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The Effectiveness of Using the Word Network Technique to Teach English Vocabulary for First Graders: A Case Study of Teachers from Southern Thailand

RATIMA TIANCHAI
Faculty of Liberal Arts, Mahidol University, Thailand
SUTHATHIP THIRAKUNKOVIT*
Faculty of Liberal Arts, Mahidol University, Thailand
SONGSRI SORANASATAPORN
Faculty of Liberal Arts, Mahidol University, Thailand
Corresponding author email: suthathip.thi@mahidol.edu

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Abstract

This research explored the effectiveness of using the word network technique to teach English vocabulary to first graders in Thai Primary schools. The 150 top-frequency words used in three nationally-used textbooks were inventoried. The list of the words then was compared with the list proposed by the Ministry of Education, Thailand. The combined words based on semantic categories found in two sources of wordlists were then derived to form word networks as the models for the participating teachers. To carry out the study, both quantitative and qualitative research designs were used. In choosing the representative sample of the participants, 48 teachers who taught the English subject for first grade level and 206 first graders in Songkhla Primary Educational Service Area Office 1 participated voluntarily in this study. Most of the teachers had no degree in English or any related fields, but they were assigned to teach English courses. The research instruments were the students' scores from the pre-test and post-test, the word network diagrams, classroom observations, and the teachers' semi-structured interview. Results showed that there were significant differences between the students' mean scores of the pre-test and post-test. The participating teachers were able to adapt the ideas of using word network technique to create the diagrams to teach vocabulary and related structure to their students after training.

INTRODUCTION

Vocabulary knowledge is essential in foreign language learning and teaching (Swan & Walter, 1984). Vocabulary knowledge is one of the key components of language development for learners and plays an important role in language acquisition (Hatch & Brown, 1995; Hiebert et al., 2018; Li & Chayanuvat, 2021; Nation, 2001). This idea is similar to the statement made by Wilkins (1972) "...While without grammar very little can be conveyed, without vocabulary *nothing* can be conveyed," (pp. 111–112). Even if students learn the English language at

earlier ages, a number of language learners in foreign language contexts still cannot communicate in English fluently and achieve low scores on vocabulary tests in English because of the lack of vocabulary knowledge (Coxhead, 2021; Mitchell, 2013). Clearly, vocabulary knowledge is a major building block in children's early literacy development. Young EFL learners with sufficient vocabulary size will perform well in all aspect of a language (Silverman, 2007). In Thailand, English education begins in the first grade, with students typically receiving three to four hours of instruction per week. The primary focus of the first-grade curriculum is to familiarize children with essential vocabulary related to themselves, family, animals, school, and food. This foundational curriculum aims for students to know, understand, and memorize at least 150 words in English (Office of the Basic Education Commission, 2016). As mentioned by He and Seepho (2010), networks of word knowledge play a unique and powerful role in supporting children's understanding of language. Comprehension requires not only that children have a broad vocabulary but also that those words form interconnected networks of conceptual knowledge. Results of a number of studies have shown the effectiveness of word networks in vocabulary teaching. Children show significantly greater growth in vocabulary depth for words taught in classifications, and word networks could significantly enhance the young learners' English vocabulary proficiency (Hadley et al., 2019; Nation, 2001; Zhao et al., 2018). Therefore, vocabulary development is extremely important in learning the English language successfully. The improvement of English learning requires the mastery of a considerable number of English words.

In many remote areas of Thailand, a number of teachers at the primary school level are required to teach every subject. Many of them do not hold a degree in English or any related field, but they are assigned to teach English. Since English is not their area of specialization, they normally have no confidence in teaching it to students, especially with respect to English pronunciation (Noom-ura, 2013; Termprayoon, 2020). Phonological differences between English and Thai are the biggest issue in pronunciation teaching and learning. A teacher provides a role model for students; thus, inadequate knowledge and competence in the teacher's use of English massively affects the students' English learning proficiency (Cedar & Termjai, 2021; Yaacob et al., 2020). A number of studies have revealed that Thai EFL students, consequently, tend to have very low English proficiency. Based on the results of the Ordinary National Education Test (O-NET), in the past three years, the students in the southern part of Thailand have demonstrated a particularly low level of English proficiency. The students' average score of the national English test is the lowest (29.26) when compared with other subjects such as Thai (45.14) and social science (34.06). Additionally, the latest ranking of Thai students' English language average score shows that the country lags behind regionally (Cedar & Termjai, 2021; Hayikaleng et al., 2016; Taechoteaussanee, 2019; Thadphoothon, 2019). There are myriads of reasons for such low English proficiency of students in Thailand. The students' L1 interference, lack of motivation during English activities, and unchallenging English lessons are all contributory factors affecting the learners' ability to master English language skills (Noom-ura, 2013). As mentioned, the main challenges and opportunities for teachers of English are to use a variety of teaching techniques by selecting appropriate content, materials, and sources for students to extend their exposure to English (Tayjasanant & Suraratdecha, 2016). If the students do not receive proper instruction from an early age, fossilization can occur, which may affect whether young learners cope successfully with English in the future (Moskovsky & Ratcheva,

2014). The root of this phenomenon might comprise an array of problems such as the weakness of English curricula design, learning materials which are not created specifically for young English learners, or unqualified English teachers. To make the situation worse, the language teachers assigned to teach English usually lack opportunities to develop their English skills once they take on the responsibility. Therefore, this study will narrate how one of the researchers helped a group of teachers design word networks to teach young learners and explore the effectiveness of using these word networks to expand the vocabulary knowledge of, not only these teachers, but also their students.

LITERATURE REVIEW

The concept of English vocabulary knowledge

Vocabulary knowledge plays an important role in foreign or second language (L2) learning (Hatch & Brown, 1995); specifically, it involves a range of aspects such as form and meaning, grammatical functions, or word parts (Dugan, 2010). The theory of Nation (2013) which classified vocabulary knowledge into three general categories: a) knowledge of word form (form and meaning); b) knowledge of word meaning (concept and referents, and associations); and c) knowledge of word use (grammatical functions, collocations, and constraints on use) has been widely used in vocabulary research.

Since words carry meaning beyond their forms, it is very important to have a clear understanding of both their forms and their functions (Dakhi & Fitria, 2019; He & Godfroid, 2018; Oljira, 2017). Although the acquisition of an adequate vocabulary is essential for learning language successfully, a language learner will not be able to use the structures and functions without an extensive vocabulary (Alqahtani, 2015; Nation, 2001). Therefore, the strategies of "study word with a pictorial representation of its meaning," "use semantic maps," "group words together within a storyline," and "study the spelling of a word" proposed in the memory strategies by Schmitt and McCarthy (1997) help learners to learn new words relating to the previously learned knowledge more easily.

Word list and word network

Richards and Schmidt (2010) defined a word list as "a list of the basic and most important words in a language or in a register of a language, generally intended for use as a basis for language teaching or for the preparation of teaching materials" (p. 638). Teaching the frequency-based vocabulary list of most common words appropriate to grade levels is a fundamental aspect of teaching and learning the English language (Aziza, 2022; Richards & Schmidt, 2010; Wilkins, 1972).

A technique to generate word lists for EFL learners is called "Word Network," which goes beyond "Semantic mapping" (Zhao et al., 2018). This strategy enables students to connect words in a chain and bring out the meaning relationships of words surrounding a theme word and categories (Barcelo-Coblijn et al., 2019). The networks of associations are the way that

each word relates to other words semantically (e.g., synonyms and antonyms, etc.), morphologically (e.g., derivations in other parts of speech, etc.), or phonologically (e.g., same initial/final sounds, rhymes), among other possible connections (Sailor, 2013). Word networks are excellent for learners in making the meaning of unknown words clear; they help learners understand the meaning and make the word more memorable (Mansourzadeh, 2014).

