

Integrating KWL Plus Technique with Mind Mapping to Develop Reading Comprehension Skills of Thai 9 Graders

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Abstract

The purposes of the study were 1) to examine the effectiveness of the KWL plus mind mapping learning management on Thai grade 9 students' reading comprehension and 2) to study the participants' satisfaction with the KWL plus mind mapping learning management. The study employed a one-group experimental design, with 25 students from a public school in Mahasarakham province participating. The research instruments included a KWL Plus mind mapping learning management plan, a reading comprehension test, and a satisfaction questionnaire. Data were collected through pre-tests, post-tests, and during the implementation of six sub-learning lessons. The effectiveness of the learning management plan was assessed using process-product effectiveness (E1/E2), post-test effectiveness (E2), and an effectiveness index (E.I.). The results indicated significant improvements in students' reading comprehension, with the learning management plan showing a high effectiveness index (E.I. = 0.82). Additionally, the students expressed a very high level of satisfaction (average $\bar{x} = 4.85$) with the learning approach. This study contributes to the field of reading development by providing evidence of the combined effectiveness of KWL and mind mapping techniques in enhancing language learning in similar educational contexts.

Keywords: KWL plus, mind mapping, reading comprehension

1. Introduction

Reading remains one of the fundamental skills for students since the early of their education. Reading comprehension is also a crucial element as students could use to transform into more advanced levels of education (Butterfuss et al., 2020; Perfetti, 1985). However, it is not simply developing such a skill as students especially teenage students of grade 9 might face challenges in mastering the skills. To be specific, students at this stage face the difficulty in interpreting complexity of reading materials and the greater demands for cognitive skills (Evans & Carr, 1985). Additionally, at the age of 15 the teenage 9 graders are distracted from various sources, including social media, gaming, and other online activities (Guo, 2023; Hezam et al., 2022). This could lead to shorter attention spans and reduced focus on academic tasks. Therefore, it could be difficult for students to focus attention on reading and reading development. Consequently, the needs for effective strategies to enhance reading comprehension are highlighted in language classroom around the globe.

Scholars define reading comprehension as the ability to process and understand text while integrating it with prior knowledge (Kendeou et al., 2016; Perfetti & Adlof, 2012; Snow, 2002). In detail, Comprehensive reading requires several key skills: a strong vocabulary, the ability to interpret information accurately, and the capacity to connect different elements of a text into a coherent whole (Butterfuss et al., 2020; Perfetti & Adlof, 2012). These skills are fundamental for students to engage meaningfully with reading materials across all subjects. However, despite the critical importance of these skills, their development is often a significant burden for both teachers and students. As mentioned earlier, many students struggle to cultivate these abilities, making it challenging to achieve high levels of reading comprehension (Gotmare & Potey, 2023; Guntur & Rahimi, 2019; Hezam et al., 2022).

Regarding the challenges in reading comprehension development in school level, Thai education has long faced critiques and difficulty in such matter (Boonaree et al., 2017; Intasena & Nuangchalerm, 2022; Ratanaruamkarn et al., 2023). Particularly, among students who struggle to analyze and interpret texts, lack the ability to identify key information, find text main ideas, and connect components of a reading passage into understanding, poor

reading performances could normally be noted. This could be evidenced by the results of both national (National Institute of Educational Testing Service, 2022) and international assessments (OECD, 2022), where Thai students consistently score below expected score in reading section. To tackle these problems, instructional method that is appropriate for the context should enable students to utilize the text analysis skills and connect text components to form comprehension.

In the case of the Thai education context, the KWL Plus can be considered to have potential to help students develop necessary skills for the comprehension of the text. The technique is defined as a strategy designed to enhance students' engagement with texts by activating prior knowledge, setting specific learning goals, and reflecting on what has been learned (Carr & Ogle, 1987; Made, 2021; Usta & Yilmaz, 2020). In detail, KWL stands for "Know," "Want to know," and "Learned," and these components let students to learn through a structured process of inquiry and reflection. The KWL has been known to have positive effects on language classrooms particularly on reading skill development. Aladwani et al. (2022) emphasize that KWL is beneficial for reading comprehension, particularly in language learning environments, as it systematically engages students by activating prior knowledge, setting learning goals, and reflecting on acquired knowledge. Similarly, Made (2021) supports this view, showing that the KWL-Plus strategy significantly improves reading comprehension among students by integrating additional components like summarization and information organization. Nair and Said (2020) further argue that the use of graphic organizers like the KWL chart enhances reading comprehension in ESL settings by providing a structured approach to learning. Suhaimi (2020) and Zalisman and Astafi (2021) also affirm that KWL, especially when extended with techniques like mind mapping (KWL-Plus), helps students connect and retain information more effectively. These findings collectively suggest that KWL is a highly regarded tool in language education due to its ability to facilitate comprehensive reading and understanding.

