AN INVESTIGATION OF READING STRATEGIES EMPLOYED BY THAI EFL LOWER SECONDARY STUDENTS IN SCIENCE ABILITY PROGRAMME

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AN INVESTIGATION OF READING STRATEGIES EMPLOYED BY THAI EFL LOWER SECONDARY STUDENTS IN SCIENCE ABILITY PROGRAMME

by

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LIST OF ABBREVIATIONS

ADDIE	Analysis Design Development Implement Evaluate methodology
ADDIE	Analyze, Design, Develop, Implement, and Evaluate model
ANCOVA	The Analysis of Covariance
CALLA	Cognitive Academic Language Learning Approach
EAP	Academic Purposes
EAP	English for Academic Purposes
EBP	English for Business Purposes
EFL	English as a Foreign Language
EGP	General Purpose
ELL	English Language Learner
ELP	English for Legal Purposes
EMP	English for medical purposes
EOP	English for Occupational Purposes
ESCP	English for Sociocultural Purposes
ESL	English as a Second Language
ESP	English for Specific Purposes
EVP	English for Vocational Purposes
FL	The development of Foreign Language
GAT	The General Aptitude Test
GPA	Grade Point Average
ISD	Instructional Systems Design
ISD	The Instructional Systems Design
L1	Fist Language
L2	Second Language

MA	Master of Arts
MANOVA	Multivariate Analysis of Variance
MARSI	Metacognitive Awareness of Reading Strategies Inventory
MCS	Master the Metacognitive Strategies
ME	Metacognitive Experience
MK	Metacognitive knowledge
MS	Metacognitive Strategies
NEA	The National Educational Act
NIETS	National Institute of Educational Testing Service
ONEC	The National Education Act in 1999
O-NET	Ordinary National Educational Test
O-NET	The Ordinary National Education Test
PAT	Academic Aptitude Test
PSU	Prince of Songkla University
SLA	Second Language Acquisition
SSBI	Styles-and Strategies-Based Instruction Model

LIST OF APPENDICES

PENYELIDIKAN STRATEGI MEMBACA YANG DIGUNAKAN OLEH PELAJAR SEKOLAH MENENGAH RENDAH EFL THAILAND DALAM PROGRAM KEMAMPUAN SAINTIFIK

ABSTRAK

Kajian ini menyelidiki keberkesanan strategi membaca yang digunakan oleh pelajar menengah rendah saintifik EFL Thailand dalam satu sekolah swasta, dan dua sekolah menengah kerajaan di wilayah selatan Thailand. Kajian ini menggabungkan strategi kognitif, metakogatif, tekad, sosial dan ingatan ke dalam rawatan membaca. Hasilnya diharapkan dapat meningkatkan pengetahuan pelajar dalam menerapkan teknik pengajaran strategi membaca. Sampel kajian ini adalah tiga puluh pelajar EFL Thailand dari Gred 7 dipilih berdasarkan gred National English Test Thailand. Data kuantitatif dan kualitatif diperoleh dari tiga sumber utama yang terdiri daripada ujian pra dan pasca dari modul saintifik. Instrumentasi penyelidikan kuantitatif adalah daripada versi disesuaikan Metacognitive Awareness of Reading Strategies Inventory-Revision (MARSI-R) oleh Mokhtari dan Reichard, (2013) dan ujian pemahaman sebelum dan sesudah membaca. Lapan unit Ilmiah dalam bahasa Inggeris dan arahan strategi membaca diperkenalkan kepada intervensi pengajaran untuk meningkatkan kemampuan membaca mereka. Soal selidik mengenai strategi membaca oleh kumpulan eksperimen, dan maklum balas oleh enam peserta berkemahiran tinggi, sederhana dan rendah, dan temuduga separa berstruktur mengenai pengalaman mereka menggunakan modul saintifik dan strategi membaca yang digunakan semasa membaca diambilkira. Setelah selesai pengumpulan data, pengkaji melakukan analisis data untuk setiap instrumen. Data dianalisis dan ditafsirkan secara kuantitatif dan kualitatif. Program latihan terdiri daripada lima strategi membaca, lapan unit membaca

