

The Development of Thai Reading Literacy among Grade 10 Students through the Implementation of the KWL Plus Instructional Approach

Wiwatchai Ketkarn^{1*}, Phamornpun Yurayat¹

¹*Faculty of Education, Mahasarakham University, Thailand*

E-mail: phamornpun.y@msu.ac.th*

*Corresponding author

Article Info	Abstract
Received: 20 February 2026 Reviewed: 10 March 2026 – 26 May 2026 Accepted: 20 June 2026 Published: 30 June 2026	Purpose The purpose of this study was to achieve three main objectives: 1) to determine the efficiency of the KWL Plus instructional management framework based on the 75/75 criterion; 2) to compare students' Thai reading literacy before and after the intervention; and 3) to compare students' Thai reading academic achievement before and after the implementation of the KWL Plus model. Methodology This study employed a one-group pretest-posttest experimental design. The sample comprised 40 tenth-grade students from Sarakhampittayakom School during the 2025 academic year, selected through cluster random sampling. The 12-hour intervention utilized seven structured lesson plans. Data were collected using a Thai reading literacy test and a reading academic achievement test, and subsequently analyzed using percentages, means, standard deviations, and paired-samples t-tests. Results/Findings The results of the study revealed three main outcomes: 1) the efficiency of the KWL Plus lesson plans for Thai reading literacy was 84.82/81.21, which exceeded the established 75/75 criteria; 2) the students' Thai reading literacy after the implementation was significantly higher than before the implementation at the .01 level; and 3) the students' Thai reading academic achievement after the implementation was significantly higher than before the implementation at the .01 level. Implications The findings suggest that the KWL Plus approach serves as an effective metacognitive scaffolding tool for language educators to enhance students' reading comprehension and analytical skills. By guiding learners through structured inquiry, collaborative mind mapping, and summarizing, this pedagogical framework enables students to systematically process and understand complex literary texts, ultimately transforming passive readers into active, self-regulated learners.

Keywords: KWL Plus learning management; Thai reading literacy; Thai reading academic achievement; Efficiency criteria

1. Introduction

On an international level, reading competence is acknowledged as one of the basic academic competencies for creating knowledge and lifelong learning (Geske & Ozola, 2008). The OECD (2019) stresses that, in the modern-day world, students need to have skills for information searching, comprehending critically, and assessing complex written material. As mentioned above, the instructional goals developed by teachers are crucial for ensuring literacy learning; those goals are needed to turn general standards into a set of observable reading behaviors.

To cope with these needs, the nation of Thailand has adopted some international literacy assessment models, such as PISA. The modern Thai curriculum highlights the importance of twenty-first-century reading competencies (IPST, 2020). However, despite the high-quality national plans, there are still gaps that separate policies from practices in the country's secondary classrooms (IPST, 2021). It is stated that all academic areas require high reading competence, which many Thai students lack.

The macro-level problem is especially evident at the micro-level, in certain school environments. For example, in Sarakhampittayakhom School, recent empirical findings pointed out a critical problem—the mean reading literacy test score of tenth graders significantly decreased from 5.97 in June 2025 to 4.32 in July 2025. This drop in scores suggests the inability of learners to deal with complicated information, analysis, and integration of main ideas while reading non-continuous texts.

Given this severe situation in secondary classes, the current researcher decided to implement an effective instructional approach to address this issue—KWL Plus. First developed by Carr & Ogle (1987), this approach supports the process of learners' metacognition through pre-reading, during-reading, and after-reading steps. In particular, the Plus stage is based on concept-mapping and summarizing techniques to help students organize their knowledge and make it more durable. According to local research conducted in Thailand, Burinrat (2016) and Nanudon (2022), the use of KWL Plus improves reading comprehension. Moreover, as demonstrated by Suksabai (2019), Suranit (2021), Suttiwet (2018), and Mopim (2022), KWL Plus develops the ability to conduct critical analysis.

