recall (.83), suggesting adequate to excellent reliability.

The experimental and control groups received a pretest (60 minutes) to ensure equivalence in vocabulary recognition and recall. After taking the pretest, the group receiving Card-based instruction (Experimental) interacted with pre-structured games, while the other students practised learning through a teacher-centred method (Control). Immediately following the intervention, participants in the experimental condition completed a five-point Likert-scale engagement questionnaire (approximately 10 minutes). A posttest, matched on format and content to the pretest, was administered immediately afterwards to all participants to assess vocabulary uptake under comparable test conditions. Three weeks later, a delayed posttest was given to evaluate retention.

Lastly, eight students from the experimental group were selected for semi-structured interviews to explore their learning experiences, engagement, and motivational responses that emerged during 15-20-minute interviews following the card-game-based instruction.

3.4 Procedure for Card-Game-Based Instruction

This study aimed to compare the effectiveness of a traditional approach (control group) with an experimental treatment using a structured Card-Game-Based Learning (CGBL) informed by *Happy Campers 5* textbook vocabulary instruction. To maintain internal validity and enable comparability across the different lessons/items, the teacher modelled on a similar pedagogical cycle while, through this active engagement, encouraging an authentic discussion of concepts and the appropriate use of contextualised vocabulary.

Each lesson had three overall stages: presentation, guided interactive practice and consolidation. During the presentation stage, the vocabulary items were introduced with picture cards and realia along with short, contextualised descriptions of their meanings to establish accurate form-meaning connections. The teacher modelled both pronunciation and guided repetition to support initial understanding and correct phonological representation.

In stage two, guided exposure with structured card-based activities (word matching, word association, sentence structuring). These were deliberately written to encourage retrieval practice, peer working, and the consolidation of words in context. Elements of cooperation and light competition were incorporated to keep participants motivated while maintaining a supportive, low-anxiety environment. At this stage, active participation (i.e., negotiation) and multisensory engagement were stressed. The last phase was about consolidation and reflection. The students did short oral and written activities that went beyond just using the vocabulary in-game, deeper processing and transfer. To foster retention through practice retrieval and meaningful application, individual accountability and group interaction were needed.

The control group, however, received traditional teacher-fronted instruction based on a Presentation-Practice-Production framework. Vocabulary was taught indirectly, through explicit instruction, translation, repetition and workbook activities. While structured and systematic, this method relied heavily on memorisation through rote learning and written work by the individual learner, with minimal engagement or contextual use of the vocabulary.

3.5 Data Analysis

The quantitative data from the vocabulary tests and the engagement questionnaire were analysed using descriptive and inferential statistics. Descriptive statistics (means, standard deviations and percentages) were calculated to summarise pretest, immediate posttest and delayed posttest performance. Independent-samples *t*-tests were performed to assess between-group differences (experimental vs control). Statistical assumptions were examined before performing inferential analyses. Normality was assessed via the Shapiro-Wilk test and homogeneity of variance using Levene's test. The results showed that the data met all required assumptions, thereby validating the use of parametric testing. Behavioural and emotional engagement for the experimental group was descriptively analysed (means, standard deviations, and percentages) on five-point Likert scales of continuous variables from part one of the questionnaire.

Qualitative interview data were transcribed verbatim and analysed through Braun and Clarke's (2006) six-step thematic analysis framework. Two independent coders analysed the transcripts to improve trustworthiness. The intercoder reliability was substantial (Cohen's $\kappa = 0.85$), meaning there was high agreement between coders. Disagreements were resolved through discussion until consensus was achieved. The accuracy of interpretations was validated through member checking, which enhanced the credibility and dependability of the findings.

4. Results

4.1 Effect of Card Game-Based Instruction on Vocabulary Knowledge and Retention among Thai EFL learners

Table 1 presents the descriptive statistics of students' performance on the four vocabulary tests. A general trend in performance was observed across both groups, with the experimental group consistently performing better than the control group. Specifically, mean scores in the experimental group were 6.47 (S.D. = 1.13), corresponding to 10.78% on the pretest, and mean scores in the control group were 5.93 (S.D. = 1.10), corresponding to 9.88%. Upon completion of the posttest, the experimental group's mean score increases to 29.80 (49.67%, S.D. =7.86) while that of the control group becomes 22.33 (37.22%, S.D.=7.93). Regarding vocabulary retention, the delayed posttest analysis revealed that the experimental group had a larger mean (22.60; 37.67%; S.D. = 7.79) than the control group (15.27; 25.44%; S.D. = 5.62). Overall, the results suggest card game-based instruction is useful for enhancing vocabulary knowledge and retention among Thai EFL learners.