sains, dan pelbagai aktiviti memperkaya dan menarik. Data dikumpulkan dan dianalisis melalui ujian pra, ujian pasca, soal selidik pasca dan sesi temu ramah dilakukan pada akhir program latihan. Data dianalisis dengan taburan frekuensi menggunakan ANOVA dan peratusan. Hasil kajian mungkin dapat digeneralisasikan untuk memberikan bantuan yang sesuai dan memperbaiki situasi pengajaran Bahasa Inggeris di Thailand secara umum. Statistik menunjukkan bahawa semua subjek yang melalui lapan perlakuan membaca ilmiah meningkat dengan ketara dalam kemampuan membaca mereka. Maklum balas yang diperoleh dari borang soal selidik menunjukkan bahawa penilaian diri pelajar terhadap kemampuan mereka dalam ujian pasca meningkat dengan baik pada akhir rawatan membaca, dan mereka mendapati strategi membaca dapat meningkatkan pengetahuan membaca mereka dalam bahasa Inggeris dengan lebih berkesan. Selanjutnya, analisis tematik data wawancara mengungkapkan kepuasan keseluruhan dan meningkatkan sikap positif pelajar terhadap Sains dalam Bahasa Inggeris.

AN INVESTIGATION OF READING STRATEGIES EMPLOYED BY THAI EFL LOWER SECONDARY STUDENTS IN SCIENCE ABILITY PROGRAMME

ABSTRACT

This study investigated the effectiveness of reading strategies employed by Thai EFL lower secondary students of Science and Math's Ability program at one private, and two government secondary schools in Southern province of Thailand. The integration fo cognitive, metacogtive, determination, social, and memory strategies that form the reading training program were expected to enhance the students' reading strategies instruction techniques. The sample of the study were thirty, grade seven students selected based on National English Test of Thailand. Quantitative and qualitative data were obtained from three primary sources; Pre- and Post-test from scientific modules, and interviews. The quantitative research instrumentation consisted of an adapted version of Metacognitive Awareness of Reading Strategies Inventory-Revised (MARSI-R) by Mokhtari and Reichard, (2013) and reading comprehension exam as pre and post-test. Eight Scientific units in English and reading strategies instruction were introduced as the teaching intervention to enhance the students' reading ability. Questionnaires on reading strategies by the experimental group, and feedback by six high, medium and low participants, semi-structure interview on their experience using scientific module and reading strategies were employed in the study. The training program consisted of five reading strategies, eight scientifice reading units, and various enriching and engaging activities. The data was analyzed by frequency distribution using ANOVA and percentage. The study's results may possibly be generalized to provide appropriate assistance and improve the English

teaching situation in Thailand in general. Statistics showed that all subjects exposed to the eight scientific reading treatment improved significantly in their reading ability. The feedbacks obtained from the post-questionnaires revealed that the students' self-evaluation of their ability in the post-tests improved considerably at the end of the reading treatment, and that they found the reading strategies could enhance their reading of science in English. Thematic analysis of the interview data revealed an overall satisfaction and enhanced students' positive attitudes towards Science in English.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Reading is a receptive skill that requires less effort than productive skill from learners to master a foreign language. According to Eskey (2002), reading is a process of obtaining information from written or printed texts to gain knowledge. Reading could also associate with studying where firstly, reading could identify written symbols on the page and secondly, it could grasp and interpret certain symbols to decipher the meanings. The former is named as analyzing skills, whereas the latter is named as comprehension skills. Grabe and Stoller (2011) pointed out that analyzing comprehension requires rapid, efficient, interactive, strategic, flexible, comparing, practical and linguistic tactics. Most of these skills are interrelated to help readers attain comprehension of a particular text.

It is apparent that the development reading in English as a Foreign Language (EFL) has developed from hypotheses and insights within the First Language (L1) reading studies (Qurashi & Aljanadbah, 2021). EFL researchers additionally undertake and regulate analyzing thoughts and expert perspectives in L1 reading technology, which is often performed in the English language contexts. This supports worldwide reading requirements (Stevenson, 2010).

To improve reading in English, lerners must address, undertake, and adapt reading skills within everyday educational existence. According to Wallace (2003), learners will have to interact with their attitudes, motivation, historical past knowledge in arts and science, or even personal hobbies at the same time trying to comprehend the texts.