For the "Plus" component, techniques are expected to use with KWL. In this study, mind mapping was combined KWL with the aim to students to organize information visually, summarize key points, and connect ideas in a way that enhances their comprehension. According to Buzan (2006), mind mapping helps students create diagrams that link concept which helps learners to see relationships between ideas, retain memory, and deepen understanding of the text.

Therefore, integrating the KWL Plus technique with mind mapping holds theoretical potential for developing a comprehensive approach to improving reading comprehension in the Thai context. Moreover, previous studies have demonstrated the practical effectiveness of these techniques and have encouraged further research to explore the integration of additional methods in classroom settings. Building on this, the current study aims to evaluate the effectiveness of combining KWL Plus with mind mapping and to assess students' satisfaction with this integrated approach. The purposes of the study were 1) to examine the effectiveness of the KWL plus mind mapping learning management on Thai grade 9 students' reading comprehension and 2) to study the participants' satisfaction with the KWL plus mind mapping learning management.

2. Methodology

2.1 Research Design

The study was developed in a one-group experimental design. A learning management plan was designed with the principles of the KWL technique with an integration of mind mapping, and it was implemented with 9th graders in the Thai educational context to enhance their reading comprehension skills. The results of the study were justified by three key statistics, including E1/E2), (E2), and the effectiveness index (E.I.) used in indicating the learning management plan effectiveness as well as the average score of the satisfaction questionnaire.

2.2 Participants

The participants in this study were 25 grade 9 students from a public school in Mahasarakham province, Thailand, selected through convenient sampling. The province ranks in the middle on national academic tests for school students (National Institute of Educational Testing Service, 2022), suggesting that the participants may represent typical Thai students and share similar language learning challenges with the broader student population. Ethical considerations in human research were carefully observed during data collection to ensure the participants' rights and well-being were protected.

2.3 Research Instruments

2.3.1 KWL Plus Mind Mapping Learning Management Plan

The learning management plan was designed using the principles of KWL Plus, as students are taught to ask questions for what they "know," what they "want," and what they "learn" while reading texts. They were also instructed to create mind mapping and use it to show the connection between text elements. These learning

activities were used to teach the topics of comprehending articles, comprehending documentaries, comprehending folklore, comprehending news, comprehending literature in lessons, and comprehending textbooks. Therefore, the learning management plan consists of six sub-learning lessons with the forementioned topics. Each plan was evaluated by experts in language education and professional teachers—5 in total. The learning management plan evaluation indicates a very high level of appropriateness, as the scores of the sub-learning lesson rank from 4.70 to 4.75.

2.3.2 Reading Comprehension Test

The reading comprehension test consisted of 30 multiple-choice items gained by the design of 45 preliminary items, which were then tested on students of similar ability to evaluate their difficulty and discrimination values. The test items were also evaluated by experts to find Index of Item-Objective Congruence (IOC). Overall, IOC was at an appropriate level ranging from 0.5 to 1.0. The difficulty ($p = 0.42-0.78$) and discrimination ($b = 0.24-0.76$) are also at an appropriate level with a reliability coefficient of 0.92, as tested by Lovett. The test was used as pre-test and post-test during data collection.

2.3.3 Satisfaction Questionnaire

The questionnaire was designed on 5-Likert scales to let participants express their satisfaction with the learning management plan. There were 10 items chosen from 20 preliminary items, which were evaluated by the expert to examine the items IOC. It was also tested with the students of similar ability to evaluate to identify its reliability. The question development process indicated both validity (IOC = 0.5-1.0) and reliability (α -Coefficient = 0.94).