Nevertheless, a significant research gap still remains in current literature. Previous studies have mostly emphasized the basic pedagogical mechanics of this strategy, without investigating KWL Plus as a systematic instructional management approach designed to reach strict PISA literacy standards. Furthermore, the actual efficacy of this technique within tenth-grade Thai literature classrooms has not been empirically established, particularly for complex classical works like Mongkhon Sut Kham Chan and Maha Vessantara Jataka, which feature high linguistic complexity and deep thematic layers. Finally, there is a clear shortage of studies exploring how scaffolded metacognitive strategies at the classroom level actively contribute to broader curriculum alignment across the entire school. This study directly aims to fill these specific gaps.

Therefore, this study aims to assess the effectiveness of the managed KWL Plus framework as an instructional management strategy to raise local literacy performance to international standards. The specific research objectives are defined as follows:

- 1.1. To determine the efficiency of the managed KWL Plus instructional framework for enhancing Thai reading literacy among tenth-grade students based on the 75/75 efficiency criterion.
- 1.2. To compare students' Thai reading literacy levels before and after the implementation of the managed KWL Plus model.
- 1.3. To compare students' Thai reading academic achievement before and after the implementation of the managed KWL Plus model.

2. Literature review

2.1. Path-Goal Theory

Path-Goal Theory, initially developed by Robert House and Philip Mitchell (1975), provides the main theoretical framework for discussing how leaders influence subordinates' motivation, effectiveness, and satisfaction. The primary role of leaders is to determine how goals will be achieved through target setting, elimination of barriers, and providing support structures. Leaders act as motivational intermediaries whose actions change followers' expectancies and increase their perception of the worthiness of educational benefits (Evans, 1996). Bans Akutey (2021) argues that success in the educational sector depends on achieving a strategic balance in managerial activities, such as effective allocation of resources and leadership activities aimed at encouraging students to learn.

There are four types of leaders identified in the theoretical framework: directive, supportive, participative, and achievement-oriented leaders. Meanwhile, according to Alanazi et al. (2013), the practical significance of the

theory lies in presenting a practical model for increasing the effectiveness of organizations. Empirical studies by Schriesheim and Schriesheim (1980) have refuted the initial assumptions about supportive leadership by demonstrating its strong effect on learners' satisfaction regardless of the level of complexity of their tasks. According to Ma and Marion (2021), instructional leadership, in turn, promotes an environment conducive to learning and boosts teacher efficiency and institutional trust. In other words, in this particular case, teachers are considered strategic managers who provide coaching and feedback necessary for achieving desired results. Teachers are responsible for regulating these instructional paths to develop institutional trust by making sure that efforts made by students result in successful performance.

2.2. Teacher instructional leadership as educational management

As far as the current school reform discourse is concerned, instructional leadership is seen in a new light as an organizational management strategy, viewed as the composing element of the system that integrates its resources, policy, and routines to facilitate academic success (Lashway, 2002).

It requires school leaders to operate with multiple logics of organizations that may contradict one another (Rigby, 2013) and move from professional practices to entrepreneurial ones to provide efficiency and legitimacy of the organization. Proper managing of this system calls for the balanced combination of administrative, political, and instructional duties to keep the organization's mission intact (Hallinger, 2005). Thus, under the management approach, the role of the principal includes establishing an ordered atmosphere for students' learning and improvement (Hopkins, 2001).

It is clear that success in this area is possible through effective management. Indeed, there is evidence of a positive relationship ($r = 0.74$) between managerial effectiveness and leadership skills in the instructional context (Sebastian et al., 2019). The leaders of successful organizations tend to be effective managers focusing primarily on strategic personnel management and resource allocation rather than classroom training (Hornig & Loeb, 2010). As part of organizational management, systematic actions such as coordinating the curriculum, monitoring its implementation, and examining instructional materials help ensure the effectiveness of instruction (Manaseh, 2016). Moreover, the influence of the principal's transformational support and collaboration through shared leadership on instructional practice was found to depend on transformational behavior (Bellibaş et al., 2021). Lastly, leaders can contribute to developing teachers' professionalism and increasing their efficacy through a culture of management characterized by open communication and trust (Kilag & Sasan, 2023).

