THE DEVELOPMENT OF INSTRUCTIONAL MODEL BY THINKING-BASED LEARNING TO ENHANCE ENGLISH READING COMPREHENSION ABILITIES AND ANALYTICAL THINKING SKILLS OF UPPER SECONDARY SCHOOL STUDENTS

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ABSTRACT

This research is being conducted based on the following objectives: 1) to develop and find the quality of an instructional model by thinking-based learning to enhance English reading comprehension abilities and analytical thinking skills of upper secondary school students, and 2) to study the effectiveness of an instructional model by thinking-based learning. The sample group used in this study comprised 42 Mathayom 5 students, majoring in Chinese, and was conducted during the 1st Semester of the 2021 academic year, at Srinakharinwirot Prasarnmit University Demonstration School (Secondary Division). The research instruments consisted of an instructional model by thinking-based learning, the English reading comprehension learning management plan user guide, the student's analytical thinking skills assessment form, and a questionnaire to seek students' opinions on learning activities. The data were analyzed statistically through the determination of the mean, standard deviation, dependent t-test, and content analysis. The results of the study revealed the following; (1) The instructional model by thinking-based learning to enhance the ability to read English for comprehension and analytical thinking skills of upper secondary school students, is named "AUAE", and consists of 4 main components: 1) Principles, 2) Objectives, 3) Learning activities, which consist of 4 steps: Step 1: A: Activating, Step 2: U: Understanding, comprising 3 sub-steps: 2.1 Pre-reading, 2.2 While-reading, and 2.3 Post-reading; Step 3: A: Analyzing, and Step 4: E: Evaluating. Quality assessment was conducted and was found to be at the appropriate level ($\overline{X}$= 4.35, S.D. = 0.58). (2) The model's efficacy revealed that 2.1) after studying, the student's ability to read English for comprehension was significantly higher prior to their studies at a level of .05. 2.2) Students who studied according to the instructional model by thinking-based learning developed higher analytical thinking skills. 2.3) After studying, the students' opinions on the thinking-based learning management activities were found to be at a high level of agreement.

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Introduction

English is another language that plays a significant role in people's lives on a global scale as it is considered as a language that is necessary for communication. According to the 2019 English Proficiency Index of 100 countries around the world, the Netherlands was found to have the highest English proficiency at 70.27%, while Thailand was ranked 74 (47.61%). In Asia, with a total of 25 countries, Singapore was ranked first at (66.82%), while Thailand was ranked 17th, considered a country with a very low English proficiency (47.61%). This goes to show that Thailand must seriously focus and promote knowledge and English proficiency to be in line with today's world[1].

In an effort to teach English, the focus should be to develop the students' proficiency in all 4 skills, namely listening, speaking, reading and writing skills, and the main skill that learners use the most is reading. Paul & Elder[2], stated that in order to learn a language's basic skills well, one must develop the prerequisite of good reading skills, especially reading for the purpose of comprehension. Learners will need to learn the ability to read to facilitate communication and apply it to various other aspects, such as seeking information in books and documents written in English[3]. If the learner has a high level of competence, it will help in enhancing them towards more progress in management and their work. It will also prove to be beneficial to education and their livelihoods[4]. In addition, it will also help enhance English teaching skills. This is a subject about enhancing English reading skills for 105 students for Mathayom 5 students who were subjected to a 50-item English reading comprehension test. After completing the test, it was found that the students lacked basic knowledge about the language and its vocabulary, where 54.3% lacked proper reading techniques, and 50.1% lacked comprehending capabilities where they did not possess knowledge or experience in reading. Therefore, it is, thus, reasonable to conduct research to promote English reading comprehension abilities to enhance Mathayom 5 students' reading efficiency.

Effective thinking skills is also another necessity in today's world. In terms of Buddhism, Paitoon Sinlarat et al.[5] stated that, from a Buddhism perspective, it teaches thinking based on virtue and truth, reasoning based on the correct wisdom and faith, or thinking based on the 4 Yonisomanasikara principles; the right method of thinking, the right way of thinking,

1 Education First, *English Proficiency Education Index-2019, A Ranking of 100 Countries and Regions by English Skills*, Accessed April 10, 2022, https://www.ef.co.th/epi/.