2.4 Data Collection and Data Analysis

The data collection took place in the second semester of the 2023 academic year. The learning management plan was implemented in the class. The participants' reading comprehension was assessed in the pre-test, during the 6 sub-learning lessons, and post-test. The satisfaction questionnaire was also used in the post-treatment session. The results of the study were analyzed using process-product effectiveness (E1/E2) calculated by the percentage of students' scores in learning activities in sub-lesson plans and the percentage of students' post-test score. Both were compared to the predetermined criteria of 75. Also, effectiveness index (E.I.) calculated by division of post-test score minus pretest score and sum of students score minus their score in pretest, was also employed. The participants' satisfaction was analyzed using the mean score and standard deviation. The mean scores were interpreted in levels: very high ($\bar{x} = 4.51-5.00$), high ($\bar{x} = 3.51-4.50$), average ($\bar{x} = 2.51-3.50$), low ($\bar{x} = 1.51-2.50$), and very low ($\bar{x} = 1.00-1.50$).

3. Results

Table 1. The effectiveness of the KWL plus mind mapping learning management plan

Effectiveness	Max score	\bar{X}	S.D.	%
Process effectiveness (E ₁)	300	248.44	2.74	82.81
Product effectiveness (E ₂)	30	26.08	2.17	86.93
The effectiveness of the learning management plan (E ₁ /E ₂) = 82.81/86.93				

Table 1 shows the effectiveness of the KWL plus mind mapping learning management plan. Out of 300 maximum points in sub-learning lesson activities, the participants' average score was 248.44 (SD = 2.74). In the post-test, the participants' mean score was 26.08 (SD = 2.71) out of the full mark of 30. That the activity score as the process effectiveness (E1) accounts for 82.81% of the full mark and the posttest score as the product effectiveness (E2) accounts for 86.93% makes the effectiveness of the learning management plan 82.81/86.93 (E1/E2) reach the predetermined criteria of 75/75, suggesting that the KWL plus mind mapping learning management plan led to the expected outcomes regarding the development of the participants' reading comprehension.

Table 2. The effectiveness index of the KWL plus mind mapping learning management plan

N	Max score	Sum		E.I.
		Pre-test	Posttest	
25	30	199	652	0.82

Table 2 presents the effectiveness index of the KWL Plus combined with mind mapping learning management plan. The data indicates that the effectiveness index of the learning management was 0.82, which suggests that students experienced an 82% increase in learning progress from the pre-test to the post-test.

Table 3. Participants' satisfaction with the KWL plus mind mapping learning management plan

No.	Statements	\bar{X}	S.D.	Degree of agreement
1	I enjoyed learning with the KWL Plus technique combined with mind mapping.	4.92	0.28	Very high
2	I felt enthusiastic because learning is fun.	4.72	0.46	Very high
3	I had fun during lessons with the KWL Plus technique combined with mind mapping.	4.96	0.20	Very high
4	I learned with pleasure.	4.76	0.44	Very high
5	I felt that I can apply the knowledge further in other subjects.	4.72	0.46	Very high
6	I enjoyed participating in reading comprehension activities.	4.92	0.28	Very high
7	I liked doing individual activities.	4.84	0.37	Very high
8	I had more opportunities to express my opinions.	5.00	0.00	Very high
9	I enjoyed having the opportunity to exchange ideas with my classmates.	4.80	0.50	Very high
10	I felt valued when I was able to help my friends.	4.84	0.37	Very high
Average		4.85	0.34	Very high

The results indicate a very high level of participants' satisfaction with the KWL plus mind mapping learning management plan ($\bar{x} = 4.85$, $S.D = 0.34$). In detail, it could be interpreted from the results of the study that the participants perceived the learning management plan as an instructional method that provided them enjoyable and active learning experiences. They were also satisfied with the opportunity to learn with classmates and contribute to the learning of each other.

5. Discussion

Considering the results of process/product effectiveness, effectiveness index, and participants' satisfaction, we could claim that the KWL strategy was effective in reading classrooms in the Thai educational context. This could relate to the core principles of KWL technique - guiding the students to learn through what they already know (Know), what they want to learn (Want), and what they have learned (Learned). According to Carr & Ogle, (1987), these processes encourage active thinking and engagement with the text, which in turn leads to better text comprehension. In this study, the KWL strategy helped students organize their thoughts and reflect on their learning, making it a powerful tool in fostering deeper understanding.