2.3. The KWL plus model and metacognitive development

KWL Plus represents a metacognitive developmental model involving systematic planning, goal setting, and comprehension monitoring in order to develop the ability of students to take cognitive responsibility of their literacy growth. The KWL model is based on the fundamental model presented by Carr & Ogle (1987). It involves the organization of learning in a certain order using predetermined pre-reading, during-reading, and post-reading strategies. An important feature of this model compared to other instructional strategies is the stage of Plus which assumes structural rearrangement of complex materials into visual mind maps and written summaries. Such an information processing technique can be viewed as a tool for managing instruction since it allows teachers to evaluate students' performance more effectively and helps learners prioritize complex data. Indeed, empirical data confirms the high effectiveness of the chosen strategy. For instance, Hamdan (2014) found that KWL Plus is substantially more effective than regular instruction for tenth graders. Furthermore, activation of prior knowledge was recognized as a key aspect of reading at the higher level of proficiency according to the study by Farha & Rohani (2019). Finally, the strategy was proven to have a large effect on student success as stated by Al Mamari (2019) and Amelia & Kamalasari (2018).

2.4. Reading literacy and academic achievement

Thus, reading literacy can be defined as an integral competence, which should be developed in order to create new knowledge and be an active member of society (Delgadova, 2015). This competence serves as a crucial prerequisite for academic success in different subjects, ranging from language arts, to math, and even science (Delgadova, 2015; Bastug, 2014). Evidence based on structural equation modeling reveals that attitude to reading and comprehension play a vital role in predicting the level of academic success (Bastug, 2014). In its turn, a lack of analytical and critical reading skills often leads to poor academic achievements and GPA scores (Delgadova, 2015).

Therefore, efficient management of instruction requires metacognition and involves planning and monitoring of personal progress (Carr & Ogle, 1987). It allows students to move from a shallow to a deep level of understanding, where themes and complex terminology of high-quality classical literature appear (Carr & Ogle, 1987; Delgadova, 2015).

The use of strategic techniques like KWL Plus contributes to the development of schemas for more profound processing of information (Bankston & Zhou, 1995; Carr & Ogle, 1987). Activation of prior knowledge (K) and creation of questions for further discussion (W) facilitate the schemas needed for high-level text comprehension (Carr & Ogle, 1987). The Plus part of the KWL technique involves mind mapping and summarizing, which serves as an efficient instrument for structural and visual representation of learned material (Carr & Ogle, 1987; Al Mamari, 2019). According to international research, this strategy shows high efficiency and positively impacts academic achievement compared to a conventional approach (Amelia & Kamalasari, 2018; Bastug, 2014; Hamdan, 2014).

3. Research method

3.1. Research design

This study employed an experimental design, specifically a one-group pretest-posttest design (Campbell & Stanley, 1963). The design is represented by the formula $O1 - X - O2$, where $O1$ represents the pretest of Thai reading literacy and academic achievement, X denotes the implementation of the KWL Plus learning management, and $O2$ refers to the posttest.

3.2. Research participants

The research population comprised 400 tenth-grade students across 10 classrooms at Sarakhampittayakom School during the second semester of the 2025 academic year. The study sample, obtained through cluster random sampling with the classroom serving as the primary sampling unit, consisted of 40 students from a single tenth-grade classroom (Class 4/10). This sampling method ensured that the selected participants represented a naturally assembled collective within the school's educational environment.

3.3. Research instruments

Three principal tools were developed and validated for this study. First, the KWL Plus Lesson Plans consisted of seven distinct lesson plans designed for twelve hours of instruction covering the classical texts “Mongkhon Sut Kham Chan” and “Maha Vessantara Jataka”. A panel of five experts evaluated these plans, yielding an average suitability score of 4.68, which reflects excellent pedagogical quality standards.

Second, the Thai Reading Literacy Test was created based on the PISA 2018 Reading Literacy Assessment Framework. This instrument contains 20 items in its final version, split evenly into ten multiple-choice questions and ten subjective questions, offering a total score of 40 points. Following content validity verification by the expert panel, the Index of Item-Objective Congruence (IOC) achieved a range between 0.80 and 1.00. To ensure psychometric validity, the tool underwent a try-out session with Grade 11 students who had already completed the instruction of these specific literary works. For the ten multiple-choice items, the analysis demonstrated difficulty indices (p) between 0.25 and 0.75, alongside discrimination power (r) from 0.33 to 0.67, resulting in a Kuder-Richardson 20 (KR-20) reliability coefficient of 0.84. As for the ten subjective items, the difficulty indices (p) ranged from 0.22 to 0.62, with discrimination power (r) spanning 0.20 to 0.66, and a separate Cronbach's alpha reliability coefficient established at 0.82.