1.2 Background of the Study

1.2.1 English as a global language and English language teaching

English, like many other languages around the world, is a language used to connect humans globally regardless of race, culture or belief. Crystal (2003) claims that *more* than one thousand million humans internationally talk, learn, train *or* use English as a first, second, or as a foreign language worldwide. Thailand is one of the countries that use English as a foreign language.

Ammon (2006) and Graddol (1997) found that English is by far the most descriptive for use in correspondence and it is the most preferred and utilized language in faculties and professional fields. In education, as an example, nearly every nation in the world chooses English as one of the obligatory subjects of the curriculum. According to Noom Ura (2013), the problems involving learners who wished to learn reading in English y included interference from the L1, lack of opportunity to understand English in their texts, unchallenging English lessons, being passive learners, being too shy to ask teachers classmates, or, being poorly motivated and lack of responsibility for their own learning. These problems produced unsatisfactory results in the English subject.

Bernhardt (2005) claimed that some foreign countries will benefit from the development of their very own culture-precise English curricula along with teaching methodology, and materials, consistent with the English language policies and materials. Similarly, Phan (2008) posited that English teaching-gaining knowledge of resources designed and evolved by using the English local professionals can be reasonably appropriate for native English countries but not in non-local contexts.

However, different researchers, who include Wisaijorn (2003) believed that developing English teaching materials linked to the different cultures are necessary. He argued that teaching English in a foreign country needs the presence or intervention of English native speakers to help their opposite numbers in designing and making ready the English materials and to evaluate and determine whether the approach and method are properly and systematically designed. This collaboration has been completed efficaciously and carried out successfully in some countries around the world. It has produced English textbooks using local cultures as needed by local learners (Pandarangga, 2015).

1.2.2 English Education in Thailand and its System

The teaching and learning of English in Thailand commenced within the late 19th-century with personal assignment schools teaching English to commoners 'beyond the palace'. with English included within the curriculum, have been set up across the kingdom, replacing the traditional Buddhist monastery schooling (2008). Education reform in Thailand started in 1996 with the goal of realizing the potential of Thai people to develop themselves for a better quality of life and to develop the nation for peaceful co-existence in the world community (Pitiyanuwat & Anatrasirichai, 2002). In the 20th century, Thais were encouraged to study English because of it being recognized as the global language of knowledge and experience, aviation, commercial enterprise, and international relations (Kitjaroonchai & Kitjaroonchai, 2012). Over the years, the English language has been regarded highly in the Thai society and its role is given a much higher importance than any other foreign language.

English is getting important in Thailand. The new era today involves the use of the internet for communication in the world today. Modern technology in Education, Medicine, Engineering and Business are using English as the mode of communication. Furthermore, a regional and global collaboration between Thailand and foreign countries, by way of mergers, alliances, and acquisitions has established the need for the use of English. Hence, with this new development Thai learners need to have a strong command of the language. They need to be good in the language skills like reading writing and speaking (Tan, 2019). The importance of English as the world language, the advancement of technology and education are key determinants for new developments for English language teaching and learning in Thailand in this era.

According to Wiriyachitra (2001), Thais have a high demand for the English language in the era of globalization; however, they cannot make a high level of development in terms of science due to their lower-than-average competency in English compared with many other countries in Asia (e.g., Malaysia, Philippines, and Singapore). Wiriyachitra (2008) concluded that until now, English language teaching in Thailand has not been able to prepare Thai students for the future (Smyth, 2001).

In 2008, education reform packages in Thailand were launched to instill countrywide competitiveness in terms of the education system. The schooling consist of twelve years of curriculum with four different ranges which are the lower primary schooling (Grades 1 — 3 or 7 – 9 years old), upper primary (Grades 4 – 6 or 10 – 12 years old), lower secondary (Grades 7 – 9 or 13 – 15 years old), and upper secondary (Grades 7 – 12 or 16 -18 years old).

In the upper-secondary level, students could choice to study in either academic or vocational education, based on their final academic result and in addition, and every student is required to choose a foreign language as an elective (Ministry of education, 2008a). English is the most popular foreign language subject. The duration for English at primary and secondary levels ranges from 40 minutes per week for years 1 to 3, 80 minutes per week for years 4 to 6, 120 minutes per week for years 7 to 9, and 240 minutes a week for years 10 to 12. The students are also required to take the national test, which consist of English as one of the primary topics (The National Institute of Educational Testing Service, 2008).