Likewise, mind mapping could also be considered as a contributing factor to the success of the study. In detail, mind mapping played a significant role in achieving the expected results because it provided an opportunity for students to use visual representation of the information to see relationships between concepts and organize their thoughts more effectively (Buzan, 2006). For example, when they read crime news, the students were encouraged to use mind mapping to connect suspects, victims, spaces, and cause of the situation. As suggested by the results of the study, this visual organization aided memory retention and supports the processing of complex information, making it easier for students to grasp and connect different elements of the text.

Furthermore, the combination of KWL and mind mapping provided students with valuable learning experiences. Considering the activities designed with KWL plus mind mapping, we could note that they could be linked to collaborative learning, systems thinking, and a structured approach to reading. Apart from desirable outcomes in the academic aspects, this could make the learning process more enjoyable. In this study, students were observed to be able to work together, think critically, and develop a positive attitude toward reading, which contributed to their overall satisfaction and success.

The results of this study are consistent with the findings of previous research (aladwani et al., 2022; Made, 2021; Nair & Said, 2020; Suhaimi, 2020; Zalisman & Astafi, 2021), which also highlighted the benefits of using KWL and its integration with other strategies in reading classes. Therefore, the study adds a piece of evidence to support the approaches as a teaching method that can significantly improve students' reading comprehension and overall learning outcomes, reinforcing the value of these methods in educational settings.

6. Conclusion

The principles of KWL were employed in the current study with an integration of mind mapping technique as a "plus" element to design learning activities in a learning management plan used in developing grade 25 9 language learners in the Thai educational context. The findings of a single-group study indicate that the learning management system effectively enhances students' reading comprehension and contributes to overall satisfaction

inside the classroom. The study could contribute to the area of reading development as it adds evidence to support the use of KWL and mind mapping technique. It could also suggest how the two techniques can be combined to develop language learners in the Thai and similar contexts.

The findings from this study suggest that integrating KWL with mind mapping in classroom activities can significantly enhance students' reading comprehension and engagement. Teachers could apply this approach in various subjects to support students in organizing and connecting ideas, thereby improving overall learning outcomes. For further research, it would be beneficial to explore the long-term effects of this combined strategy on different age groups and subjects, as well as to investigate how technology can be integrated with KWL and mind mapping to further enhance learning.

However, there are limitations that could not be overlooked in the design of the study. The findings may not be generalizable to all students in the Thai educational context due to the limited sample size. The study also lacked certain qualitative aspects of data collection. For instance, comprehensive interviews or observations would have provided greater insight into how students utilized the KWL Plus mind mapping technique. Future study should consider these aspects to provide a comprehensive understanding of the plan's effectiveness.

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Authors contributions

Kornkanok Charusapsodsai was responsible for the study design and revising the manuscript. Assoc. Dr. Authapon Intasena contributed to data collection and drafting the manuscript. Both authors read and approved the final manuscript. Both authors contributed equally to this study.

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.

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Obtained.

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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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References

- Aladwani, A., alfadley, A., algasab, M., & Alnwaiem, A. F. (2022). The Effect of Using KWL (Know-Want-Learned) Strategy on Reading Comprehension of 5th Grade EFL Students in Kuwait. *English Language Teaching*, 15(1), 79-91. <https://doi.org/10.5539/elt.v15n1p79>
- Boonaree, C., Goulding, A., & Calvert, P. (2017). Reading for Pleasure (rfp) and Literacy Problems in Thailand. *TLA Research Journal*, 10(2), 16-28.
- Butterfuss, R., Kim, J., & Kendeou, P. (2020). Reading Comprehension. In *Oxford Research Encyclopedia of*