Finally, the Thai Reading Academic Achievement Test was designed as a 25-item multiple-choice test to measure student learning outcomes. This test tool demonstrated an IOC range between 0.80 and 1.00. Statistical analyses of the pilot test data from the same Grade 11 try-out cohort revealed that item difficulty (p) varied from 0.21 to 0.79, the discrimination index (r) ranged between 0.29 and 0.71, and the overall reliability index (KR-20) was established at 0.96. The complete psychometric characteristics of these validated instruments are systematically outlined in Table 1 below.

Table 1: Psychometric properties of research instruments

Instrument / Test Component	IOC Range	Difficulty (p)	Discrimination (r)	Reliability
1. KWL Plus Lesson Plans (7 Plans)	-	-	-	4.68*
2. Thai Reading Literacy Test	0.80-1.00			
Multiple-Choice Items ($n = 10$)		0.25-0.75	0.33-0.67	0.84
Subjective Items ($n = 10$)		0.22-0.62	0.20-0.66	0.82
3. Thai Reading Achievement Test (25 Items)	0.80-1.00	0.21-0.79	0.29-0.71	0.96

*Note: For Lesson Plans, the reported value represents the mean score of instructional suitability evaluated by experts.

3.4. Procedures of data collection

This study was conducted in accordance with the ethical standards approved by the Institutional Review Board of Mahasarakham University (January 21, 2026; No. 049-023/2026). The research was carried out during the second semester of the 2025 academic year, beginning with a pre-test (O1). Following the initial assessment, the researcher implemented the 12-hour KWL Plus intervention (X), followed by a post-test (O2) using the original instruments. Data were analyzed using descriptive statistics, including means and standard deviations, while a paired-samples t-test was employed for hypothesis testing to compare pre- and post-intervention scores.

3.5. Ethics statements

The studies involving human participants were reviewed and approved by the Institutional Review Board of Mahasarakham University, Thailand (Approval No. 049-023/2026). The participants provided their written informed consent to participate in this study prior to data collection.

4. Results

The findings are described in several aspects, namely:

4.1. The findings related to the efficiency of the KWL plus learning management

In this study, the E1/E2 efficiency framework was employed as our main evaluative paradigm. This particular model is commonly used within the context of Thailand's education system for the purpose of validating newly built curricula and instructional designs. Built on top of mastery learning principles, this dual-index model maintains that an instructional system is truly efficient only when continuous process engagement (E1) and terminal product outcomes (E2) simultaneously meet a stringent performance threshold. Under this framework, the efficiency criterion of 75/75 was intentionally developed by the researcher as a baseline for this specific intervention. This benchmark carefully takes into account the demanding cognitive load involved in high-level text processing and is appropriately balanced against the rigorous PISA-oriented reading literacy competencies required for Grade 10 students.

The chosen 75/75 benchmark is especially useful for reading-literacy interventions as it directly addresses the shortcomings of traditional single-point assessment approaches by placing an equal emphasis on formative process engagement (E1). Conventional assessments usually depend exclusively on summative post-test data (E2), which unwittingly permits a student to achieve high superficial results through short-term rote learning rather than showing a successful cognitive transition to independent reading. By requiring that the ongoing learning process (E1) meets the same empirical standard as the final product (E2), this framework guarantees that the recorded level of efficiency results from a stable and sound cognitive development.

In this research, the measure for E1 process efficiency was reflected through the structural quality and cognitive depth of individual visual mind maps created during the collaborative "Plus" instructional segments throughout the seven lesson plans, with a maximum possible score of 70 points. On the other hand, the E2 product efficiency index was operationalized as a balanced, 50:50 weighted composite score derived from the post-intervention results of the Thai Reading Literacy Test and the Thai Reading Academic Achievement Test. These empirical results can be seen below in Table 2.