A number of studies have explored the effectiveness of using word lists and word networks in teaching young learners, and the results of many of these studies show that children had significantly greater growth in vocabulary depth for the words taught. A study by Sitompul (2013) was conducted to investigate the effect of using a word list on 50 graders' vocabulary mastery. The results showed that students were able to memorize the words easily, were more motivated to learn English, and understood the vocabulary more easily after they were taught by using the word list. In addition, several studies revealed that presenting children with new words in thematic groups can help create connections between concepts and build more extended semantic networks. Fostering vocabulary knowledge involves not only teaching single word entities, but also introducing systems of conceptually related words to build networks, as investigated by Hadley et al. (2019) and Pollard-Durodola et al. (2011). However, the findings by Hills et al. (2009) further suggest that phonological information should also be incorporated into the lessons.

Previous studies on English teachers and vocabulary teaching in primary school

Students' ability to develop L2 proficiency is influenced by teachers. However, the problems of English teaching in Thai classroom are worsened by an overall perceived inadequacy in the level of English of Thai ELT teachers, who, for the most part, are unqualified and poorly trained (Alqahtani, 2015; Farrelly & Sinwongsuwat, 2021; Surayatika, 2022). A number of studies have revealed serious problems in ELT in Thai primary schools. Noom-ura (2013) estimated that 65% of teachers in primary schools in remote areas in Thailand did not graduate with an English degree. Similar findings are shown in Termprayoon's study (2020), which reported that a large number of teachers -- who may teach as few as two or as many as every subject -- are teaching subjects they are not qualified to teach. Some teachers hold bachelor's degrees that are not relevant to English language teaching, yet they are assigned to teach English. They might have some basic English knowledge, but they do not know suitable techniques and activities to teach the language to primary school students. Thai students who participated in Saengpakdeejit's study (2014) stated that discovering the meaning of unknown words and retaining the newly learned words in long-term memory, and then recalling them, were key problems in vocabulary learning. Oljira (2017) also studied the problems of vocabulary teaching among English teachers in the primary school level, finding that students often waited for teachers' vocabulary translation into their mother tongue (L1). The teachers did not know what activities or materials to use in classrooms, so they failed to encourage students to participate in class.

With all these problematic causes, there is an urgent need to solve the critical issue of teachers' insufficient English language skills by enhancing their English teaching ability in classrooms. Vocabulary teaching techniques used at primary school level contributes greatly to students'

later abilities to be more productive in language. Thus, students need to know and use adequate vocabulary in order to reach their potential with respect to academic performance. To do so, a training workshop should be developed for English teachers that aims to help them expand learners' vocabulary knowledge beginning at the first-grade level. Such an initiative is urgently needed to address the issues with English language instruction in early primary school in Thailand.

Research questions

The goal of this study is to examine the effectiveness of using the word network technique to teach English vocabulary to first graders and explore how the participating teachers feel about this technique. The research questions of the current study are as follows:

1. How did the participating teachers use the word networks to improve the students' English vocabulary knowledge?

2. To what extent is the word network technique effective in L2 learning and teaching?

METHODOLOGY

This research relied on both qualitative and quantitative methods to answer these research questions.

Research setting and participants

There are 235 teachers comprising the total population of first grade level English teachers in public primary schools in the rural areas under Songkhla Primary Educational Service Area Office 1. Of these, 147 first grade English teachers in the service area were the potential samples in this study. Application forms for the training workshop were distributed to these 147 first grade English teachers at schools. However, only 48 teachers returned the forms to participate voluntarily in this study. As previously mentioned, the teacher training workshop was delivered to these 48 teachers. Classroom observations were collected from the participating teachers and 206 first grade students. The participating teachers' ages ranged between 20 and 50. Seventy percent of the participating teachers were in their 30's, and 83.33% of them were female. Eighty percent of the participants had been assigned to teach English for several years, despite most of them being non-English major graduates, as detailed in Appendix A. The largest group of these teachers held degrees in Mathematics (44.13%), followed by those with degrees in Science (32.27%). Consequently, since English was not their area of specialization, they often lacked confidence in employing a variety of teaching techniques and activities. Schools in southern Thailand face several challenges due to this issue. Many teachers lack degrees in English or related fields, which results in inadequate teaching methods. Furthermore, there are limited opportunities for both teachers and students to practice English, and budgets for essential equipment are restricted. As can be seen from Appendix A, only 5.06% of teachers have a degree in English and are specialized in selecting appropriate methods and materials for teaching English at the primary school level.

Research tools

Word lists, word network diagrams, students' pre-test and post-test, classroom observation, and semi-structured interview were employed as research tools in this study.

1. The development of word lists

To adhere to the policy of the Ministry of Education (2008) which states that children at the first grade level must know, understand, and memorize the vocabulary lists comprising 150 to 200 words about themselves, family, animals, school, and food, the 150-vocabulary list for the first graders specified by the MOE and the 150 top-frequency words used in three nationally used textbooks -- (i.e., *Smile*, *Projects: Play & Learn*, and *PW. Inter Primary English*) -- were inventoried. Words appearing in the selected books were typed into a word doc. format and the list was carefully checked for errors and corrected by the researchers. Then, all three files were converted and combined into one text file before being uploaded to the *AntConc* program to find word frequency. There were 866 word types and 11,121 word tokens. The most frequently used 150 words in two sources were pasted in the Excel program (see Appendix B). Subsequently, 77 combined words in terms of six categories found in three nationally-used English textbooks and the MOE (see Appendix C) were derived to create word networks to teach vocabulary and related structures for the first graders in order to help both teachers and students to expand knowledge of vocabulary and skills in using them.

2. The development of word networks

As proposed by Zhao et al. (2018), one technique to generate a word list for EFL learners is called a "Word Network," which enabled learners to connect words in a chain and brought out the meaning relationships between words surrounding categories. Based on these statements, the combined words on wordlists of the two aforementioned sources were grouped into six categories: 1) ***Human body***, 2) ***Family***, 3) ***Animals***, 4) ***School***, 5) ***Plants, vegetables, and fruits***, and 6) ***Food***. They were later converted to form word networks as the models for the participating teachers to teach first grade students. These word networks were presented to teachers at the workshop in the forms of diagrams and pictures.

To create a word network for vocabulary development, the researchers followed the four-step procedures of Johnson and Pearson (1984). Firstly, the teacher chose a topic of interest. Secondly, the teacher listed a group of words related to the topic and wrote them on the board. Thirdly, the teacher encouraged students to brainstorm words that are related to the selected topic, and then grouped those brainstormed words by categories. Finally, the teacher asked students to work collaboratively to transform those lists into word networks. Using these procedures, a key concept to create word networks related to the chosen category was first determined. A group of words within the same category was later created (see Appendix C). For example, the category "***Human body***" included *ears*, *eyes*, *legs*, *face*, *feet*, *hair*, *head*, *nose*, and *mouth*. The category "***Family***" included *boy*, *brother*, *father*, *girl*, *kid*, *man*, *mother*, and *sister*. The category "***Animals***" included *ant*, *bat*, *bee*, *bear*, *bird*, *cat*, *chicken*, *dog*, *fish*, *fox*, *giraffe*, *goat*, *hamster*, *lion*, *monkey*, *mouse*, *owl*, *panda*, *rabbit*, *rat*, *sheep*, *snake*, *turtle*, and

zebra. The category "***School***" included *bag*, *board*, *book*, *box*, *card*, *chair*, *class*, *clock*, *computer*, *desk*, *eraser*, *pen*, *pencil*, *picture*, *ruler*, *student*, *table*, and *teacher*. The category "***Plants, vegetables, and fruits***" included *apple*, *banana*, *bean*, *flower*, *grape*, *mango*, *orange*, *papaya*, and *tomato*. The category "***Food***" included *bread*, *cake*, *egg*, *ice cream*, *milk*, *noodles*, *salad*, *tea*, and *water*.