In the last 40 years, top-secondary school students were allowed to enter to tertiary education by passing the countrywide university entrance examination. In the closing decade, however, the device of admissions has been reformed as it became seen to rely too heavily on the entrance examination that evaluated students' academic performance based on the summative examination. In 2001, the admission manner was adapted in accordance with the academic reform coverage highlighted within the National Educational Act (NEA) of 1999, advocating extra formative evaluation modes. College entry should be primarily based on an aggregate of educational fulfillment of candidates at some stage in upper secondary school and countrywide education test scores, now administered the National Institute of Educational Testing Service (NIETS) based in 2005.

All candidates are expected to take English as one of the key papers of the Ordinary National Education Exam (O-NET). English is also required for both the General Aptitude Test (GAT) and the Technical and Academic Aptitude Test (PAT) assessments.

1.2.3 Reading in English for Thai students

In 2008, the Ministry of Training required English language as one of the eight learning areas inside the Basic Education Center Curriculum (BECC) for Thai college students. The Ministry of Education also determines the goals for the ELT in the BECC. By the time they graduate they should achieve the following goals.

1) to be able to speak and comprehend the language for verbal exchange functions;
2) to be able to use English in understanding different cultures.

The curriculum covers the capability to apply English language in diverse conditions in school and society (Ministry of Education, 2008). The ability to read English has become a necessity for students. It has become evident that English has shifted from the task to pass examination to be able to acquire the language. Darasawang (2007) argued that the second language teaching in Thailand emphasized studying skills and thus encourages analyzing for language exercise.

The program additionally aims to allow learners to read English books, to achieve knowledge on other subjects, and to encourage them to keep up with global trends. Dubin and Bycina (1991) argued that reading had been one of the most important analytical topics in the discipline of teaching English to speakers of other languages. Therefore, students should learn English to understand scientific and technical facts that are in most cases published in English as well as being capable of communicating with and exploring the world without language barriers.

Robb and Susser (1989) posited that reading capabilities were deemed to be the most important elements for exclusive occupations and professions. Reading is the most essential language ability for new graduates to have. For instance, Thai medical

students need English analysis skills for analyzing international medical texts, journals, or any associated documents to their career (Phutirat & Suwannapatama, 2007). Nevertheless, despite the importance of the language, a research on the reading capability of Thai EFL students found that most of the students who did not major in English had low to medium English proficiency (Chamot, 2004; Prapphal, 2003).

1.2.4 Teaching and Learning Science in Thailand

The Ministry of Education launched the National Education Act in 1999 (ONEC, 2000) to reform the Thailand training machine. The new reform, defined the goal of science teaching in Thailand as follows: Science teaching should help the students (1) recognize fundamental ideas and theories of technological & practical knowledge; (2) understand the regulations and knowledge of nature; (3) gain talents in the research, scientific and technological systems; (4) develop the technique of imagination and creativity, and also the potential of problem solution and management, communication skills, and expertise in making decisions; (5) understand the relationships amongst, technologies, citizenry, and environments in terms of having an impact on and affectation; (6) practice the information of technology and generation for developing the usefulness to society and residing; and (7) have scientific thoughts, ethics, and interest inside the use of science and generation at the beginning.

In the academic context, the Thai syllabus and the Basic Education Core Curriculum were required to follow terms set by the Thai Ministry of Education in every grade (the Ministry of Education, 2008). With Thailand's current trend of training reform, teaching, and studying science in English it has come to be increasingly more applicable. Students are required to study science from primary level (IPST, 2002), and it is a requirement for lower secondary students to discover

technical terms of science in English, specifically those collaborating within the Science's Abstract Idea Capability Program. Tansiengsom (1986) attested that coaching and mastering science in English in Thailand in which the scholars focused on translating unexpected phrases and spent too much some time consulting their dictionaries, and reluctant to read medical papers in English, gave way to the notion they are probably not able to understand them. Similarly, Naranunn (1998) found that the majority of ESL/EFL reading school classrooms supported the practice of presenting new phrases, dictation and meanings, and explaining some grammatical systems. This led to the low level of comprehension among students.