Table 2: Efficiency of the KWL plus learning management (N = 40)

Evaluation Items	Full Score	Mean ($\bar{x}$)	S.D.	Percentage (%)
Process Efficiency (E ₁)	70	59.38	1.82	84.82
Product Efficiency (E ₂)	65	52.79	8.03	81.21
Total Efficiency (E ₁ / E ₂) = 84.82/81.21				

Table 2 shows that the KWL Plus learning management yielded an efficiency of 84.82/81.21. The developmental efficiency (E1) was 84.82%, while the resultant efficiency (E2) was 81.21%. These results indicate that the learning management surpassed the established 75/75 efficiency criterion, confirming its effectiveness for classroom implementation.

4.2. The findings related to the comparative analysis of Thai reading literacy

To evaluate the development of Thai reading literacy, the researcher conducted a comparative analysis of the participants' performance before and after the intervention. The process commenced with a pre-test to establish baseline literacy levels. Subsequently, the students engaged in the developed KWL Plus learning management until the instructional sequence was completed. Upon conclusion of the intervention, a post-test was administered using the same 20-item Thai Reading Literacy Test employed during the initial assessment. The comparative results of students' reading literacy performance are presented in the following table.

Table 3: Comparison of Thai reading literacy performance before and after the intervention (N = 40)

Assessment Period	M	S.D	t	p
Pre-test	10.58	4.30	28.10	<.001
Post-test	30.85	3.32		

As illustrated in Table 3, the Thai reading literacy of tenth-grade students after the implementation of KWL Plus learning management was significantly higher than before the intervention at the .01 level ($p < .01$).

4.3 The findings related to the comparative analysis of academic achievement in Thai reading

To investigate the impact of the KWL Plus model on students' academic performance, a comparative analysis was conducted on their Thai reading achievement scores. The data collection process initiated with a pre-test to determine the students' initial achievement levels. Following the full execution of the developed KWL Plus lesson plans, a post-test was administered using the same 25-item assessment tool to ensure consistency in measurement. The resulting data were statistically analyzed to evaluate the progress in students' academic achievement, with the comparative findings detailed in the table below.

Table 4: Comparison of Academic Achievement in Thai Reading Before and After the Intervention (N = 40)

Assessment Period	M	S.D	t	p
Pre-test	12.05	4.27	14.33	<.001
Post-test	21.33	2.94		

Table 4 reveals that the Thai reading academic achievement of tenth-grade students following the implementation of KWL Plus learning management was significantly higher than the pre-intervention scores at the .01 level ($p < .01$).

5. Discussions

5.1 The efficiency of KWL plus learning management (E1/ E2)

The KWL Plus learning management model registered an efficiency rating of 84.82/81.21. The efficiency value was above the expected 75/75 criterion. Process efficiency (E1) refers to steady learning progress, as demonstrated through regular formative assessments and mind mapping performed throughout the interactive "Plus" sessions. At the same time, product efficiency (E2) highlights the strength of the terminal outcomes, represented by a weighted composite score based on the Thai Reading Literacy Test and Thai Reading Academic Achievement Test.

This increased operational efficiency was caused by a comprehensive process of curricula development that aligned with the Tenth Grade Thai language performance indicators in the curriculum of the Sarakhampittayakhom School. The instructional design matched the participants' learning needs by combining frameworks related to reading literacy with actual reading assignments. This procedural effect corresponds with the theoretical perspective put forth by Amelia and Kamalasari (2018). According to the authors, a well-developed instructional strategy can provide instructors with an easily manageable toolset for providing benchmark reading instructions. Additionally, the systematic procedure described in the report corresponds with the findings presented by Al-Mamari (2019). The author stated that the complete curricular development process could lead to the guaranteed achievement of predetermined instructional benchmarks.

In terms of cognitive processes, the efficiency of this type of learning management can be explained by its systematic scaffolding of the processes associated with information processing. The systematic structure of the instructional model stimulates the formation of organized thinking from activation of previous knowledge to assimilation of new information. More specifically, when working on their mind maps at the "Plus" step, learners prioritize complex information presented in the text and illustrate connections between concepts. These findings correspond with the work of Carr and Ogle (1987), which states that organizing and summarizing information after reading promotes deep and systematic knowledge processing and helps learners to transform text parts into internalized knowledge structures.