2 Richard Paul and Linda Elder, *Critical Thinking: Tools for Taking Charge of Your Professional and Personal Life*, (New Jersey: Financial Times Prentice Hall, 2022), 112.

3 Brien, *Learning English Online: How the interest is changing language*, Accessed December 14, 2012, http://www.bbc.co.uk/news/magazine-20332713.

4 Lía D. Kamhi-Stein, "Reading in Two Languages: How Attitudes Toward Home Language and Beliefs About Reading Affect the Behavior of Underprepared L2 College Readers," *TESOL Quarterly* 37 (2003): 35-71.

5 Paitoon Sinlarat et al., *Science of Thinking*, (Bangkok: Dhurakij Pundit University, 2015), 19.

thinking rationally, and thinking to produce desirable results. The Phra Dhammapitaka[6] has compiled 10 Yonisomanasikara ways of thinking, namely; 1) the way of thinking through the investigation of factors, i.e. searching to consider the cause and effect, 2) the way of thinking by discriminating the components, i.e. classifying and separating the sub-components, 3) the common way of thinking, which is the use of the accumulative experience and knowledge to become aware of the events and the causes and factors, 4) thinking through the use of the Noble Truths, i.e. knowing and understanding the issues and finding the cause and solving the problem, 5) thinking by applying principle and rationale, which is developing an understanding of the principles and the intent to connect relationships and take action to achieve results, 6) thinking through kindness and chastisement and finding solutions, i.e. analytical thinking that connects various situations, finding advantages and disadvantages and searching for a solution to the problem, 7) thinking based on true or artificial value, which is the understanding of things as they really are, being aware of one's true self, consciousness, not looking at things superficially and without reason. 8) Thinking in a morally stimulating way, where past experiences is being improved upon in a good way with consciousness and reasoning. 9) Thinking in the present, where reflections on the past and what will happen in the future to develop present thoughts and what must be done to achieve the best results. 10) Thinking based on the Vibhajjavada principle, i.e. looking at reality, analyzing and separating all aspects of one's statement, which corresponds to the Ministry of Education[7], where it has determined the two key competencies of learners upon completing basic education, which is item 2, the ability to think. Learners must be able to think critically, develop synthetic thinking, creative thinking, critical thinking, and thinking systematically, which will lead to the creation of a body of knowledge or information in order to make an appropriate decision about oneself and society. From the foregoing, it can be seen that thinking skill is an important factor in all aspects. For the Srinakharitwirot University Demonstration School, Prasarnmit (Secondary Division), an English analytical thinking evaluation test was conducted on 411 Mathayom 5 students. It was found that the students could not achieve a passing score of more than 50%. Therefore, from the problems mentioned above, it was found that the student's reading comprehension and analytical thinking skills are a problem that should be addressed. Comprehension from reading contents is essential to the analytical ability to achieve reading and comprehension objectives[8], by applying an instructional model by thinking-based learning to help promote English reading

6 Phradhammapitaka, *Buddhadhamma*, (Bangkok: Mahachulalongkornrajavidyalaya Printing Press, 2003), 675-713.

7 Ministry of Education, *Basic Core Curriculum*, (Bangkok: Agricultural Cooperative Association Printing House, 2008), 6.

8 Christian Soto et al., "Reading Comprehension and Metacognition: The importance of Inferential Skills," *Cogent Education* 6 (2019): 31-42.

comprehension abilities and analytical thinking skills. Swartz[9] and Adriana[10] stated that, thinking-based learning focuses on thinking process skills and is a form of learning management that aims to help students learn to think ingeniously, develop their ability to think and make decisions and solve problems, and create an understanding of what can be learned by oneself, the manner of teaching of which originates from analytical thinking and creativity. In the management of thinking-based learning, students are the center of learning, which is different from traditional teaching methods as it allows students to practice independent decision-making and free to choose a solution to a problem. Additionally, it teaches them to think further and use it for future benefits. The thinking-based learning concept consists of 3 aspects: 1) Skillful thinking, the ability to use thinking processes to solve specific situations; 2) Habit of mind; and 3) metacognition, self-assessment of independent learning[11].