Polmanee and Sinsuwan (2001) conducted a study which came to the same conclusion and found that the students' reading ability was at a low level to comprehend their reading. The unknown words continued to be a problem as students tended to have small English vocabularies, and although they perceived that they read better, their lexical capacity did not seem to increase. Even though the students had techniques to deal with unfamiliar words, these were not enough for a contextual understanding of the words. Translation was also considered an issue particularly when an English word had many possible in Thai equivalent meaning. This occurred when students knew the meaning of the word, but they did not know how to select a suitable Thai word.

Research-based knowledge about comprehension does not simultaneously attend to the demands of reading to learn during content-area instruction while still learning to read, and it does not incorporate responses to the reading profiles of many of the students in today's classrooms. Given the enormous educational importance of promoting both reading comprehension and learning among elementary and secondary students, it is crucial to organize what we know about these topics, define what we

need to know, and pursue the research that will be most important for improving teacher preparation, classroom instruction, and student achievement.

In order to help students comprehend reading in science, it be better to include reading strategies to help learners to recognize text meaning by recognizing sounds and phrases, matching sounds words. To state it clearly, analysis is regarded as a hierarchical manner practiced through guidelines, memorization, and categorization. Acknowledging this example, it is reasonable to teaching using reading strategies McNamara (2009) stated that reading strategies were not only used to understand the texts, but they were used to solve reading problems and help the readers to be better at reading and comprehension. Furthermore, reading is the primary means for independent learning, whether the goal was to perform in completing academic tasks, learning more about the subject matter, or improving language ability. Therefore, it is apparent that proficiency in English reading skills is crucial for Thai students while studying and working.

1.3 Statement of the Problem

Thai EFL learners faced a lot of problems in reading English texts. Limited knowledge of vocabulary and of sentence structure were regarded as the main problem (Gunning, 2002). Knowledge of vocabulary was very important to help students understand complex materials in reading such as textbooks which contain many concepts and technical vocabularies. They could not comprehend what they had read because they lack the ability to understand the texts which lead to the problems that affect their reading comprehension Chanwang (2008). It was found that complex sentences caused problems in reading comprehension for students learning science in English as a second or foreign language (Abid., 2008). Furthermore, even as

researchers, Yimwilai, (2008) indicated that the major causes of learners' reading problems were their lack of reading and spent little time reading English contexts in most schools in Thailand. Evidently, students were familiar with studying strategies and might occasionally used them to interpret English texts successfully. Many students had misconceptions as to the limitations to acquire expertise in science because they obtain information without expertise (Countrywide Research Council, 1997). Therefore, in reading comprehension, word difficulty was a major problem for EFL students; that is, they could not discover the meaning of words in context.

Teaching and learning Science in Thai contexts and developing students' science learning in the formal setting *provide* favorable opportunities for developing the important area of science and technology (Yuenyong, 2009). However, it seemed that teaching and learning science in English did not provide students to link science concepts for applying to their reading comprehension. They had difficulty completing assignments about science in English and had difficulties understanding words and meaning in science. They devise predictions, ask questions, generate questions, and vigorously search for solutions. It had been found during the last four years that numerous students have problems in gaining knowledge of technological terms due to their lack of English abilities and a lack of reading meta-cognitive consciousness of analyzing strategies (Mokhtari & Sheorey, 2002). To correctly examine science text, one ought to bear in mind what they were analyzing. They needed to understand why they were analyzing; and that they needed to assert tentative plans or techniques for dealing with problems (Pressley & Afflerbach, 2005).

Factors crucial to students' success in reading comprehension are teaching and learning in Thailand. Oranpattanachai (2004) recommended that poor reading ability in English may be a common problem among Thai students with the lowest level of

education. Wisaijorn (2003) also claimed that there is a spotlight on process in Thai classroom contexts, whereby all students perform the equal venture, irrespective of potential abilities, hobbies, and wishes. The teaching and studying technique entailed repetition and memorization of facts. Similarly, Dorkchandra, (2010) observed that the studying duties had been frequently assigned to their students then examined their reading comprehension, but they were rarely taught studying strategies needed for their study.