These created word networks were later included in a teaching manual. The processes to convert words from the six categories of the word lists to networks were as follows. The words in the "***Animals***" category were divided into seven sub-categories: 1) "*Wild animals*" consisted of '*bat*, *bear*, *fox*, *giraffe*, *lion*, *monkey*, *owl*, *panda*, and *zebra*'; 2) "*Farm animals*" included '*goat* and *sheep*'; 3)"*Insects*" included '*ant* and *bee*'; 4) "*Reptiles*" included '*snake* and *turtle*'; 5) "*Pets*" included '*cat*, *dog*, *fish*, and *rabbit*'; 6) "*Poultry*" included '*bird* and *chicken*'; and 7) "*Rodents*" consisted of '*hamster*, *mouse*, and *rat*' (see Figure 1).

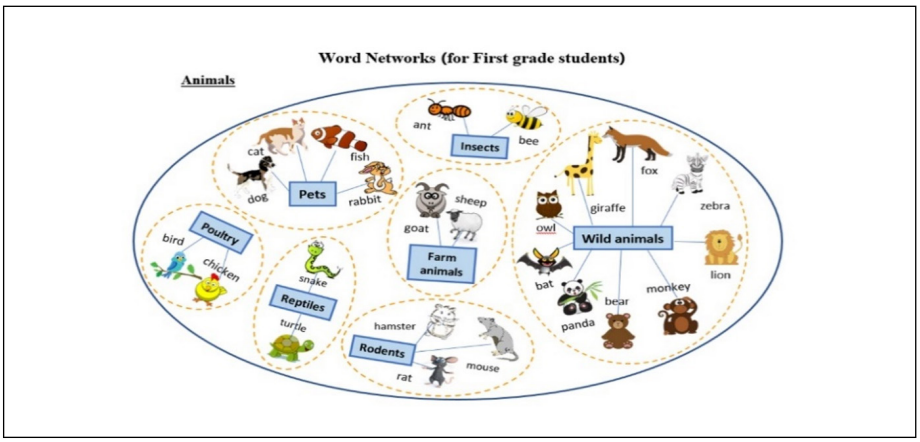

Figure 1 A word network of "***Animals***" category

Later after the students learned the vocabulary, some English structures were introduced. For example, based on the word network about "***Animals***," the affirmative structures such as "*A dog has four legs*." or "*A bird has two wings*." were introduced to the students (see Figure 2).

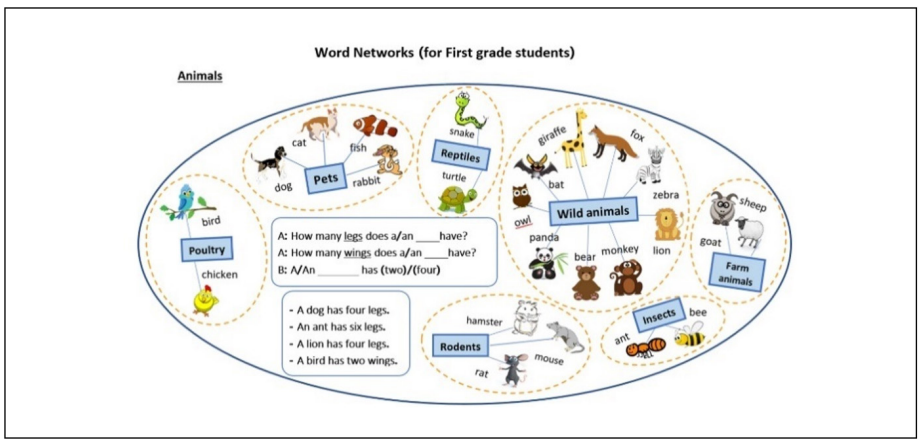

Figure 2 A word network of "***Animals***" category with related structures

The word network diagram on the category "***Human body***" included the related words such as "*ears, eyes, legs, face, feet, hair, head, nose*, and *mouth*" and related structures of affirmative such as "*I have two legs*." and "*I have a/one nose*." The "***Family***" category contained related words like "*boy*, *brother*, *father*, *girl*, *kid*, *man*, *mother*, and *sister*" and related affirmative structures such as "*He is my father*." and "*She is my mother*." (see Figures 3 and 4).

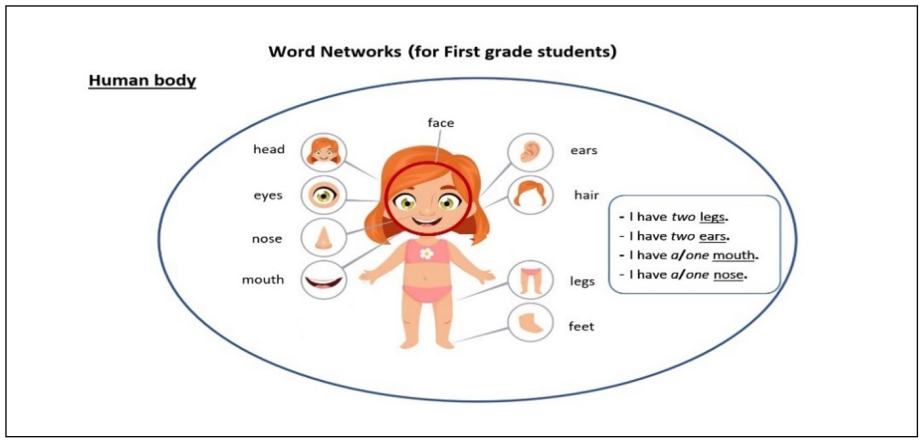

Figure 3 A word network of "***Human body***" category with related structures

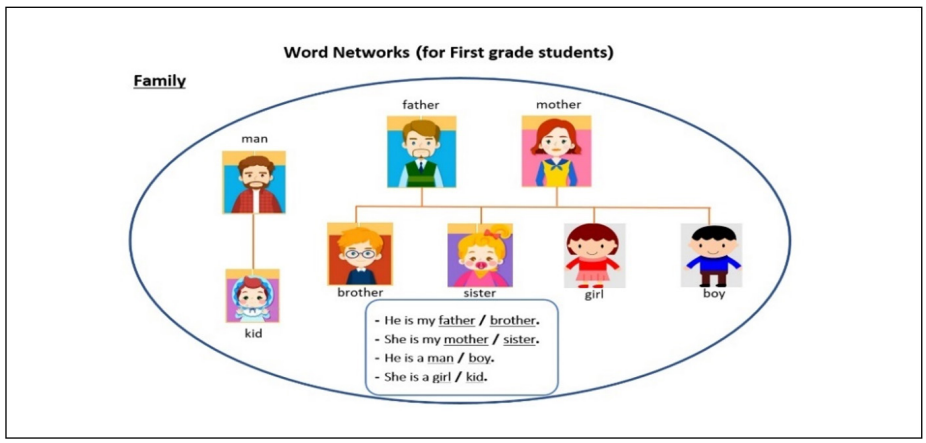

Figure 4 A word network of "***Family***" category with related structures

The category "***School***" was classified into three sub-categories: The "*Supplies*" sub-category consisted of '*bag, book, card, eraser, pen, pencil,* and *ruler*'. The words '*box, board, chair, clock, computer, desk, picture,* and *table*' were in the "*Class Equipment*" sub-category, while the words '*student* and *teacher*' were in "*People*." Related structures such as "*A table is in my classroom*." and "*A pen and a pencil are in my bag*." were introduced in this diagram (see Figure 5).