Table 1. Descriptive statistics

Group	Test	Pretest			Posttest			Delayed posttest		
		Mean	%	S.D.	Mean	%	S.D.	Mean	%	S.D.
Experimental	Meaning-recognition	2.93	19.56	0.80	9.53	63.56	2.10	7.67	51.11	2.44
	Form-recognition	3.40	22.67	0.83	8.73	58.22	1.75	5.80	38.67	1.70
	Meaning-recall	0.00	0.00	0.00	7.20	48.00	2.18	6.07	40.44	2.28
	Form-recall	0.13	0.89	0.35	4.33	28.89	2.16	3.07	20.44	1.75
	Total	**6.47**	**10.78**	**1.13**	**29.80**	**49.67**	**7.86**	**22.60**	**37.67**	**7.79**
Control	Meaning-recognition	2.80	18.67	0.77	7.47	49.78	2.20	4.87	32.44	1.64
	Form-recognition	3.07	20.44	0.96	6.27	41.78	2.09	3.47	23.11	1.25
	Meaning-recall	0.07	0.44	0.26	5.47	36.44	2.39	4.60	30.67	1.88
	Form-recall	0.00	0.00	0.00	3.13	20.89	1.64	2.33	15.56	1.29
	Total	**5.93**	**9.89**	**1.10**	**22.33**	**37.22**	**7.93**	**15.27**	**25.44**	**5.62**

Table 2 shows overall performance on vocabulary knowledge tests at three time points. An independent-samples *t*-test was conducted to determine the differences between groups. The analysis of the findings revealed no significant differences in the pretest performance. In contrast, statistically significant differences were observed at posttests ($t = 2.59$, $p < .05$) and delayed posttests ($t = 2.96$, $p < .05$). These findings suggest that card game-based instruction enhances Thai primary school EFL participants' vocabulary knowledge. Additionally, the effect sizes were calculated using Cohen's *d*. The result showed small-to-moderate effect sizes in the pretest ($d = 0.48$), suggesting comparable baseline performance (Cohen, 1988). The posttest, however, found a large treatment effect ($d = 0.94$), and the delayed posttest showed that this sustained effect was also large ($d = 1.08$) (Cohen, 1988). The results revealed that card-game-based instruction significantly enhanced vocabulary learning and retention.

Table 2. Comparison of overall performance on vocabulary knowledge between groups

Tests	Groups	Mean	%	S.D.	*t*-value	*p*-value	Cohen's *d*
Pretest	Experimental	6.47	10.78	1.13	1.31	0.20	0.48
	Control	5.93	9.89	1.10			
Posttest	Experimental	29.80	49.67	7.86	2.59	0.05*	0.94
	Control	22.33	37.22	7.93			
Delayed posttest	Experimental	22.60	37.67	7.79	2.96	0.05*	1.08
	Control	15.27	25.44	5.62			

Note: the total score = 60

4.2 Students' Engagement in Card Game-Based Instruction in Vocabulary Learning

4.2.1 Questionnaire Results

Learner engagement in card-game-based vocabulary activities was examined across two dimensions: behavioural and emotional engagement. Behavioural engagement encompassed active participation, adherence to game rules, sustained attention to target vocabulary, and collaborative interaction. Emotional engagement referred to students' affective responses, including enjoyment, enthusiasm, confidence, and satisfaction.