5.2. Enhancement of Thai reading literacy through metacognitive scaffolding

The noticeable increase in Thai students' reading literacy scores after applying the intervention is a confirmation of the effectiveness of KWL Plus as an instructional scaffolding approach. In particular, through careful planning, setting goals, and comprehension monitoring, the learners had more control over the development of reading skills. In such a way, the collaborative learning process was encouraged; consequently, learners gained the ability to investigate and analyze difficult literary materials systematically. In this context, the

main advantage of using the framework under discussion lies in active involvement of learners' prior knowledge. According to Farha and Rohani (2019), it can be considered the crucial basis of higher-level reading processes.

In this case, the early stages of learning provided necessary cognitive schemas needed for assimilation of novel complicated data. It should be admitted that implementation of stages introduced by Carr and Ogle (1987) was the immediate cause of this progress. In particular, pre-reading included activation of prior knowledge (K) and inquiry-based questioning (W). Thus, a necessary cognitive schema was created for further activities. At the same time, in the course of reading, the learners monitored comprehension and collected new data (L). Finally, in the post-reading stage, the focus was made on creation of mind maps, which served as an efficient information processing tool. As a result, the necessity to represent complex literary material visually ensured deeper reading literacy.

In this way, the results obtained can be confirmed by the literature. In his work, Hamdan (2014) provides evidence that tenth-grade students who used the KWL Plus approach significantly progressed in text-processing skills in comparison with those who applied conventional approaches to reading instructions. Nevertheless, there are certain differences compared to findings presented by Farha and Rohani (2019). Namely, they have proved that application of the basic KWL framework can help students feel more motivated. Still, no significant differences between experimental and control samples were found. Therefore, the crucial value of the "Plus" stage introduced in current research becomes apparent.

5.3. Academic achievement and the path-goal theory in language instruction

According to the post-intervention analysis, there was a statistically significant increase in reading academic performance. The progress can be largely credited to the design of the KWL Plus instruction that incorporates metacognitive regulation and practical reading strategies. The structured design proved vital for comprehending classic Thai literary texts such as Mongkhon Sut Kham Chan and the Mahajati (the Great Vessantara Jataka). The Know and Want to know stages allowed students to tap into their prior knowledge and correlate it with their learning objectives in order to understand more difficult literary concepts.

In addition, the Plus stage encouraged critical skills related to information processing through visual synthesis of knowledge. Group collaboration during the brainstorming process contributed to this stage, as students were able to eliminate any possible comprehension gaps through peer explanations. Thus, a comprehensive and effective understanding of the text resulted in better scores in the final evaluation. The findings are in agreement with the claims made by Carr and Ogle (1987) that structured summarization and cognitive maps contribute to effective metacognitive regulation and allow students to monitor and process information efficiently.

Furthermore, the results obtained by the implementation of the KWL Plus strategy are in line with the empirical research conducted by Al-Mamari (2019). The researcher focused on tenth-grade students and concluded that KWL Plus has a statistically significant impact on reading proficiency as well as helps to identify main ideas and specific details. Moreover, the considerable progress made by students in this study is supported by statistical data published by Amelia and Kamalasari (2018) when using Effect Size formulas to categorize intervention impact. In light of all evidence provided above, the KWL Plus approach can be regarded as highly promising and viable.

6. Conclusions and suggestions

6.1. Conclusions

Based on the research findings and discussions, it can be concluded as follows:

In conclusion, the implementation of the KWL Plus learning management model has proven to be a highly effective pedagogical innovation, significantly enhancing both Thai reading literacy and the academic achievement of tenth-grade students. The model's efficiency, which comfortably exceeded the established criteria, underscores a structural design that is both robust and meticulously aligned with the secondary education context.

The essence of this success lies in the integration of metacognitive processes, particularly through the 'Plus' stage, which facilitates a pivotal transition for learners from being 'passive readers' to becoming 'analytical readers'. By engaging in collaborative mind mapping and knowledge synthesis, students were empowered to reorganize complex information systematically. This process not only led to a durable understanding of sophisticated literary content but also fostered a positive attitude toward reading. Ultimately, these factors establish a sustainable foundation for advanced literacy development, ensuring that students can navigate and master complex subject matters effectively in their future academic pursuits.