Therefore, in this research, the researcher is interested and uses the thinking-based process to enhance reading comprehension abilities and analytical thinking skills. Mohsen & Reza[12] studied the research on the subject of the supporting role of thinking in enhancing reading comprehension of Iranian students studying English as a second language, and found that developing students' thinking skills affect reading skills. Students with critical thinking skills and judgement are more likely to achieve success in reading. Nasirahmadi[13] studied the relationship between Iranian learners' critical thinking ability and reading achievement using the analytical thinking skills test, and discovered that the scores obtained from the analytical thinking skills test could be used to predict their success in the IELTS reading test.

From the study of the issues and significance mentioned above, the researcher, as an experienced English teacher, has been looking for ways to improve the management of English language learning and apply thinking as a base to enhance reading comprehension abilities and analytical thinking skills of upper secondary school students to enable them to develop better reading comprehension skills, create a systematic thought process, and eventually become a thinker, where they can apply it to their daily lives in the future.

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[9] Swartz, *Thinking-based Learning: Activating Students' Potential,* (America: Christopher-Gordon Publishers, Inc, 2008), 1.

[10] Adriana Maldonado, *Thinking Based Learning- Richmond Solution Podcast*, Accessed November 30, 2021, https://www.youtube.com/watch?v=65jG7DzYAeA

[11] Swartz, *Thinking-based Learning: Promoting Quality Student Achievement in the 21st Century,* (America: Christopher-Gordon Publishers, Inc, 2010), 2-3.

[12] Mohsen Zare and Reza Biria, "Contributory Role of Critical Thinking in Enhancing Reading Comprehension Ability of Iranian ESP Students," *International Journal of Research in English Education* 3 (2018): 21-28.

[13] Arman Nasirahmadi, "The Relationship between Iranian Language Learners' Critical Thinking Ability and their Reading Comprehension Achievement," *International Journal of Research Studies in Language Learning* 3 (2014): 15-27.

Research Objectives

1. To develop and determine the quality of an instructional model by thinking-based learning to enhance English reading comprehension abilities and analytical thinking skills of upper secondary school students.

2. To study the effectiveness of an instructional model by thinking-based learning for enhancing English reading comprehension abilities and analytical thinking skills of upper secondary school students, based on the following issues;

   2.1 To compare the ability to read English for comprehension before and after using the thinking-based learning model.

   2.2 To study the development of analytical thinking skills during the study based on the thinking-based learning model.

   2.3 To study the students' opinions towards learning management activities.

Research Tools

Tools used in this research consist of; the instructional model by thinking-based learning, the learning management user guide, the learning management plan, the English reading comprehension test, the Student's Analytical Thinking Skills Assessment Form, and the questionnaire to seek the student's opinion toward learning activities.

Population

766 Mathayom 5 students (21 classes) at Srinakharitwirot University Demonstration School, Prasarnmit (Secondary Division), attending Course Code: Aor3 2 2 0 3 Enhancing English Skills 1, 1st Semester of the 2021 Academic Year.

Sample Group

42 Mathayom 5 students Z1 (1 class, majoring in Chinese) at Srinakharitwirot University Demonstration School, Prasarnmit (Secondary Division), attending Course Code: Aor32203 Enhancing English Skills 1, 1st Semester of the 2021 Academic Year, obtained through the use of cluster random sampling.

Research Methodology

Step 1 Research (R_1). Study and analyze the basic information.

1. Study and analyze the basic information regarding the Basic Core Curriculum, B.E. 2551, by proceeding as follows:

   1.1 Study the information documented in the Basic Core Curriculum, B.E. 2551.

   1.2 Study and analyze the concepts, theories, and related research by studying and analyzing the documents and textbooks on teaching concepts, principles, and concepts of the thinking-based model, and English reading for comprehension ability and analytical thinking skills.

2. Study opinions on thinking-based learning management to enhance English reading comprehension abilities and analytical thinking skills of upper secondary school students from those involved. The researcher interviewed 10 people who are involved in order to use the information as a guideline for developing an instructional model by thinking-based learning to enhance upper secondary school student's ability to read English for comprehension abilities and develop analytical thinking skills, which consists of; 1) 7 English language teachers at the upper secondary level, 2) 2 experts in English teaching activities, and 3) 1 expert on analytical thinking skills.