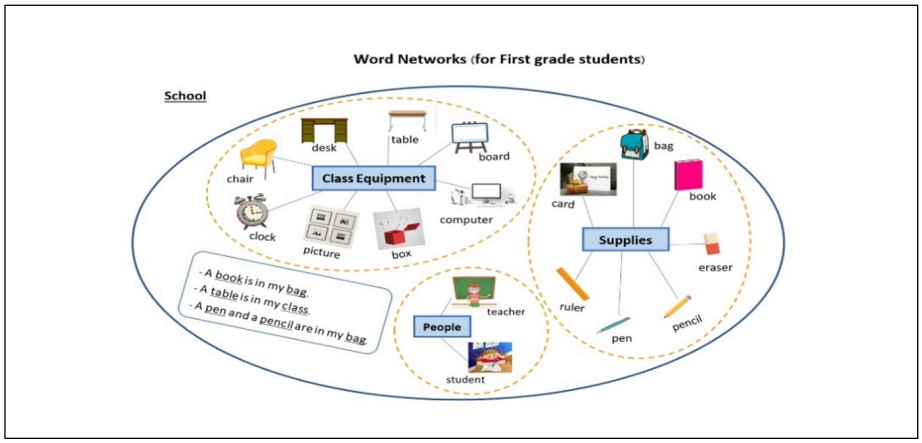

Figure 5 A word network of "***School***" category with related structures

Similarly, the "***Plants, vegetables, and fruits***" category was classified into three sub-categories: A "*Fruits*" sub-category consisted of '*apple, banana, grape, mango, orange,* and *papaya*'. The words '*bean* and *tomato*' were in "*Vegetables*." A sub-group of "*Plants*" included '*flower*'. The structures of questions and answers (see Figure 6) were introduced, such as: *A: What is your favorite fruit? B: My favorite fruit is _____. Or I like _____.*

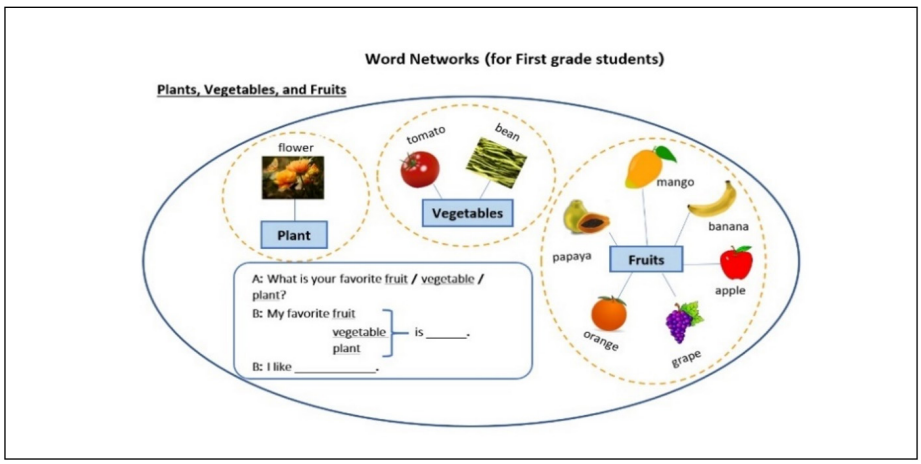

Figure 6 A word network of "***Plants, vegetables, and fruits***" category with related structures

The final category of "***Food***" was classified into three sub-categories. The words '*milk, tea,* and *water*' were specified in a sub-category of "*Drink*." A "*Sweet*" included '*cake* and *ice cream*', while "*Food*" consisted of '*egg, noodles, salad,* and *bread*'. In addition, related structures such as "*A: What is your favorite food/drink/sweet? B: My favorite food/drink/sweet is _____.*" are introduced (see Figure 7).

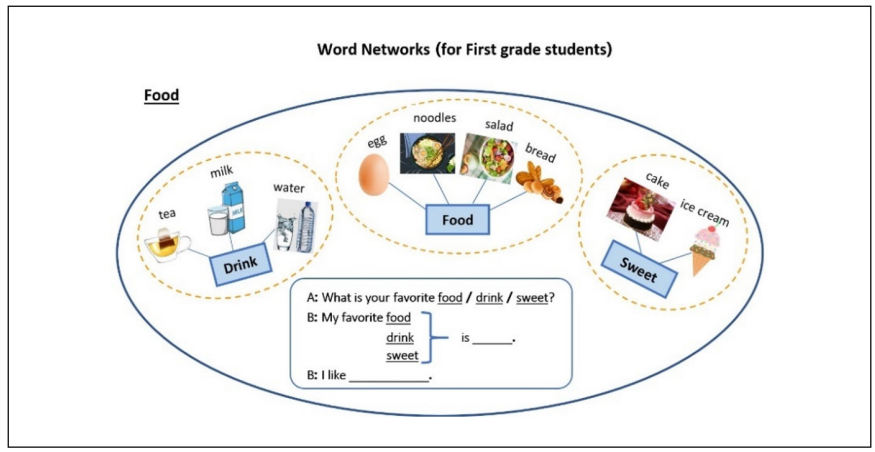

Figure 7 A word network of "***Food***" category with related structures

***Validity*:** The word network diagrams were checked for content validity by three experts who each had more than ten years' experience in teaching English to find out whether they agreed with the accuracy of the categorizations. The agreement of all experts was needed for the word network diagrams to be considered valid. Researchers modified the diagrams until all experts agreed with all the revised versions.

3. Students' pre-test and post-test

The pre-test and post-test consisted of 30 items and were presented in multiple-choice formats. The content of the two tests were identical; however, the items in the post-test were randomly reordered in order to prevent the familiarization effect. Reliability was verified by KR-20, with a result of 0.87, indicating that the test had a high degree of reliability. For content validity, the question items were examined by three experts to determine whether all items on the tests were appropriate. Based on the IOC index formula, the content validity was measured at 0.88. One correct answer and three distracters were provided for each item. All the items were dichotomously scored (0 for incorrect; 1 for correct). The contents in the tests were extracted from the textbooks the participating teachers used at schools (see examples in Figure 8).

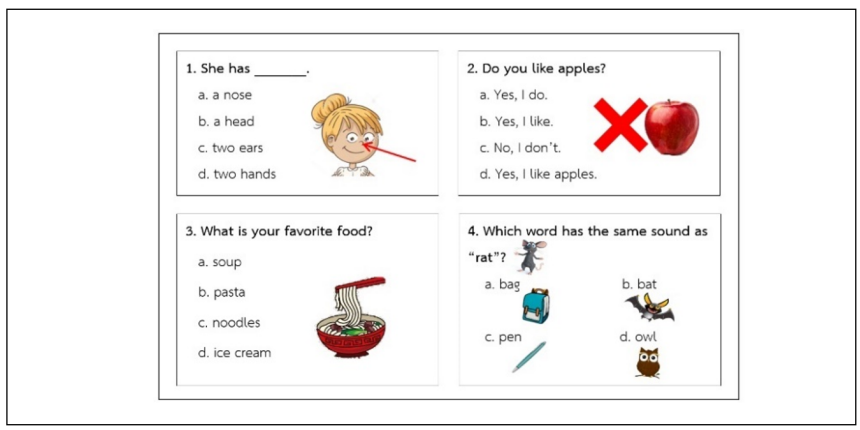

Figure 8 The examples of students' pre-test and post-test

4. Semi-structured interview

Five teachers who participated in the training workshop volunteered to be interviewed. All the questions for the interviews were written based on the research questions of the current study. The questions were: 1) Do you think the word network technique is useful for first graders, and how does this technique improve your students' English vocabulary knowledge?, 2) How did you adapt the word network technique to teach English vocabulary in your classrooms?, and 3) What are the strengths and weaknesses of using the word network technique to teach English vocabulary to your students?