Table 3. Students' engagement in vocabulary acquisition through card-game-based activities

Statements	Mean	%	S.D.	Meaning
Behavioural engagement				
1. I try my best to play the card games during vocabulary lessons.	4.47	89.33	0.64	Very high
2. I pay attention to the words in the card games.	4.80	96.00	0.41	Very high
3. I follow the rules of the game while playing.	5.00	100.00	0.00	Very high
4. I help my friends understand words when we play.	4.53	90.67	0.64	Very high
5. I try to remember the words from the card games.	5.00	100.00	0.00	Very high
6. I use the words I learned from the games when I speak or write in English.	4.07	81.33	0.46	High
Total	**4.64**	**92.89**	**0.36**	**Very high**
Emotional Engagement				
7. I enjoy learning new words by playing card games.	5.00	100.00	0.00	Very high
8. I feel happy when we play vocabulary card games.	5.00	100.00	0.00	Very high
9. I feel more confident about the words I learn after playing the card games.	4.60	92.00	0.51	Very high
10. I'm excited to learn new words through card games.	4.67	93.33	0.49	Very high
11. I feel proud when I use the words I learned from the games.	4.87	97.33	0.35	Very high
12. Playing card games makes learning new words fun for me.	5.00	100.00	0.00	Very high
Total	**4.86**	**97.11**	**0.18**	**Very high**

Table 3 presents students' engagement in vocabulary learning through card-game-based instruction. The findings indicate a high level of behavioural engagement (M = 4.64, 92.89%, SD = 0.36), suggesting that students were consistently attentive and actively involved in the learning tasks. The low standard deviation reflects relatively uniform engagement across participants. Emotional engagement was reported at a very high level (M = 4.86, 97.11%, SD = 0.18), indicating that students experienced strong positive emotions during

gameplay. Overall, the results demonstrate that card-game-based instruction effectively fostered both active participation and positive affective responses, creating a supportive and motivating environment conducive to vocabulary learning and retention among Thai primary school EFL learners.

4.2.2 Seimi-Structured Interview Results

The semi-structured interviews yielded qualitative data in addition to the findings from the questionnaires and vocabulary tests. Participants were classified into High-Performing (HP) and Low-Performing (LP) groups based on their scores for a vocabulary test (grouping criterion: 31/45). Eight students, four from each group, were interviewed.

Braun and Clarke's (2006) six-step thematic analysis was employed to analyse the data. Two independent coders created and revised initial codes (n = 32) with high intercoder reliability (Cohen's $\kappa = 0.85$), reflecting substantial agreement. Discuss and resolve discrepancies, followed by member checking to establish credibility and interpretive validity. The analysis identified two superordinate themes: behavioural engagement and emotional engagement.

Behavioural Engagement

This theme focused on students' visible engagement in vocabulary learning through card games, including their participation, effort, and interactions with peers. The results show that card games elicited active engagement during the class but revealed substantial differences in individual students' confidence and persistence.

Regarding participation and involvement, the results show how much students engaged in gameplay and classroom activities. Most participants described themselves as more engaged than in traditional lessons.

"I like the group activities… we were rarely able to work as groups before the card-game sessions." (HP1)

"I like that we're not sitting there studying the entire time." (HP2)

But the LP students took a more passive stance when unsure of a vocabulary item.

"If I'm not sure of the words, I just watch sometimes." (LP6)

"I did what friends told me." (LP5)

These replies suggest that although engagement was generally good, the level of confidence influenced the intensity of participation.

The analysis of the results indicated students' effort and persistence. This subtheme relates to students' persistence and self-regulation of their learning while playing and after the game has ended. Some students described targeted practices to strengthen vocabulary.

"I repeat them in my head or write them down." (LP4)

"I want to learn from my mistakes that will not affect me next time." (HP2)

Still, some admitted to limited independent review outside of class.

"I never take the time to learn words outside of class." (LP5)

This suggests that, while card games seem to have increased in-class effort, out-of-class persistence varied.

Regarding collaboration and interaction, this subtheme identified the social aspect of engagement. Students often described assisting peers, clarifying vocabulary and organising strategies.

"All my friends ask me to tell them the laws of words. (HP3)

"I used to talk with my friends a lot and ask what I could do to help." (LP5)

Such comments indicate gameplay that encourages collaboration, shared responsibility, and peer-supported learning.

Emotional Engagement

This theme captures students' affective responses to card-based learning, including enjoyment, confidence, and emotional reactions to competition. Overall, these findings reflect mostly positive feelings that helped maintain motivation.

Intrinsic motivation refers to the interest and enjoyment coming from the engagement by virtue of play itself. Most students found the activities fun and motivating.

"I don't even feel like I'm studying. (HP2)

"I like learning new words when we play the card games." (HP5)

These responses indicate that enjoyment was a primary motivator for sustained attention and engagement.