3. Study opinions of upper secondary school students about thinking-based learning activities to promote their ability to read English for comprehension and develop critical thinking skills. The researcher distributed questionnaires to SWU Prasarnmit Demonstration School (Secondary Division) high school students, which consisted of a sample group of 30 students, to seek their opinions with regards to thinking-based learning activities to promote their ability to read English for comprehension and develop analytical thinking skills

Step 2 Development (D_1). Design and development of an instructional model by thinking-based learning

1. Develop a thinking-based learning management model by using the concepts obtained from the study and analyzing the basic information as stated in Step 1, to synthesize the learning management model. The related components consist of the principles, objectives, learning management activities, measurement, and evaluated by the thesis advisor to verify their accuracy and appropriateness. It was then presented to experts to provide information for quality assessment and consistency of the learning management model. This assessment is characterized as a Likert Five Rating Scale evaluation through analyzing the mean ($\bar{x}$) and standard deviation (S.D.).

2. Develop tools in support for using the thinking-based learning model, such as a user guide for using the learning management model and a learning management plan.

3. Develop and examine the quality of the 3 tools used, to assess the effectiveness of the teaching model, as follows:

3.1 The English reading comprehension test, the Student's Analytical Thinking Skills Assessment form, and the questionnaire seeking students' opinions on learning management activities, utilized a 40-question multiple-choice, four-choice format, with a full score of 40. The students were given 60 minutes to complete the assessment, and it was conducted before and after the class.

3.2 The Analytical Thinking Skills Assessment form for the upper secondary school students evaluates the students on 3 skills: 1) assessment of the significance, 2) analysis of the relationship, and 3) analysis of the principles. After completing each

unit, the assessment will be conducted in 4 phases: Phase 1 - after the 4th period, Phase 2 – after the 8th period, Phase 3 – after the 12th period, and Phase 4 – after the 16th period.

3.3 The questionnaire seeking the students' opinions on thinking-based learning activities to enhance English reading comprehension abilities and develop analytical thinking skills of upper secondary school students, consists of 3 aspects: the learning atmosphere, learning activities, and the benefits received. The questionnaire is characterized as a Likert Five Rating Scale evaluation through analyzing the mean ($\bar{x}$) and standard deviation (S.D.).

Step 3 Research (R_2). Conducting an experimental study of the instructional model by thinking-based learning.

The researcher designed the learning management activities of the thinking-based learning model by using 4 steps, as follows:

1st Step: Stimulate thinking (A: Activating). Apply basic thinking practices to learners by encouraging students to learn by introducing interesting content to the learners. The language used was to stimulate thinking and encourage students to be aware of the purpose of thinking provoking thoughts.

2nd Step: Understanding the problem (U: Understanding). Students were encouraged to develop an understanding of the contents, by dividing the study into choosing content that explores the causes of the problem, gathering contextual information to understand the meaning of words and the story, specifying the details of the content, understanding the importance of the story, interpret the passage, analyze the content and structure of the language, experience, and knowledge. And in the period of comprehension, reading skills are taught, as follows:

Pre-reading: Stimulate knowledge, teach vocabulary, advise the purpose of reading, and brainstorming.

While-reading: Understanding the content and practice independent reading.

Post-reading): Students assess their reading comprehension.

3rd Step: Analyzing (A: Analyzing). Students will be able to practice their analytical thinking skills and gather information from various sources for analysis to obtain a variety of information. Analyze and distinguish the various elements, compare and find correlations through collaborative work. The students will be required to make decisions in finding ways to solve problems and make decisions that can be applied in their daily lives.

4th Step: Evaluating (E: Evaluating). Students and teachers work together to draw conclusions from the lessons and reflect on what has been learned. The students will also conduct a self-assessment on how well they understood the material being studied. What reading strategies did they use, and how did they develop an understanding of the content that they have learned.

Step 4 Development (D_2). Assess the effectiveness of an instructional model by thinking-based learning .

Analyze the data gathered from the results of the development and quality of the thinking-based learning management model and the evaluation results of the thinking-based learning management model.

Research Results

1. The results of the development and quality assessment of the instructional model by thinking-based learning to enhance reading comprehension abilities and develop analytical thinking skills in upper secondary school students.