6.2. Suggestions

Based on the discussion and conclusion above, the researcher puts forward the following suggestions:

The findings of this study provide clear evidence that the KWL Plus instructional model is a robust tool for enhancing student competencies. To maximize its effectiveness, educators should transition from traditional

lecturing to a "facilitator" role, providing strategic guidance and fostering a collaborative environment that promotes authentic Active Learning. In selecting reading materials or literary texts, instructors should prioritize content that resonates with contemporary student interests or offers meaningful connections to modern societal contexts. Such relevance is crucial for stimulating reading literacy and empowering students to articulate their reflections with clarity and purpose.

Furthermore, the instructional process must emphasize the activation of prior knowledge, as this serves as the essential cognitive foundation for inquiry and the subsequent acquisition of new knowledge. Most importantly, practitioners should place significant weight on the "Plus" stage. This phase provides a critical opportunity for students to reorganize their thoughts and construct creative mind maps. This study confirms that such synthesis is particularly effective in helping students master and summarize complex Thai literature, including Mongkhon Sut Kham Chan and Maha Vessantara Jataka, which are often perceived as challenging due to their sophisticated linguistic and thematic structures.

To further expand the scholarly understanding of this model, future inquiries should investigate the impact of KWL Plus on other dimensions of high-level cognition, such as Critical Thinking or Creative Thinking, to ensure a more holistic development of learner competencies. Additionally, comparative studies between KWL Plus and other innovative instructional frameworks would be beneficial in identifying the most effective pathways for fostering reading performance in alignment with PISA global standards. Finally, researchers are encouraged to implement this model across different grade levels or within diverse strands of Thai language studies to evaluate the versatility and efficacy of the technique in broader educational contexts.

Declaration of conflicting interest

The authors declare that there is no conflict of interest in this work.

Funding acknowledgment

This research is derived from a master's thesis entitled "The Development of Thai Reading Literacy among Grade 10 Students through the Implementation of the KWL Plus Instructional Approach" conducted by Wiwatchai Ketskarn under the dedicated supervision and guidance of the thesis advisor, Phamornpun Yurayat. Furthermore, this research project was financially supported by Faculty of Education, Mahasarakham University. The research team would like to extend our sincere gratitude to Sarakhampittayakhom School and all participating students for their invaluable cooperation during the data collection process. It is important to note that while the original core content was conceptualized and authored entirely by the researchers, an artificial intelligence system was utilized solely for the purpose of refining the English prose and enhancing the linguistic fluency to ensure the manuscript meets international academic standards.

References

- Alanazi, T. R., Alharthey, B. K., & Rasli, A. (2013). Overview of path-goal leadership theory. *Sains Humanika*, 64(2).
- Al-Mamari, A. M. H. Z. (2019). *The Effect of KWL Plus Metacognitive Reading Strategy on Tenth Grade Students' Reading Comprehension and Attitudes* (Master's thesis, The British University in Dubai), Dubai.
- Amelia, R., & Kamalasari, J. (2018). The Effect of Using KWL PLUS (Know, Want, Learn) Plus Mapping and Summarizing) Strategy on Students' Reading Comprehension. *Ijelt*, 4(1), 123-132.
- Bankston III, C. L., & Zhou, M. (1995). Effects of minority-language literacy on the academic achievement of Vietnamese youths in New Orleans. *Sociology of education*, 68(1), 1-17.
- Bans-Akutey, A. (2021). The path-goal theory of leadership. *Academia Letters*, 2(748), 10-20935.
- Bastug, M. (2014). The structural relationship of reading attitude, reading comprehension and academic achievement. *International Journal of Social Sciences and Education*, 4(4), 931-946.
- Bormuth, J. R. (1973). Reading literacy: Its definition and assessment. *Reading research quarterly*, 9(1), 7-66.
- Burinrat, W. (2017). The development of learning on reading for comprehension of Matthayomsuksa 2 students taught by cooperative learning STAD technique with KWL Plus. *The Journal of Pacific Institute of Management Science (Humanities and Social Science)*, 3(2), 163-171.
- Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. Rand McNally.
- Delgadova, E. (2015). Reading literacy as one of the most significant academic competencies for the university students. *Procedia-Social and Behavioral Sciences*, 178(1), 48-53.
- Evans, M. G. (1996). RJ House's "A path-goal theory of leader effectiveness". *The Leadership Quarterly*, 7(3), 305-309.
- Farha, N. A., & Rohani, R. (2019, July). Improving students' reading comprehension of report text with KWL strategy. In *ELT Forum: Journal of English Language Teaching*, 8(1), 25-36.
- Geske, A., & Ozola, A. (2008). Factors influencing reading literacy at the primary school level. *Problems of Education in the 21st Century*, 6(1), 71-77.