Regarding feelings of accomplishment and confidence, the findings showed an increase in students' perceived confidence in vocabulary learning.

"I remember the words well in the posttest. (HP1)

"When I learn happily, the outcomes are better than earlier." (HP3)

"I liked it when I learned a new word, and then I used it right in the game." (LP6)

These statements illustrate the reciprocal relationship among positive emotions, self-efficacy, and performance.

Another subtheme identified relates to competition and emotional regulation. This sub-theme focuses on students' emotional reactions to competitive aspects of gameplay. Competition stimulated some excitement and motivation, although mild anxiety was sometimes reported.

"I get more excited about the aspect of competition." (LP4)

"I was nervous because I wanted to win." (LP4)

"I wasn't angry… it's just a fun way to learn." (LP8)

These results indicate that competent competition mainly increased engagement with the task while enabling students to control their emotional reactions.

Overall, the qualitative findings add strength to the quantitative results, illustrating that instruction based on card games promoted long-term participation when behaviours were not consistently employed and positive emotional involvement, but also highlighted subtle individual differences in confidence, persistence, and emotion control.

5. Discussion

5.1 Effect of Card-Game-Based Instruction on Vocabulary Knowledge and Retention among Thai EFL learners

The results of this study provide empirical evidence that card-game-based instruction significantly improves vocabulary knowledge among Thai primary school learners. Quantitative analysis found that, across form recognition, form recall, meaning recognition, and meaning recall, vocabulary gains are not only immediate but also enduring when children learn actively through games. These findings support Nation's (2022) argument that repeated, meaningful encounters with items in rich contexts will strengthen form-meaning links and support later recall. The nearly 50% gain in the experimental group's form-recognition scores, coupled with only a slight decline in lexical retention (4%), highlights the effectiveness of repeated exposure via structured gaming. While both groups showed some improvement, the minimal attrition in the treatment group suggests that interactive learning is superior to rote learning (Schmitt, 2019). Similarly, increases in form recall of over 30% and a marginal decrease of only 3% in delayed task performance demonstrate the efficacy of retrieval practice and active call mechanisms employed by games (Finn & Zimmer, 2012).

The positive effects of card-game-based instruction may be explained by the underlying learning mechanisms. Specifically, card games create an interactive and enjoyable learning environment that supports learners' motivation and sustained attention. Moreover, gameplay provides repeated exposure to target vocabulary and frequent retrieval of word forms and meanings, thereby enhancing memory retention. The collaborative and competitive elements of card games also encourage active participation and immediate feedback, both of which support deeper vocabulary processing. Therefore, these results align with previous research indicating that game-based learning enhances engagement, vocabulary learning and long-term retention (Teemueangsai et al., 2025).

The benefits of meaning-based interaction were even greater. In a sentence, in a study of meaning recognition and recall, this experimental group showed approximately 40% improvement, with a slight decrease in retention over time. These findings are consistent with Ellis's (2019) notion of meaning-driven involvement, which promotes deeper cognitive processing and long-term memorability. They are also consistent with the depth of processing hypothesis (Schmitt, 2019), which holds that students who engage in deeper processing, such as elaboration, peers' explanations, and discussion, develop more robust lexical profiles.

The overall gains across all test types are grounded in cognitive processing, as other game-based instruction has demonstrated benefits for multimodal learning. Citing Mayer's (2011) cognitive theory of multimedia learning, combining visual, auditory, and kinesthetic modalities enhances information encoding and retrieval. In this study, card manipulation, the visual presentation of words, and the ensuing verbal exchange provided rich multimodal input that reinforced learners' memory networks. Furthermore, the large effects in both recognition and recall tests validate Nation's (2022) principle of "deliberate learning through repeated exposure." These words were therefore learned repeatedly across turns by children, thereby enhancing receptive knowledge and reactivating productive vocabulary. This is consistent with Fredricks et al.'s (2004) engagement framework, which posits that cognitive, behavioural, and emotional engagement interact to influence learning.