Since the participating teachers were mostly non-English majors, they were more able to answer the questions clearly and directly when speaking in their native language. Therefore, a researcher used the Thai version of questions during the interviews. Both the Thai and English versions of the interview questions were verified by three experts to confirm their validity and reliability before implementation. All participants were assigned pseudonyms, and verbatim transcriptions of the audio recordings from the interviews were conducted.

5. Classroom observation

This is a tool that was used to collect data from the actual classroom teaching and learning process. This tool was chosen for data collection because it was possible to observe the actual teaching behavior of the participating teachers in their classes. Eight teachers voluntarily participated in classroom observations. A total of eight observations were conducted, and notes were taken regarding the general classroom atmosphere during each session.

Data collection procedure

The researchers gathered data from the participating teachers enrolled in the training workshop. The teachers were required to attend the workshop for a period of six weeks, for a total of 30 hours. Each workshop lasted five hours. Collection of data via classroom observation took about eight weeks. The pre-test was administered to the sample students at the beginning of the experiment, and the post-test at the end of the eight-week implementation period. The following steps were followed for data collection.

Step 1: Teacher training

A workshop for teachers was held with the main purpose of enhancing their vocabulary knowledge and English-language teaching skills so that they could help improve their students' English vocabulary proficiency. The participating teachers were trained how to teach the words from the lists by applying the word network technique. Each workshop session lasted five hours. The participants were required to attend the sessions for a period of six weeks, for a total of 30 hours. One category was covered each week, as follows: Week 1: ***Human body***, Week 2: ***Family***, Week 3: ***Animals***, Week 4: ***School***, Week 5: ***Plants, vegetables, and fruits***, and Week 6: ***Food***. At the beginning of each period, words in each category were presented in the form of word cards and pictures. Based on the ideas that "teachers teach as they are

taught" and teachers are a role model for their students (Blume, 1971), the teachers were expected to actively participate in effective pronunciation learning in order to adopt teaching techniques to help them improve their students' pronunciation efficiently (Cedar & Termjai, 2021). During the training workshop, the teachers were asked to mimic the pronunciation of words, sentences, and conversations accurately, clearly, and fluently. In terms of pronunciation practice, the common pronunciation mistakes on short and long vowels, word stress, and intonation, particularly in consonants such as the initial consonants: [r], [l], [g], [z], [v], [tʃ], [ʃ], [Z], [θ], initial consonant clusters: [_r], [_l], [s_], and consonants in the final position: [l], [p], [t], [d], [k], [g], [s], [z], [θ] were emphasized (Cedar & Termjai, 2021). Additionally, resources such as websites related to teaching English pronunciation were provided. Although the participating teachers finished the workshop training, they were treated as independent learners who continued with pronunciation practice by using specific pronunciation training websites.

After that, the researchers encouraged teachers to list and think of as many words related to the selected category as they could, and then to share their answers. After they finished the word sharing activity, an example of the word network diagrams based on each category was presented. The techniques for grouping words from the lists specified by the Ministry of Education and the three nationally used textbooks to create word networks based on categories and the related structures were explained (see details in methodology and examples in Figures 1-7). At the end of each workshop, the participating teachers were asked to practice creating word networks individually, based on a given topic or the content on the textbook they were currently using. They then shared and discussed their created word networking with the whole group. During this session, the teachers created their word networks, applying English pronunciation teaching techniques such as 'the ways to pronounce either the words beginning with the initial consonants sounds: [r], [l], [g], [z], [v], [tʃ], [ʃ], [Z], [θ], or the words end with consonants in the final position: [l], [p], [t], [d], [k], [g], [s], [z], [θ]', and 'the techniques to stress the single words, sentences, and conversation levels'. At the same time, they received feedback and suggestions from the experts with over ten years of English language teaching experience, and their classmates in order to adapt their teaching methods efficiently. In the following week, the teachers were required to create their own word networks and record their pronunciation teaching of words regarding the networks. They later submitted their teaching recordings as mp4 files in the notes section of the LINE group provided. After submitting their teaching records, the teachers received comments and feedback from an English expert on words or sentences that were mispronounced. Interestingly, Nguyen and Newton's study (2021) supports the teachers' post-training performances in this present study in that the recordings by teachers showed improved pronunciation pedagogical knowledge and pronunciation teaching skills after attending the workshop. The steps of word networks training workshop are shown in Appendix D.

Step 2: The observations of classroom teaching

After the participating teachers finished training, they went back to teach their students. The participating teachers used the word network technique to teach vocabulary in their classes for eight weeks. The focused category in each week was related to the categories proposed

by the national core curriculum for the first grade level (e.g., 1) ***Human body***, 2) ***Family***, 3) ***Animals***, 4) ***School***, 5) ***Plants, vegetables, and fruits***, and 6) ***Food***); however, two more categories were, in some cases, set up, depending on the textbooks used by each teacher.

At the beginning of the experiment, a pre-test was administered to the sample students by one of the researchers. Classroom observations provided a valuable opportunity to gather specific and concrete information about classroom dynamics. Feedback and comments from observers can encourage teachers to enhance their teaching performance (Halim et al., 2018). Accordingly, eight classroom observations were conducted, with subsequent analysis based on detailed notes taken during these sessions. These observations focused on whether participating teachers effectively implemented English teaching techniques, such as word networks, oral repetition, and appropriate use of visuals tailored to students' levels and lesson content. To minimize disruption, researchers positioned themselves unobtrusively at the back of the classroom. The feedback provided to teachers after each observation session was intended to help them reflect on and improve their teaching practices. Furthermore, observations documented instances where students demonstrated clear comprehension of wordlists, word network diagrams, and instructional structures presented during lessons.

And at the end of the eight-week implementation period, the same test was administered to the same group of students in order to assess the retention rate of the target words and find out whether they had improved their English vocabulary knowledge. In addition, semi-structured interviews were carried out with the participating teachers after the semester to explore the effectiveness of using the "Word Network" and their perceptions towards the training workshop. Five teachers volunteered to be interviewed. The average length of each interview was approximately 15 minutes. All the interview questions were checked by both Thai and English language experts to ensure content validity.

Data analysis

To obtain in-depth information, semi-structured interviews were used in this study. All interviews were audio-recorded. After completing the data collection stage, the interview recordings were transcribed verbatim, based on the research questions, and then translated from Thai into English for the purpose of data analysis. The translated data were then validated and analyzed using content analysis. The analyzed results were then presented in a descriptive manner.

To determine the effectiveness of using the word network technique to teach English vocabulary for first graders, the scores from the students' pre-test and post-test, which used a multiple-choice format, were compared. A paired T-test analysis was carried out to identify whether there were any significant differences between the two tests.

RESULTS

Findings are reported in two major sections, following Research Questions 1 and 2.

Research question 1

To answer the first research question on how the participating teachers use the word networks to improve the students' English vocabulary knowledge, classroom observations and semi-structured interviews were conducted.