The study analyzed basic information, documents, and related theories and used the results obtained from the interviews with those involved together with the results of the questionnaire seeking the opinions of Mathayom 5 students to develop the instructional model by thinking-based learning based on the AUAE Model, consisting of 4 components, namely the principles, objectives, learning management activities, and the measurement and evaluation. The result obtained from expert opinions regarding the thinking-based learning management model, was found to be at a high level of suitability. The overall thinking-based learning management model user guide was also found to be at a high-level (= 3.86, S.D = 0.49). Additionally, the overall thinking-based learning management plan was also found to be at a high-level (= 3.86, S.D = 0.49).

2. The results of the evaluation of the effectiveness of the instructional model by thinking-based learning for enhancing English reading comprehension abilities and developing analytical thinking skills in upper secondary school students.

2.1 The results of the comparison of the English reading comprehension of the sample group using a thinking-based learning model, before and after learning, is summarized in Table 1.

Table 1. The results of the comparison of the English reading comprehension abilities of the sample group using the instructional model by thinking-based learning.

The ability to read English for comprehension	Ttl. No. of Students	Full Score	($\bar{x}$)	S.D.	t-test	p
Before learning	42	40	17.33	6.66	14.93	0.00
After learning	42	40	32.10	1.82	9	

Statistically significant level of .05

From Table 1, it was found that the mean score ($\bar{x}$) before learning the English reading comprehension of the sample group was ($\bar{x}$) was 17.33, and the standard deviation (SD) was 6.66. The mean score ($\bar{x}$) after learning the English reading comprehension of the sample group was 32.10, with a standard deviation (SD) of 1.82. This indicates that after learning, the sample group's ability to read English for comprehension was found to be statistically significant at .05, when compared to the period before learning.

From Table 2, the researcher studied the students' ability to read English for comprehension, before and after learning, classified by the various aspects, as follows;

Table 2. The ability to read English for comprehension, before and after learning, according to the instructional model by thinking-based learning, classified by the various aspects.

The ability to read English for comprehension		Ttl. No. of Students	Full Score	($\bar{x}$)	S.D.	t-test	p
1. Understand the vocabulary in context.	Before learning	42	8	4.76	2.11	7.008*	0.00
	After learning	42	8	7.00	0.86		
2. Understand the main idea of the content and able to explain it.	Before learning	42	10	4.02	2.23	11.299*	0.00
	After learning	42	10	7.69	0.84		
3. Analyze the content in context and able to distinguish the various elements.	Before learning	42	5	1.79	1.28	8.442*	0.00
	After learning	42	5	3.81	0.77		
4. Analyze and able to link the various content, and interpret them.	Before learning	42	8	3.12	1.52	10.791*	0.00
	After learning	42	8	6.10	1.05		
5. Analyze the language structure.	Before learning	42	9	3.69	1.77	11.833*	0.00
	After learning	42	9	7.50	0.99		

Statistically significant level of .05

From Table 2, it was revealed that the English reading ability, which can be divided into 5 areas: 1) understanding the vocabulary in context, 2) understanding the main idea of the content and being able to explain it, 3) analyzing the content in context and being able to distinguish the various elements, 4) analyzing and being able to link the various content, and interpreting them, and 5) analyzing the language structure, found that the ability to read English after learning, yielded the following results; ($\bar{x}$ = 7.00, SD = 0.86, $\bar{x}$ = 7.69, SD = 0.84, $\bar{x}$ = 3.81, SD = 0.77, $\bar{x}$ = 6.10, SD = 1.05, $\bar{x}$ = 7.50, SD = 0.99 respectively).

2.2 The results of the development of analytical thinking skills of students studying the model of thinking-based learning management, are shown in Table 3.

Table 3. Overall development of the students' analytical thinking skills and classified by aspects.