- Education*. <https://doi.org/10.1093/acrefore/9780190264093.013.865>
- Buzan, T. (2006). *The Ultimate Book of Mind Maps* (UK ed.). Thorsons.
- Carr, E., & Ogle, D. M. (1987). KWL Plus: A Strategy for Comprehension and Summarization. *Journal of Reading*, 30, 636-631.
- Evans, M., & Carr, T. (1985). Cognitive Abilities, Conditions of Learning, and the Early Development of Reading Skill. *Reading Research Quarterly - READ RES QUART*, 20. <https://doi.org/10.2307/748022>
- Gotmare, P. S., & Potey, M. M. (2023). Review of Parameters, Approaches and Challenges in Reading Comprehension Systems. In M. Tuba, S. Akashe, & A. Joshi (Eds.), *ICT Systems and Sustainability* (pp. 775-786). Springer Nature. https://doi.org/10.1007/978-981-19-5221-0_72
- Guntur, L. M. F., & Rahimi, S. P. (2019). Exploring the Challenges of Reading Comprehension Teaching for English Proficiency Test Preparation Class in Indonesia. *ELS Journal on Interdisciplinary Studies in Humanities*, 2(3), Article 3. <https://doi.org/10.34050/els-jish.v2i3.7401>
- Guo, Y. (2023). *The Influence of Digital Media on Teenager's Reading Habits*. 374-379. https://doi.org/10.2991/978-2-38476-068-8_47
- Hezam, T. A., Ali, J. K. M., Imtiaz, S., Saifi, M. A., & Islam, M. R. (2022). Challenges and Problems of Reading Comprehension Experienced by EFL Learners. *Journal of English Studies in Arabia Felix*, 1(2), Article 2. <https://doi.org/10.56540/jesaf.v1i2.28>
- Intasena, A., & Nuangchalerm, P. (2022). Problems and Needs in Instructing Literacy and Fluency of Reading and Writing Skills of Thai L1 Young Learners. *Journal of Education and Learning*, 11, 63-70. <https://doi.org/10.5539/jel.v11n2p63>
- Kendeou, P., mcmaster, K. L., & Christ, T. J. (2016). Reading Comprehension: Core Components and Processes. *Policy Insights from the Behavioral and Brain Sciences*, 3(1), 62-69. <https://doi.org/10.1177/2372732215624707>
- Made, D. S. (2021). The Use Of KWL-PLUS On Improving Reading Comprehension of The Tenth Grade Students of Sma Negeri 2 Banjar. *Journal on Studies in English Language Teaching (JOSELT)*, 2(2), 45-49.
- Manuel, J. (2012). Teenagers and Reading: Factors that shape the quality of teenagers' reading lives. *English in Australia*, 47(2), 45-57.
- Nair, P., & Said, N. E. M. (2020). The Effect of Graphic Organizer (KWL Chart) on Young Learners' Reading Comprehension in an ESL Setting. *International Journal of Management and Humanities*, 4(8), Article 8. <https://doi.org/10.35940/ijmh.H0768.044820>
- National Institute of Educational Testing Service. (2022). *ONET result 2023*. Retrieved from <https://www.niets.or.th/th/content/view/11821>
- OECD. (2022). *Thailand Student performance (PISA 2022)*. Retrieved from <https://gpseducation.oecd.org/countryprofile?Primarycountry=THA&treshold=10&topic=PI>
- Perfetti, C., & Adlof, S. (2012). Reading comprehension: A conceptual framework for word meaning to text meaning. In J. Sabatini, E. Albro, & T. O'Reilly, *Measuring up: Advances in how to assess reading abilities* (pp. 3-20). Rowman & Littlefield Education.
- Perfetti, C. A. (1985). *Reading ability*. Oxford University Press.
- Ratanaruamkarn, S., Piyanukool, S., & Nuemaihom, A. (2023). Trends in Teaching Critical Reading in the Thai Context. *Theory and Practice in Language Studies*, 13(2), Article 2. <https://doi.org/10.17507/tpls.1302.17>
- Snow, C. (2002). *Reading for Understanding: Toward an R&D Program in Reading Comprehension*. RAND Corporation.
- Suhaimi, S. (2020). The Influence of KWL Strategy on Students' Reading Comprehension. *International Journal of Scientific & Technology Research*, 9(3), 4622-4628.
- Usta, N., & Yilmaz, M. (2020). Impact of the KWL Reading Strategy on Mathematical Problem-Solving Achievement of Primary School 4th Graders. *Journal of Educational Research*, 113(5), 343-363. <https://doi.org/10.1080/00220671.2020.1830017>
- Zalisman, Z., & Astafi, R. (2021). Improving Students' Reading Comprehension Through "KWL Plus" Technique at SMAN 2 Kampar. *Akademika: Jurnal Keagamaan Dan Pendidikan*, 17(2), Article 2. <https://doi.org/10.56633/jkp.v17i2.338>