During eight classroom observations, researchers observed that all participating teachers were able to make use of the wordlists found in the textbooks and the MOE and adapted the techniques of word network, brainstorming, oral repetition, discussion, and role play to teach vocabulary and related structures. For instance, in the first period of "***Human body***," a teacher presented and pronounced the words "*ears, eyes, legs, face, feet, hair, head, nose,* and *mouth*" correctly, and then she asked students to repeat three times. After that, the word network diagram and the related grammatical structures such as "*I have two legs*." and "*I have a/one nose*." were presented. Students were asked to substitute the words in a diagram with the given structures one by one. In one instance, a researcher observed an English class taught by a teacher who had graduated with a major in Science who was able to adapt the word network technique to create a diagram to teach the category "***My Hobbies***," even though it was not specified in the workshop. The focus words consisted of five main categories and five verbs as follows: "*Group 1: badminton, football, volleyball, basketball, chess, tennis, the guitar, the violin,* and *the piano,*" "*Group 2: yoga, exercise,* and *jigsaw puzzle,*" "*Group 3: TV* and *movie,*" "*Group 4: jogging, fishing, shopping,* and *camping,*" "*Group 5: newspaper, magazine,* and *comic book,*" and included five other words/phrases: *draw picture, ride a bike, take photos, fly a kite,* and *swim*. Apart from presenting the words, the teacher also focused on the "*Verbs*" related to each word category. For instance, "*Group 1: badminton, football, volleyball, basketball, chess, tennis, the guitar, the violin,* and *the piano*" was related to the verb "*play*" and "*Group 2: yoga, exercise,* and *jigsaw puzzle*" was related to the verb "*do*" (see Figure 9).

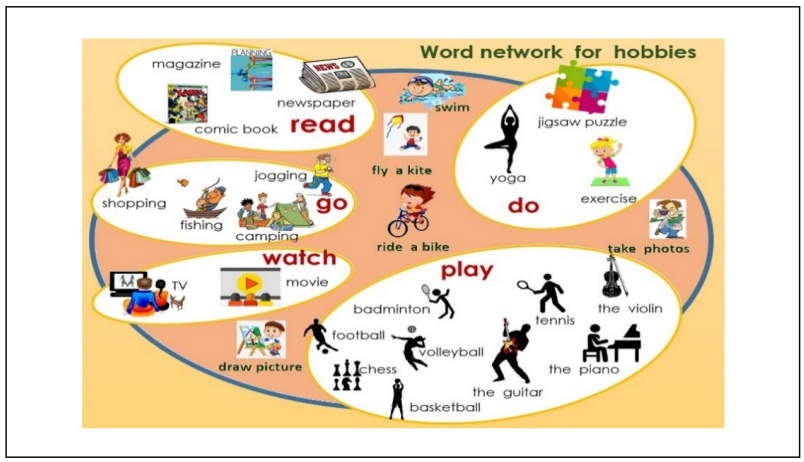

Figure 9 Word Network (1) created by an English teacher who graduated with a major in Science

Another English class was instructed by a teacher who graduated with a major in Mathematics. Based on the observation by a researcher, she created a word network diagram to teach a category "***New Year Party***." The multiple sub-categories "*Foods and Drinks*," "*Clothes*," and

"*My Family*" were included in the same diagram. She adopted the words of the sub-categories "Clothes: belt, pants, backpack, shirt, shoes, dress, and necklace" and "*My family: father, mother, grandfather, grandmother, sister,* and *brother*" with the structure "*Whose presents are these?*" Moreover, words related to "*Foods and Drinks: bacon, sandwich, pizza, hamburger, fried rice, pasta, ice-cream, soda, cola, apple, orange, pomelo, cake, chicken soup, noodles, milk,* and *grapes*" were adopted to the structures "*Do you like _____?*" and "*Would you like _____?*" in order to ask the family members what things they needed to eat or drink. In the last ten minutes of a class, the teacher asked students to make sentences in pairs to ask and answer their partner using the words and structures presented in the diagram. Therefore, the students not only studied the vocabulary but they also learned English structures that related to the given words (see Figure 10).

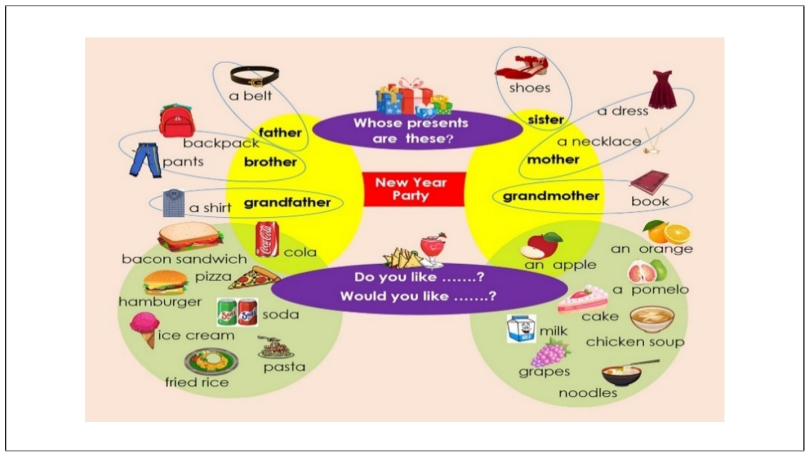

Figure 10 Word Network (2) created by an English teacher who graduated with a major in Mathematics

Figure 11 Word network adapted by a teacher during an English class

In addition to the classroom observation results, semi-structured interviews were conducted in which the findings related to two major sections, according to the interview questions, could be discussed: 1) The adaptation of the word network technique to teach English vocabulary

in the classroom and how it improves the first graders' English vocabulary knowledge and 2) The usefulness, strengths, and weaknesses of using the word network technique.

1) The adaptation of the word network technique to teach English vocabulary in the classroom and how it improves the first graders' English vocabulary knowledge

The following comprises a statement and a question spoken by a researcher during a structured interview: "Evidence from classroom observations showed that you have done a very good job on adapting the word network technique into the classes and have received positive feedback. Could you please give me examples of the adaptation of the word network technique in your English classrooms?"

When asked whether the participating teachers adapted the word network technique to their classes, a number of the interviewees mentioned that they usually designed the word network diagrams related to the categories specified in the textbook to teach vocabulary to their students. Although the word network technique was claimed to be an effective way to teach young learners vocabulary, one teacher claimed that designing a network to teach vocabulary was not easy, so she rarely used this technique. Improving first graders' vocabulary presents a challenge, particularly because most participating teachers are non-English major graduates, and they have no background knowledge of English teaching. This lack of familiarity with English teaching techniques, activities, and games could hinder their ability to effectively teach English vocabulary in classrooms.

Excerpt 1

Teacher Ammy: Before I attended the workshop, most of my students learned English inactively because I always used grammar translation method to teach English vocabulary. After training, I adapted a word network technique to create diagrams to teach topics such as "*Welcome to school*." I linked the words and related structures of the categories "*Greetings*" and "*School subjects*" to the main category. I started the class by showing the picture of '*school*' and then encouraged the students to brainstorm as many words related to the given category as they were able to. At the same time, I drew a diagram on the board which showed the students' words. I then pronounced each word as their model and let them repeat it. After that, the related structures were presented, and then the students practiced building sentences using the words and structures they learned.

Excerpt 2

Teacher Cherry: I adapted the word network technique to teach vocabulary on the topic "*Sports*." The sub-topics of "*go, play,* and *do*" were specified on the board. Then, I asked the students to stick the word cards for sports on the sub-topics "*go, play,* and *do*" properly, and asked them to pronounce the words related to each sub-topic. Most students were able to pronounce and group the word cards to the given sub-topics

actively and correctly (see Figure 11). Additionally, when I instructed the students to work in groups, they were able to design their own diagrams on the topics "*My favorite foods, My hobbies,* and *My pets*."

Excerpt 3

Teacher Bella: In the beginning of the class, I divided my students into two teams, and then I gave them a topic and let each team try to list words relating to the topic through a word network diagram. They were very attentive while they were brainstorming vocabulary with their teammates; they were able to link the words they knew to the others which were in the same category or had similar meanings. When the time was up, the team which got the most words was declared the winner. Students were able to meaningfully enjoy learning the new words throughout this process.

Excerpts 1, 2, and 3 illustrate that the teachers tried to design and adapt the word network diagrams in their classes; they also claimed that their students learned English vocabulary effectively through this technique.