Punthumasen (2007) defined the key causes for the weak performance of Thai students in English: 1) Textbooks, novels, and cartoons, or materials in English were not attractive to the learners. (II) Lacking in technical guidance for science texts in English. (III) Lacking of ICT knowledge among students in reading science texts. Bernhardt (2005) identified areas of difficulties of Thai students' English comprehension in technological terms are vocabulary acquisition, complicated grammatical structures, confined heritage, the employment of both nearby and international strategies, textual content structure, motivation to read, and low reading speeds. In addition, Thai students found it tough to learn science in English as they were weak in vocabulary and terminology (Lee, 2005), which affected their analyzing comprehension and learning competencies for acquiring understanding and gathering facts in gaining knowledge of English as a foreign language (EFL). Thai students were also found to have low motivation in learning English (Wisaijorn, 2003) and they were unmotivated to read and analyze their reading (Krishnan, 2007), lacking in vital questioning talents, desires, and directions (Sivarnee, 2013).

Based on these reasons, the Thai government a had expressed serious concern about the quality of science education (OECD, 2016). Buaraphan (2010), viewed science as a product of knowledge for the purpose of explaining natural phenomena.

In their view, science was focusing on skills associated with the scientific process, scientific thinking and scientific methods for carrying out experiments, rather than having explicit discussions about science context in English.

Furthermore, to investigate the issues that the learners faced in reading science materials a study was undertaken. A science module was developed and a study wascarried out on the effective reading strategies which the variables concerned with the observation were as follows (a) meta-cognitive, cognitive, and social/effective studying techniques, which act as an experimental variable that the researcher employed as a stimulus to realize the required exchange throughout; (b) the instructional application which relies on the eight scientific units, and CALLA teaching instructional which acts as an intervening or mediator variable used as a way of finding the results of the experimental variable; and (c) analyzing comprehension, that is the practical reading strategies being discovered all through this study.

1.4 Research Objectives

The objectives of the study are:

1. To design a scientific reading module in English for EFL students.
2. To investigate the effectiveness of reading strategies instruction through a scientific reading module employed by science students in the EFL reading process.
3. To identify the reading strategies that the students use the most and the least to understand a scientific material.
4. To determine the relationship between various English learning strategies used to understand a scientific module.

5. To find out the students' feedback and experiences in reading a scientific reading module.

1.5 Research Questions

The research questions in this study are:

1. How effective are the reading strategies through a scientific reading module employed by science students in the EFL reading process?
2. What are the analyzing strategies that the scholars most frequently and least frequently used to comprehend the materials?
3. ARE there any relationship between various English learning strategies used to understand a scientific module?
4. What are the students' feedback and experiences in reading strategies employed by Thai EFL students in learning Science in English?

1.6 Research Hypothesis

The following are the related research hypothesis:

H_{01} There is no relationship between various English learning strategies used to understand a scientific module (RQ3)

H_{02} No relationship between the reading strategy instruction use and scientific module will be found. (RQ4)

1.7 Significance of the Study

The study attempted to investigate the effectiveness of analyzing strategies preparation techniques used by EFL grade 7 in the science program in a government

school, southern, Thailand. Moreover, studying techniques, and analyzing perspectives have been additionally examined in scientific content material. The consequences of this study are expected to provide EFL pedagogical implications for the scholars. The objective can serve to guide the instructional requirement for improving English reading abilities in a scientific module. Secondly, it will be used to help EFL educators in studying strategies that are suitable for their teaching, and providing guidance to students on vocabulary acquisition, comprehension structure, and making use of the reading strategies to gain the reading skills they need, through independent, motivational practice the other situations in English.

Thirdly, it would enhance the students' high-quality attitudes in the direction of Science in English reading, and be the English instructors' cognizance of the benefits of the pedagogy as a tool for developing Science in English curriculum. The result will be shed light on EFL reading techniques coaching mainly for English educators and administrative officers for the importance of teaching science congruently in English. It is hoped that in addition studies may also employ all styles of studying strategy guidance information to broaden a few powerful study gadgets for instance and associated fields of Science in English for EFL students.

1.8 Operational Definitions

Due to their frequent use in this study, the operational definitions below will be used for the following terms:

1. Strategies are classified as methods that are specifically taught to L2 learners with the intention of improving L2 reading comprehension (Chamot 2001; O'Malley & Chamot, 1990). Reading techniques are also mental actions that are consciously used to promote the reading process, to improve the reading comprehension of the

EFL, and to resolve reading challenges to accomplish clear reading objectives. Strategies are described in this study as any strategy or tactic that Thai EFL students explicitly employ.