The findings of the current study also indicate a relationship between competition and collaboration that should be maintained to achieve optimal engagement. Competition sparked enthusiasm and motivated many learners to work hard, but a few learners experienced low anxiety, which was detrimental to their performance. This finding is consistent with Young and Wang (2014), who warn that competition may increase or decrease engagement depending on users' affective responses. Emotional involvement was also particularly impactful on retention. Specifically, students with high joy and motivation at the time of measurement achieved higher posttest scores, confirming Ge and Ifenthaler's (2017) argument that positive sentiment supports academic outcomes and cognitive functioning.

It can be concluded that card games foster interactive engagement, which enhances vocabulary, memory, and recall, and provides emotional support. Multimodal input and peer collaboration, together with repeated retrieval opportunities, facilitate deep learning and long-term retention. These findings further support the view that student-centred, game-driven learning is an effective way to teach vocabulary in EFL settings, and that children require engaging activities to sustain motivation and language development.

5.2 Students' Engagement in Card-Game-Based Instruction in Vocabulary Learning

The qualitative and quantitative results have shown that card-game-based vocabulary learning can elicit participants' behavioural and emotional engagement, which in turn mediates vocabulary learning and retention. Engagement was evident in students' involvement, cooperation, interest and enjoyment, dimensions that collectively reflect Fredricks et al.'s (2004) tripartite model of engagement.

Students demonstrated high levels of behavioural engagement during the intervention. Classroom observations and interviews provide evidence that most students also showed high levels of engagement, as evidenced by their willingness to participate, assist their peers, and focus on the activity. Some previously quiet students developed confidence in vocabulary and social support, becoming more vocal, consistent with Ellis's (2019) claim that engagement in purposive language tasks promotes focused attention and participatory behaviour.

Students who frequently discussed meanings, explained rules, and used words in example sentences showed a significant increase in vocabulary retention on posttests. This suggests that vocabulary use and meaningful output help consolidate word knowledge. The card game provided a second example of an organised, flexible activity that reduces off-task behaviour and promotes sustained attention.

Collaboration was the most influential yet divisive factor in engagement. Peer scaffolding, such as students explaining word meanings, negotiating rules, or helping teammates, demonstrates Vygotsky's (1978) sociocultural theory that social interaction promotes cognitive development. This scaffolding illustrates how collaborative learning increased both understanding and confidence. This cooperative model enhanced vocabulary understanding and fostered social relationships and a collective sense of effort.

Behavioural engagement was also evident in students' adherence to discipline and game strategy, with all players reporting that they followed the game's rules and maintained focused attention on vocabulary during play, as indicated in the survey. The only relatively low behaviour was the use of learnt words outside of class, indicating that although engagement during the gameplay activity is high, there are opportunities to increase transfer to real-world contexts through post-game reinforcement activities.

Emotional engagement was equally essential, serving as the affective motor of motivation and tenacity towards a task. The students overwhelmingly reported enjoying learning vocabulary through card games, finding them exciting and confidence-boosting. "I like that we're not just sitting and studying; it's nice to take a step back sometimes," said HP2, and "I feel happy when we play vocabulary card games" (HP1) illustrate how active learning helped generate a classroom atmosphere of wonder and enjoyment.

The competitive element also spurred participation. When learners are more competitive, competition can either heighten excitement and focus, "I am more excited in the aspect of competition (LP4)", or provide tangible rewards that reinforce motivation: "I'm so excited when the teacher gives rewards. So, my group tries to be good scorers to get a reward" (HP2). These results align with Teemueangsai et al. (2025), who emphasise the importance of challenge, reward, immediate feedback, and a learner's willingness to assist others, fostering keen interest and deeper processing. However, some learners were mildly anxious about winning, which aligns with Young and Wang (2014), who argue that emotional reactions to competition vary from learner to learner. Crucially, in most cases, anxiety was converted into productive motivation among these students, indicating that moderate competitive tension can act as a positive affective catalyst when appropriately moderated.

The qualitative findings also showed a link between positive emotion and performance on the vocabulary test. Learners who expressed pleasure and confidence produced more accurate responses on the posttest and recalled information more effectively. This claim is evident in "I felt more confident when recalling what I had learned after taking the posttest" (HP1) and "I was also happy to see that my result was different from before" (HP3). These results are consistent with those of Plass et al. (2015), who found that positive emotions foster memory consolidation and deeper learning.