In addition to the word network diagrams designed in a class, Teacher Cherry revealed that she also adapted games to teach vocabulary through the word network diagrams to engage her students, especially those who might not regularly participate. Here is evidence to support this finding:

Excerpt 4

Teacher Cherry: I adapted the word network diagrams with games to teach English vocabulary for some students who perceived word network diagrams presented in the class as uninteresting. I first presented the topic "*Animals*" using the word network diagram, and then I applied words specified in a diagram with a "Who am I?" game. For instance, the statement 'I am a plant-eating mammal with long ears, long hind legs, and a short tail, so, who am I?' was adjusted to teach the word '*rabbit*'.

In contrast to Teacher Emma's class, she preferred teaching vocabulary by using the translation technique rather than using the word network because she didn't have time to prepare the lesson using word network diagrams. The evidence to support this finding is as follows:

Excerpt 5

Teacher Emma: Although using the word network technique to teach vocabulary was very effective for my students, I sometimes used the direct translation method to teach vocabulary because it takes a lot of time to prepare the lesson when using the word network technique.

2) The usefulness, strengths, and weaknesses of using the word network technique

Based on eight classroom observations and the information received from five teachers through the interviews, the results revealed that the word network technique was found to be very useful by most English teachers, and it could be used to encourage students to learn English vocabulary actively and efficiently. Furthermore, the majority of teachers encountered both strengths and weaknesses in adjusting the word network technique in classes. For the strengths, the students learned English vocabulary more easily and they were able to expand known words to the new words, and then linked them into groups systematically. This finding supports those of several researchers (Hadley et al., 2019; Mansourzadeh, 2014; Sailor, 2013; Silverman, 2007) that the more words that are mastered, the quicker is the pace of learning language. Presenting children new words in thematic groups using the word network technique helps make connections between concepts more easily and builds more extended semantic networks; the technique helped learners understand the meaning and make the words more memorable. Therefore, word network clarifies the way that each word relates to other words semantically and is an excellent learning tool for learners in making the meaning of unknown words clear.

Excerpt 6

Teacher Bella: I think teaching vocabulary using the word network technique was very beneficial to my students. Not only did they learn the new words I was presenting in classes, but they could also link those words to the words they already knew the meanings of and were able to link the related words into classifications correctly.

Excerpt 7

Teacher Ammy: Actually, my first-grade students have just begun to learn basic English such as 'A, B, C, D, ……..'; thus, recalling the vocabulary they learned for new topics was very difficult for them. When I used the word network technique, the students were able to link the words to other words themselves. The grammar translation technique was not required in my classes afterwards. I definitely believe that my students' vocabulary can be expanded after using the word network technique to teach in my classes. Instead of understanding single words at a time, they were able to remember multiple words in one lesson.

From Excerpts 6 and 7, the researchers can see that the word network technique was effective for the first graders' English vocabulary achievement. The students learned more words and were able to build linguistic relationships with other words in the same categories.

Additionally, the following statements also demonstrated the usefulness and strengths of the word network technique in helping students recognize words in the long term and learn a new language with enthusiasm.

Excerpt 8

Teacher Danny: When my students were able to think of and link the vocabulary they had learned to the new words by themselves, they were very active and looked very happy. Observations suggest this is one method that can be used to maintain students' enthusiasm about learning English.

Excerpt 9

Teacher Bella: My students were able to remember the words over a longer period of time compared to other teaching methods. It was observed that they could recall words from proceeding lessons. In addition to word recall, students were able to link the words to the category structures as well.

In addition to the positive feedback of the word network technique used in the classes, one teacher also reported weaknesses of using it in her class.

Excerpt 10

Teacher Emma: Although most students enjoyed learning and could remember the vocabulary more effectively through the word network diagrams, some of them sometimes adapted the words to the related structures wrongly. Generally, they remembered the word meanings from the given pictures in diagrams. These words were then applied to the sentences during the same period. After two to three weeks, I picked up the words (without pictures) to ask the students to make sentences again, but some of them mixed up these words with the related structures of other categories. Some students remembered the word meanings based on the matched pictures, so they sometimes adapted the words to the wrong structures due to the fact that some pictures from different categories were very similar. To solve this problem, before learning a new category, I reviewed the known words to the related structures in order to make sure that all students could remember the word network category.

In conclusion, the class observations and responses from most teachers strongly indicate that the word network technique is highly effective for language teaching. Although most of the teachers were non-English major graduates, they were able to effectively adapt the word network technique to create diagrams for teaching a single topic or multiple topics in their classrooms. In addition, several teachers noted that their students actively and enjoyably participated in class activities. Students were able to connect the existing words they already knew to the meanings of the new words, and then apply these words to related structures through the word network diagrams created by the teachers.

Research question 2

To examine the effectiveness of participating teachers using the word network technique in teaching vocabulary to the first graders, the pre-test and post-test scores of students were compared regarding the descriptive statistics (means, standard deviation) and the inferential statistics (means of a dependent sample t test). The findings of a dependent sample *t* test indicated that there was a statistical significance between the pre-test (M = 12.50, $S.D.$ = 4.70) and post-test (M = 16.27, $S.D.$ = 6.81), $t(205) = -9.18$, $p < .001$ (See Table 1). Based on these findings, the researchers can conclude that the word network technique is effective in terms of improving the first graders' vocabulary knowledge.

Table 1
Pre-test and post-test mean score comparison of first grade students who study with the participating teachers

	N	Pre-test		Post-test		t	*df*	*p*
		M	*S.D.*	*M*	*S.D.*			
Students' English achievement	206	12.50	4.70	16.27	6.81	-9.18	205	.000**

Note: N = 206, $^{**}p < .05$

Despite the fact that the first graders were able to develop their vocabulary knowledge through the word network technique used by English teachers, several language features have to be improved by students in order to study at a higher level. Examples of such language features include making sentences or short dialogues using the words they have learned.

DISCUSSION AND CONCLUSIONS

One of the major aims of this study was to determine the manner which the participating teachers could adapt the word networks to improve the first graders' English vocabulary knowledge. Results found that non-English major teachers who had previously had no confidence in using a variety of teaching techniques and activities were able to improve their pronunciation teaching techniques and gained more confidence to use English for instruction. These findings align directly with previous study by Termprayoon (2020), which revealed the improvement of students' vocabulary achievement after learning English with the non-English major teachers who use effective techniques, games, activities, and teaching aids. In addition, English major teachers also claimed that although they had been trained to select appropriate methods and materials to teach English, the word networks technique of teaching vocabulary was very effective with young learners. This conforms with the previous studies about the benefit of word networks adaptation as a means of developing young EFL students' vocabulary knowledge (Cedar & Termjai, 2021; Franz & Teo, 2017; Mansourzadeh, 2014; Nguyen & Newton, 2021). However, the interview findings from one participant highlighted a challenge with the word network technique. She occasionally resorted to traditional methods for teaching vocabulary because creating word network diagrams was time-consuming. This finding aligns

with Neuman et al. (2011), which reported that while new words are learned more effectively when they are semantically related, teachers might need additional time to prepare such lessons. As a result, despite the traditional methods being less demanding, students tended to engage more attentively in creating word network diagrams with the teacher using this technique during the English classes.

Another aim of the study was to discover the extent to which the word network technique affects the improvement of first graders' vocabulary knowledge. The reported findings showed that the first graders' post-test scores were significantly different from the pre-test scores at .05 levels. This may indicate that the first graders' significant improvement in vocabulary knowledge may have resulted from the application of word networks. Such findings are in line with those of many previous studies which suggested that children show significantly greater growth in vocabulary depth for words taught in semantic networks. They are motivated to memorize and understand the words more easily (Barcelo-Coblijn et al., 2019; Hadley et al., 2019; Pollard-Durodola et al., 2011; Sitompul, 2013). Additionally, the current finding is also supported by the theories of Hatch and Brown (1995), Nation (2001), and Schmitt and McCarthy (1997) which stated that vocabulary is the foundation to build languages, students learn the meaning of English words easily when teachers used vocabulary expansion technique such as word list and word networks. Students were able to link their learning of new words to mental processing by associating their existing knowledge with the new words (memory strategies). To conclude, the current study has provided further empirical evidence for the utility of the word network technique in vocabulary teaching for young EFL learners in primary schools, especially in the rural areas of the southern Thailand where opportunities for both teachers and students to practice language skills are limited.