Analytical Thinking Skills	Teaching Period	Analytical Thinking Skills Rating Scale		
		($\bar{x}$)	SD	Interpretation
Critical Thinking on its significance	Phase 1	2.52	0.97	**Good**
	Phase 2	4.33	1.16	**Very Good**
	Phase 3	5.12	1.23	**Very Good**
	Phase 4	5.74	0.59	**Very Good**
Correlation Analysis	Phase 1	3.83	1.08	**Good**
	Phase 2	3.98	1.16	**Good**
	Phase 3	4.31	1.12	**Very Good**
	Phase 4	5.40	0.66	**Very Good**
Analytical Thinking	Phase 1	2.10	0.43	**Good**
	Phase 2	3.90	1.39	**Good**
	Phase 3	4.48	1.31	**Very Good**
	Phase 4	4.67	1.05	**Very Good**
Overview Summary	Phase 1	8.45	1.60	**Good**
	Phase 2	12.21	2.99	**Very Good**
	Phase 3	13.90	2.84	**Very Good**
	Phase 4	15.81	1.70	**Very Good**

From Table 3, it was revealed that the overall analytical thinking skills of the students as a whole through the use of a thinking-based learning management model to enhance their analytical thinking skills have displayed development to a higher level at a Good and Very Good level, which is consistent with the research's third hypothesis, where Phase 1 shows a Good level, and Phases 2-4 showing a Very Good level ($\bar{x}$ = 8.45, SD = 1.60, $\bar{x}$ = 12.21, SD = 2.99. , $\bar{x}$ = 13.90, SD = 2.84, $\bar{x}$ = 15.81, SD = 1.70 respectively). When considering each aspect, it was found that the students who studied using the thinking-based learning management model to enhance their analytical thinking skills improved from Good to Very Good level in Phases 1 to 4 for each aspect.

2.3 The results of a study of the students' opinions on thinking-based learning activities to enhancing English reading comprehension abilities and developing analytical thinking skills in upper secondary school students, are shown in Table 4.

Table 4. A summary of students' opinions on thinking-based learning activities to promote high school students' English reading comprehension and critical thinking skills.

No.	Point of View	Opinion Level			
		$(\bar{x})$	SD	Interpretation	Ranking
Learning Atmosphere					
1.	Students are encouraged to think and practice thinking in a variety of ways.	4.44	0.70	Strongly Agree	2
2.	Students are confident enough to make comments and solve problems.	4.61	0.55	Totally Agree	1
3.	Students participate in activities together.	4.24	0.75	Strongly Agree	3
4.	Students are regularly encouraged to learn to think by themselves.	4.03	0.74	Strongly Agree	4
5.	Students are eager to learn from a variety of sources.	3.91	0.88	Strongly Agree	5
Summary of Learning Atmosphere		**4.25**	**0.12**	**Strongly Agree**	**1**
Learning Activities					
6.	Students are regularly encouraged to think about answering and asking questions.	4.58	0.50	Totally Agree	1
7.	Students are involved in the thinking process, understanding the problem, and being able to solve it.	4.00	0.71	Strongly Agree	4
8.	Students initiate the thinking process, where they can summarize and use the information to analyze the problem.	4.00	0.79	Strongly Agree	4
9.	Students are able to make decisions and apply analytical thinking skills to their daily lives.	4.12	0.74	Strongly Agree	3
10.	Students are able to assess their knowledge of reading and thinking skills.	4.21	0.70	Strongly Agree	2
Summary of Learning Activities		**4.18**	**0.11**	**Strongly Agree**	**2**

No.	Point of View	Opinion Level			
		($\bar{x}$)	SD	Interpretation	Ranking
Benefits Received					
11.	Students can read and understand English better.	4.09	0.84	Strongly Agree	3
12.	Students develop reading skills along with their critical thinking skills.	4.03	0.81	Strongly Agree	4
13.	Students are able to think critically.	4.12	0.82	Strongly Agree	2
14.	Students are able to make rational decisions.	3.94	0.90	Strongly Agree	5
15.	Students can apply reading and thinking processes in their daily lives.	4.27	0.46	Strongly Agree	1
Summary of Benefits Received		**4.09**	**0.18**	**Strongly agree**	**3**
	Total of all the aspects	**4.17**	**0.13**	**Strongly agree**	

From Table 4, the results of the study of students' opinions on thinking-based learning activities to enhance English reading comprehension abilities and analytical thinking skills of upper secondary school students found that the students Strongly Agreed regarding the thinking-based learning management activities in all aspects ($\bar{x}$ = 4.17, SD = 0.13). When considering each aspect, the students also Strongly Agreed on each of the topic of learning atmosphere ($\bar{x}$ = 4.25, SD = 0.12), learning activities ($\bar{x}$ = 4.18, SD = 0.11), and benefits received ($\bar{x}$ = 4.09, SD = 0.18).