2. Meta-cognitive strategies are considered and synthesized facts and create institutions at the same time as studying. Learners perceived and tuned their own learning styles, expectations and needs, to the degree of effectiveness of the assignment, to determine the success of any shape of studying approach.

3. Memory Strategies were the manner of storing and retrieving new statistics via grouping or using one's imagination. The learner found ways to recollect statistics into lengthy-time period reminiscence, through creating a phrase-that created a mind map (mental linkages), and then being able to retrieve that data.

4. Cognitive Strategies were discussed as the practice session or repeating, organization or grouping phrases, terminology, or principles in keeping with their semantic or syntactic attributes, influencing or guessing meaning or predicting results via the usage of the facts inside the textual content, summarizing or synthesizing the records, deducing or making use of regulations to recognize the language, imagery and integrating new ideas with regarded to statistics (O'Malley & Chamot, 1990).

5. Social/Affective Strategies contain cooperation or operating with friends to remedy a problem, thinking of an explanation, and self-communicate or the use of mental manipulation to lessen the anxiety approximated by a project (O'Malley & Chamot, 1990). Newcomers adopt the social/effective strategy to govern their emotions, motivations, and attitudes while in social conditions including asking questions, communicating with others, facilitating communication and interaction.

6. Schemata of reading states that are related to context information, previous knowledge, or just plain experience, as students make links to the text they are reading, their comprehension improves (Dunsmore et al., 2005). As a cognitive framework which consists of a number of organized ideas, schemata usually are defined as abstract knowledge models or structures which may be of use in solving problems. It assumes that those knowledge models are stored in one's memory. And by the application of the stored knowledge structures, one can deal with a problem in reading quite easily.

7. The Cognitive Academic Learning System (CALLA) was created to provide well-structured lessons for English Learners (ELL) students to learn fluency in the normal challenging language of academia (Chamot & Robinson, 2007). The CALLA paradigm is based on cognitive learning theory, combines content-area teaching with language acquisition practices and specific instruction in learning strategies.

1.9 Limitation of the Study

The study has three major limitations in the study. First, the participants of this research were Thai EFL learners, Grade 7 of the Scientific and Mathematical Ability Program at a government high school in Southern Thailand. The research had little effect on the social demographics of thestudents, i.e., rural and urban, previous English tutoring, etc. As such, the results of this research could be used, with slight changes to other related systems in other locations; and may also act as recommendations for future studies at other stages of the Thai EFL students in the normal and English school curriculum.

The second limitation concerned the prior studies, there has been no research that attempts to describe a larger depiction of English as a Foreign Language (EFL) on Science program in Thai schools, a study which considered different perspectives of

stakeholders (e.g., lecturers and students) on what actually constitutes an EFL Science reading prospective, and educational policy factors which potentially contribute to, or detract the development, implementation, and outcomes of the reading strategies.

Lastly, there was no research that tries to describe an appropriate reading technic of science in English as an English for Specific Purpose (ESP), an examination which considered exceptional views of instructors and constitutes an EFSL science studying potential, and academic policy elements, implementation, and reading strategies. Therefore, this study discovered a limitation can be determined as an important opportunity to identify new gaps in the literature and to present the need for further development for the study.

1.10 Summary

This research can be conducted and centered on reading strategies of science in English for the lower secondary students at a chosen government school in Hat Yai, Southern Thailand. This research investigates science materials in Thailand as well as the problems encountered by means of Thai students' English comprehension in reading science. The researcher attempted to apply cognitive, meta-cognitive, social-affective strategies, and CALLA educational modules in order to deliver the reading strategies. The science materials were identified through the syllabus and guidelines set by the Ministry of Education.