PEDAGOGICAL IMPLICATIONS

The findings constitute implications for EFL teachers in primary schools. The use of the most frequent words in this study might be an effective tool for EFL teachers in seeking to promote the vocabulary acquisition of young learners. The word network technique involves creating diagrams that illustrate how words are interconnected (Heimlich & Pittelman, 1986). This strategy is recognized as effective in enhancing learners' retention of background knowledge and facilitating connections between familiar and new vocabulary in an engaging manner. For EFL teachers, employing the word network technique offers an alternative approach to boost learners' vocabulary skills. When creating word network diagrams for vocabulary teaching, it is crucial to align them with learners' interests and language proficiency levels. The principles guiding the creation of these diagrams typically include: 1) introducing main topics to learners, 2) prompting learners to brainstorm words related to these topics, and 3) visually representing word associations and categories through word network diagrams. In preparing lessons using the word network technique, teachers should plan activities that expose learners to diverse categories and integrate technology to sustain their interest. This approach allows learners to integrate new vocabulary into their existing knowledge frameworks and collaborate with their teacher to construct diagrams effectively. However, it is impossible to say that one teaching technique is completely adequate or inadequate in teaching and learning vocabulary for all levels of EFL learners due to their different comprehension tendencies.

LIMITATIONS AND RECOMMENDATIONS

The current study has several limitations. Firstly, it focuses solely on the word class of 150 high-frequency words from wordlists derived from three nationally-used textbooks approved by the Ministry of Education, Thailand, specifically for first-grade students. Additionally, only 77 combined words categorized by semantic categories were used to construct the word networks based on two selected sources. Despite these constraints, our methodological approach provides a framework for future researchers to expand their investigations to include a wider range of textbooks across different proficiency levels in Thailand. Furthermore, our analysis of the constructed word networks suggests the need for further research aimed at developing tasks or exercises that can familiarize young learners with diverse categories of words, such as word classes, rhyming words, alliteration, and words with related meanings, along with lists of synonyms and antonyms.

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THE AUTHORS

Ratima Tianchai is a Ph.D. candidate in Applied Linguistics at the Faculty of Liberal Arts, Mahidol University, Thailand. Her research interests lie in the areas of teaching English as a foreign language (EFL/TESOL), language education, technology and second/foreign language learning, and corpus linguistics.
ratima.ti@skru.ac.th

Suthathip Thirakunkovit is an assistant professor and the Head of the Department of Applied Linguistics, Faculty of Liberal Arts, Mahidol University, Thailand. Her current research interests cover language test development, test validation, assessment literacy, corpus linguistics, and second language writing.
suthathip.thi@mahidol.edu

Songsri Soranasataporn was an associate professor at the Department of Applied Linguistics, Faculty of Liberal Arts, Mahidol University, Thailand. She was also previously the Head of the Department of Applied Linguistics there, as well as the e-Learning Association of Thailand (ELAT), and an executive board member of the International Simulation & Gaming Association, Thailand.
songsri.sor@mahidol.ac.th

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Appendix A

Demographic information of the participating teachers

Characteristics	Number of participants	Percent (%)
Gender		
- Male	8	16.67
- Female	40	83.33
Age		
- Less than 30	25	52.14
- 31-35	8	17.67
- 36-40	7	13.55
- 41-45	5	11.32
- 46-50	3	5.32
Teaching Experience		
- 1-5 years	23	47.92
- 6 -10 years	15	31.25
- 11-15 years	4	8.33
- 16-20 years	3	6.25
- Over 30 years	3	6.25
Majors of Graduation		
- Math	21	44.13
- Science	15	32.27
- Thai	9	18.54
- English	3	5.06

Note: N = 48

Appendix B

Word class of the 150 most frequent words (N) in three grade one textbooks (which account for 54.1% of all tokens) and by the Ministry of Education, Thailand

	Word class in *three Grade One textbooks*		Word class in *the Ministry of Education*		
Parts of speech	**N**	**Words**	**N**	**Words**	
Verbs	41	act, angry, answer, ask, chant, check, close, dig, draw, find, fly, get, go, guess, hear, jump, keep, like, listen, look, make, match, meet, play, point, put, read, repeat, ride, run, say, see, sing, smile, swim, take, talk, use, wear, work, write	22	close, count, cry, cut, dance, go, kick, listen, look, love, meet, open, say, see, show, sing, sit, stand, start, stop, swim, walk	Content
Adjectives	16	big, black, blue, correct, green, happy, little, long, new, nice, old, pink, purple, red, small, yellow	9	big, good, happy, long, sad, short, small, tall, ugly	Content
Exclamations	4	hi, hello, no, yes	2	goodbye, hello	Function
Nouns	89	activity, animal, apple, backpack, bathroom, bed, bedroom, bike, bird, board, book, brother, cake, car, card, cat, chair, chicken, circle, clock, colour, computer, cup, day, dog, doll, dress, ears, eyes, face, family, fan, farm, father, feeling, fish, food, friend, fun, game, hair, hamster, hat, head, helmet, house, kitchen, kite, lesson, listening, milk, mirror, missing, mother, mouse, mouth, noodles, nose, number, orange, paper, park, pen, pencil, picture, pillow, plane, project, rabbit, rice, robot, room, ruler, school, sentences, shirt, shoes, sister, skirt, speaking, story, table, teacher, things, time, tree, turtle, unit, word	117	ant, apple, bag, ball, banana, bat, bean, bear, bee, bin, bird, birthday, book, box, boy, bread, broom, brother, bus, cake, candle, car, cat, chair, class, crayon, cup, dad, desk, dog, door, dot, ears, eggs, eraser, eyes, face, fan, farmer, father, fish, flower, food, feet, fox, fruit, fun, giraffe, girl, glass, goat, hair, ham, head, house, ice, ice cream, jar, key, king, kid, legs, lemon, line, lion, man, map, milk, mom, monkey, moon, mother, mouth, name, nose, orange, owl, pan, panda, papaya, pear, pen, pencil, pet, play, point, pool, queen, rabbit, rat, ring, roof, ruler, salad, sheep, ship, sister, smell, snake, song, star, student, sun, T.V., table, tea, teacher, thank you, tomato, top, toy, tree, van, water, woman, zebra, zoo	Content

*Several words in this table can have multiple part-of-speech classifications.

Appendix C

The combined words based on semantic categories found in three nationally-used grade one textbooks and the Ministry of Education, Thailand

Semantic categories	N	Items
Human body	9	ears, eyes, legs, face, feet, hair, head, nose, mouth
Family	8	boy, brother, father, girl, kid, man, mother, sister
Animals	24	ant, bat, bee, bear, bird, cat, chicken, dog, fish, fox, giraffe, goat, hamster, lion, monkey, mouse, owl, panda, rabbit, rat, sheep, snake, turtle, zebra
School	18	bag, board, book, box, card, chair, class, clock, computer, desk, eraser, pen, pencil, picture, ruler, student, table, teacher
Plants, vegetables, and fruits	9	apple, banana, bean, flower, grape, mango, orange, papaya, tomato
Food	9	bread, cake, egg, ice cream, milk, noodles, salad, tea, water
Total	**77**	

Appendix D

The steps of word networks training workshop