Discussion

1. The validity of the development of an instructional model by thinking-based learning was verified by 5 experts and was found to contain an effective content that is deemed sufficient to be applied to the management of learning activities. The results of the analysis and synthesis of basic information regarding the basic core education curriculum, analysis of the related concepts, theories, and research related to the development of teaching models, as well as, the basic teaching theories, are found to be consistent with the concept introduced by Tisna Khamanee[14], which concludes that the learning management model is a systematic practical teaching model that correlates with the theory which states that the teaching model must be supported by a theory. to support it.

2. The results of the evaluation of the effectiveness of the instructional model by thinking-based learning.

[14] Tisna Khamanee, *The Science of Teaching: Knowledge for Organizing Effective Learning Processes*, (Bangkok: Chulalongkorn University Press, 2017), 221.

2.1 After learning according to the thinking-based learning model (AUAE), overall, it was found that students were able to develop a higher reading comprehension ability than before learning with a statistical significance of .05. When considering the ability to read English in each aspect, it was found that understanding the meaning of the vocabulary in context yielded the highest average score. This may be due to the fact that in learning activities, students are trained to use their previous experiences to speculate on the text that they were reading and learn new words from the context, thereby learning strategies to guess the meaning of the vocabulary from the context, which is consistent with Torgerson, Brooks, Gascoine, and Higgins[15], which stated that the basic element of good reading practices requires students to know the meaning of words in order to interpret and be able to understand the story more and learners have previous knowledge from guessing meanings from the context resulting in the student's grades to be at a very good level. The ability to analyze content in context and separate elements into main sentences and subordinate clauses, registered the lowest average score. This is due to learners having not learned the body of the text with sufficiently detailed main sentences and subordinate clauses. The readings are consistent with those of Zimmerman [16] and Murray[17], which mentioned that reading in English for comprehension requires a study of language structure. Effective sentence analysis will help to make English reading comprehension more effective. This is also consistent with the research results of Sininat Wattanasuk[18]. The development of learning English reading models by integrating strategies to promote higher thinking to promote reading comprehension and critical thinking skills of 2nd Year English language students found that, reading comprehension strategies from higher thinking strategies was found to be at a statistically significantly higher level at .05.

1.2 Students who study according to the thinking-based learning model were found to be able to develop their analytical thinking skills from Good to Very Good. This may be due to the fact that students have a foundation in analytical thinking skills and have received some basic training in various subjects, therefore, when promoting the use of a thinking-based learning model to enhance analytical thinking skills, their analytical skills are thus enhanced. This is in line with the research results of Manoon Sutika, Pricha Inthasomphan, Songkran

[15] Carole Torgerson et al., "Phonics: Reading Policy and the Evidence of Influencetiveness from a Systematic 'Tertiary' Review," *Research Papers in Education* 34 (2019): 208- 238.

[16] Susan Zimmerman, *7 Keys to Comprehension: How to Help Your Kids Read and Get It*, (New York: Three River Press, 2003), 3-4.

[17] Maria S. Murray, *Language Comprehension Ability: One of Two Essential Components of Reading Comprehension*, Accessed November 27, 2016, https://milnepublishing.geneseo.edu/steps-to-success/chapter/4-language-comprehension-ability -one- of-two-essential-components-of-reading-comprehension.

[18] Sininart Watthanasuk, *The Development of English Reading Instructional Model by Integrating High-Level Thinking to Promote English Reading Comprehension and Analytical Thinking Skills of 2nd Year English Language Students,* (Nakhonpathom: Program in Curriculum and Teaching, Silpakorn University, 2015).

Promwong[19], where they developed teachers' learning activities by using thinking-based skills at Baan Dong Community School, Saithong Rat Uthit Community School, and Baan Mae Sap Community School, Samoeng District, Chiang Mai Province. Their study revealed that the development of students' learning activities through the use of thinking-based skills have resulted in students achieving higher scores and analytical thinking skills after learning, which is a result of learning by using a learning management model that emphasizes critical thinking. This is also in accordance with the research of Pikul Saiduang[20], who conducted a research on the development of analytical thinking skills from reading English academic articles of students at Ubon Ratchathani Rajabhat University. The study found that students had developed higher analytical thinking skills in finding rational relationships from the information on reading English subject articles.