The overall results support the view of engagement as both a cause and an effect of effective vocabulary learning. Behavioural engagement facilitated practice and repetition, whereas emotional engagement sustained motivation by reducing anxiety. Taken together, these dimensions synergistically facilitated deep lexical processing, consistent with the Depth of Processing Hypothesis (Schmitt, 2019) and Fredricks et al.'s (2004) engagement model. In addition, engagement's social and collaborative nature aligns with Vygotsky's (1978) contention that learning occurs through interaction and shared activity. Peer scaffolding and cooperative play facilitated learners' acquisition of a range of vocabulary at a conceptual level, leading to increased retention and communicative exchange (Nazemi & Rezvani, 2019).

6. Conclusion

The results of this study showed that card-game-based instruction can support learners' receptive and productive vocabulary knowledge, particularly in word recognition and form recall. The results also showed a significant effect of card-game-based instruction on vocabulary retention. Moreover, both quantitative and qualitative data indicated high levels of behavioural and emotional engagement. In terms of behaviour, students actively participated in the tasks, worked with partners, and demonstrated perseverance and adherence to the rules. In terms of affect, they reported enjoying the experience and feeling engaged and motivated while playing. The findings demonstrate that affectively positive learning contexts not only increase motivation but also improve vocabulary achievement and retention. Overall, the findings indicate that card-game-based instruction increases vocabulary learning and retention and maintains young EFL learners' engagement. The findings also offer theoretical and practical significance for language instructors seeking to apply enjoyable, student-centred pedagogies and for students seeking to develop lasting receptive and productive vocabulary knowledge that fosters positive attitudes towards English learning.

7. Implications, Limitations and Suggestions for Future Research

These findings contribute to our understanding of how game-based instruction with card games can improve vocabulary learning, retention rates and learner engagement in Thai primary school EFL education. Triangulating quantitative (test scores, questionnaire data) and qualitative (interview) findings enhances the validity and interpretive strength of our conclusions.

Pedagogically, these findings suggest that vocabulary instruction through the card game should be tailored to learners' proficiency levels and classroom contexts. Language proficiency can be accounted for by task difficulty, lexical complexity and instructional scaffolding. While beginners may be supported by basic vocabulary, pictures and guided practice, advanced learners can work with higher-level lexical items and communicative tasks. Since card games are easy to set up, encourage participation with minimal resources, and allow for interaction among students in large or mixed-ability classes, they are well suited as learning exercises in resource-poor contexts. Thus, teachers are advised to choose activities that meet learners' needs, curriculum objectives and classroom limitations. Moreover, card games encourage students to be active participants and create contexts for the use of important vocabulary, allowing for both receptive and productive vocabulary learning. They repeatedly expose learners to vocabulary and use retrieval practice, applying known principles of long-term memory retention. Still, this is only true when the competition is balanced and creative, because excessive competition causes anxiety. That means that implementing classrooms with high emotional support is unavoidable.

Methodologically, the study demonstrates the value of a mixed-methods design. Triangulating vocabulary tests, engagement questionnaires and interviews enhanced credibility, internal validity and interpretive depth. Future research needs to be larger-scale and longitudinal to maximise validity and investigate longer-term retention effects.

Several limitations warrant consideration. First, the sample was small and drawn from a single primary school, limiting generalisability. Larger, more diverse samples are needed to replicate the findings. Second, cognitive engagement was not systematically assessed; future studies should examine this aspect to provide a more complete conceptualisation of engagement. Third, individual learner characteristics (e.g., aptitude, personality, prior gaming experience) were not controlled for, yet they may mediate outcomes. Lastly, the study was conducted in a classroom; future research can investigate digital or hybrid game-based settings to assess scalability and temporal stability across varied EFL contexts.

Acknowledgments

We would like to express our sincere gratitude to our participants and friends for their support and contributions throughout this research. This research project was financially supported by Mahasarakham University, Thailand. All support and contributions are truly valued.

Author contributions

Nattawut Chonghan and Dr. Apisak Sukying were responsible for study design and revision. Nattawut Chonghan was responsible for data collection. Nattawut Chonghan and Nithipong Yothachai analysed the data. Nattawut Chonghan drafted the manuscript, and Dr. Apisak Sukying revised it. Nithipong Yothachai checked the citations and references. All authors read and approved the final manuscript.

Funding

This research project was financially supported by Mahasarakham University.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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