- Hallinger, P. (2015). The evolution of instructional leadership. *Assessing instructional leadership with the principal instructional management rating scale*, 3(1), 1-25.
- Hamdan, M. H. (2014). KWL-Plus effectiveness on improving reading comprehension of tenth graders of Jordanian male students. *Theory and Practice in Language Studies*, 4(11), 2278-2288.
- House, R. J., & Mitchell, T. R. (1975). Path-goal theory of leadership. *Contemporary Business*, 3(1), 81-98.
- Horng, E., & Loeb, S. (2010). New thinking about instructional leadership. *Phi Delta Kappan*, 92(3), 66-69.
- Hopkins, D. (2003). Instructional leadership and school improvement. *Effective leadership for school improvement*, 4(3), 55-71.
- Institute for the Promotion of Teaching Science and Technology. (2020). *PISA 2018 assessment framework*. <https://pisathailand.ipst.ac.th/news-21/>
- Institute for the Promotion of Teaching Science and Technology. (2021). *PISA 2018 results: Reading, mathematics, and science*. IPST. <https://pisathailand.ipst.ac.th/>
- Kilag, O. K. T., & Sasan, J. M. (2023). Unpacking the role of instructional leadership in teacher professional development. *Advanced Qualitative Research*, 1(1), 63-73.
- Lashway, L. (2002). Developing Instructional Leaders. ERIC Digest.
- Linnakyla, P., Malin, A., & Taube, K. (2004). Factors behind low reading literacy achievement. *Scandinavian journal of educational research*, 48(3), 231-249.
- Rigby, J. G. (2014). Three logics of instructional leadership. *Educational Administration Quarterly*, 50(4), 610-644.
- Schriesheim, J. F., & Schriesheim, C. A. (1980). A test of the Path-Goal Theory of Leadership and some suggested directions for future research. *Personnel Psychology*, 33(2), 349-370.
- Sebastian, J., Allensworth, E., Wiedermann, W., Hochbein, C., & Cunningham, M. (2019). Principal leadership and school performance: An examination of instructional leadership and organizational management. *Leadership and policy in schools*, 18(4), 591-613.
- Suranit, M. (2021). *Learning management with KWL Plus technique that promotes analytical reading skills of Mathayom 3 students* (Master's thesis, Mahasarakham University in Thailand), Mahasarakham.
- Suttiwet, M. (2018). *The development of the reading comprehension achievement using learning management with KWL Plus technique for Mathayom 3 students* (Master's thesis, Silpakorn University in Thailand), Bangkok.
- Manaseh, A. M. (2016). Instructional leadership: The role of heads of schools in managing the instructional programme. *International Journal of Educational Leadership and Management*, 4(1), 30-47.
- Marks, H. M., & Printy, S. M. (2003). Principal leadership and school performance: An integration of transformational and instructional leadership. *Educational administration quarterly*, 39(3), 370-397.
- Ma, X., & Marion, R. (2021). Exploring how instructional leadership affects teacher efficacy: A multilevel analysis. *Educational Management Administration & Leadership*, 49(1), 188-207.
- Mopim, N. (2022). *The study of KWL-Plus learning activities on analytical reading ability of the Prathomsuksa 6 students* (Master's thesis, Mahasarakham University in Thailand), Mahasarakham.
- Nan-udon, S. (2022). *Development of an activity package for enhancing reading comprehension abilities of Mathayomsuksa 3 students using a cooperative learning process of CIRC and KWL Plus* (Master's thesis, Sakon Nakhon Rajabhat University in Thailand), Sakon Nakhon.
- OECD. (2019). *PISA 2018 assessment and analytical framework*. OECD Publishing. <https://doi.org/10.1787/b25efab8-en>
- Suksabai, M. (2019). *Development of Thai analytical reading abilities using the KWL Plus technique for Mathayomsuksa 6 students* (Master's thesis, Rajabhat Mahasarakham University in Thailand), Mahasarakham.