1.3 After learning according to the thinking-based learning model, it was found that the students' opinions on thinking-based learning activities to promote English reading comprehension and critical thinking skills of high school students was at a Strongly Agree level. When considering each of the three aspects, it was found that, in terms of learning atmosphere, it was ranked at number 1. While in the sub-aspects, it was found that students were more confident and dared to express opinions and solve problems at the highest level. This is in line with Banjong Amornchiwin [21] and Costa, A.L.[22], who stated that, in order to be a good thinker, one must also be able to debate, think, and communicate clearly and accurately. The second aspect which involves the aspect of organizing learning activities and its sub-aspect, it was found that the students were consistently encouraged to think in answering and asking questions at the highest level, as well as, participate in the thinking process, which is consistent with Fischer, S[23], which allowed learners to engage in group activities by separating different animal components and have each group brainstorm their ideas and choose one body part that they think is most useful and present in front of the class. Therefore, when the students were given the challenge and had to analyze in order to make a decision, it thus created an enhanced thought process. In terms of the benefits received, it was ranked as third. When considering each aspect, it was found that students were able to apply reading and thinking

[19] Manoon Sutika, Pricha Inthasomphan, and Songkran Phromwong, "The Development of Teaching and Learning Activities of Teachers Through the Use of Thinking skills at Baan Dong Community School, Saithong Rat Uthit Community School, Ban Mae Sap Community School, Samoeng District, Chiang Mai Province," *Far Eastern University Academic Journal* 12 (2018): 191-207.

[20] Pikul Saiduang, "The Development of Analytical Thinking Skills from Reading English-language Academic Articles Ubon Ratchathani Rajabhat University Students, Journal of Humanities and Social Sciences," *Ubon Ratchathani Rajabhat University* 7 (2016): 215-226.

[21] Banchong Amornchiwin, *Thinking Teacher: I Want to Teach My Students To Think,* (Nonthaburi: Amarin Book Center, 2017), 151.

[22] Arthur L. Costa, *Developing Minds: A Resource Book for Teaching Thinking*, (Alexandria, VA: Association for Supervision and Curriculum Development, 2001), 245.

[23] Stephen D. Fischer, *Infusing Critical and Creative Thinking Into Secondary Science: A Lesson Design Handbook. Pacific Grove*, (CA: Teacher's College Press, 1999), 179

processes in their daily lives. This is in line with Robert J. Swartz[24], who stated that in the teaching of thinking, it can bring on a variety of content to teach, not only does it enhance the thinking process, but it also brings on success and the gain of additional knowledge too.

Suggestions for applying the research results

1. From the results of the research, it was revealed that, in order to teach effective analytical thinking skills, teachers must possess the necessary knowledge and ability in analytical thinking skills such as classification, differentiate, and analytical thinking, etc. Additionally, students should also be encouraged to practice and continue to develop their proficiencies.

2. From the results of the research, the instructional model by thinking-based learning can effectively be applied to courses that allow students to study the content and work in groups that wants to emphasize on the students' reading and analytical thinking skills.

3. Teachers must create a friendly learning atmosphere in the classroom, build an understanding with the students to fully comprehend the elements of the model and every step of the learning activities process. They must also provide close assistance to the students, promote and stimulate their thinking, as well as, provide ample opportunities for students to make comments and pose questions, to enhance their development of their English reading ability and analytical thinking skills.

Suggestions for future research

1. There should be further research on the instructional model by thinking-based learning that focuses on teachers, who might prove to be a variable that may affect the development of analytical thinking skills.

2. There should be further research on an instructional model by thinking-based learning to promote listening and speaking abilities in English subjects, as it would encourage students to practice thinking skills through listening to stories and communicating ideas through speaking, such as thinking out loud, and reading log, etc.

3. There should be qualitative research on the causes and problems of teachers or approaches to learning management that affect analytical thinking skills.

4. There should be further research that studies other variables, such as teachers, the curriculum, lesson content, learning activities, and other factors that may have an effect on the students' thought processes in schools?

[24] Swartz, *Thinking-Based Learning: Promoting Quality Student Achievement in the 21st Century*, 53.

5. There should be further research to study the comparison of thinking-based learning management between students who have studied through the model and students who have not.

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