The research endeavors to examine reading strategies employed by participants/readers in many different ways, which enable to help them to be more efficient in reading and comprehending meaning through a systematic design of eight science materials contents, reading instruction using Backward design. Moreover, the researcher employed the Meta-cognitive Awareness of Reading Strategies Inventory

(MARSI-R) questionnaire, multiple-choice reading comprehension post-test, and semi-structured individual interviews to explore the effectiveness of the training program. Therefore, the results of this study would significantly aid to secondary school educators and administrators, in their decision on integrating reading strategies and reading comprehension into scientific contexts.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Reading, writing, speaking and listening are the four fundamental components of ESL / EFL learning. In Second Language Learning (SLA), reading is the most valuable of the four skills, as learners can gain a great deal of knowledge from reading experiences (Carrell & Eisterhold, 1983). Reading is an important fundamental language skill to attain and improve educational and academic prosperity (Heller & Grenleaf, 2007), to derive and equate information from a written or printed document with what one already knows in order to build a meaning from the whole text (Eskey, 2002). It is related to the association between vowel and consonant sounds in English, as well as their traditional spelling. Students can learn to identify terms, spell, stimulate imagination and interpret meaning on the part of the reader by reading exercises (Burns, 1999), constructing meaning by working through a text, building letters into words, words into phrases, and phrases into sentences, which are then decoded by the brain to comprehend the meaning of the text by the students (Nasr, 1972). Reading is the primary means of individual study, whether the aim is to carry out instructional activities, to learn more about the subject, or to develop language skills.

In addition to conversational English, scholarly English requires a wider mix of skills, the use of reading and writing, and context awareness (Garcia, 2005). Students have to be proficient in academic English in order to meet targets on state performance assessments (Wong-Fillmore & Frost, 1999). English learners use operating reminiscence as they attempt to study extra grammar and vocabulary associated with a foreign language. Adesope et al. (2010) believes opposing theories

regarding the cognitive load of English learners were raised in an observation by means of (a) English learners battle with working memory due to the fact they need to concurrently screen vocabulary, languages at once and grammar systems, and (b) English students increased ability working memory due to their bilingual technique to language. Schaffer (2007) postulates that learners need to be capable of extending their background knowledge of standards past fundamental vocabulary and be capable of engaging in, and manipulate the precise discourse to conquer the problem in L2 acquisition. It is also obvious that ability to read in English is essential for Thai students to find jobs.

The consensus view is that the most important language skill for new graduates to have been literacy. For example, in order to read medical texts, journals or any relevant documents for their career choices, Thai medical students need English reading skills (Phutirat & Suwannapatama, 2007). Alas, Thai scholars studied the literacy skills of Thai EFL students, finding that most of them have low to medium English proficiency, particularly those who are not English majors (Chamot, 2004; Prapphal, 2003).

Reading is important for understanding (Krashen, 1989), an "interactive manner" that includes the interplay of 4 elements: the reader, the textual content, the fluent analyzing (Anderson, 2003; Constantinescu, 2007; Gilakjani & Sabouri, 2016; Wooley, 2011), and strategic reading. The ability assess, and manipulate their reasoning must be open to lively language for the inexperienced persons (Koda, 2007).

The ability to track, assess, and control their reasoning must be open to active language students (Koda, 2007). Students, with low English reading proficiency, have to undergo many reading experiences in order to become constructive and sensitive

readers. They will also build their own range of appropriate reading techniques through classroom taught exercises (Chamot & Keatley, 2003). Thus, to achieve a thorough understanding, it is advisable that readers understand the aspects relevant to reading, such as vocabulary building, using schema to understand the text, and following the organization of the text.

Frequently, in science, students have problems with reading comprehension because they may be passive readers, the readers who received data without understanding. It appears to be inevitable to teach Thai EFL students reading strategies since some research had determined most Thai EFL students had low to moderate English proficiency. They were incapable of studying in English due to many factors. (Anusornorakarn, 2002; Chawwang, 2008; Oranpattanachai, 2010). To address the above issue, the researcher has substantially investigated the most and the least regularly used analyzing strategies by using Thai EFL students which could cause them to succeed in science reading comprehension. The researcher tries to take a look at which analyzing strategies and guidance for studying comprehension will aid or promote the studying of comprehension competencies and the learning of L2 that may be integrated into different areas of language abilities.

2.2 Reading Comprehension

Comprehension is the primary intention of analyzing. Information reading refers to the desire, for a motive, to comprehend the meaning of the study (Rubin, 1993), to derive and examine the meanings from a written text (Vellutino, 2003). This ability is important and, for that reason, a widespread goal for faculty mastering, especially inside the late primary grades (Sweet & Snow, 2003). Rubin (1993) suggests that, due to the intent and proficiency of the reader, reading comprehension can be

divided into three distinct groups. Literal interpretation, Stage 1, is text-explicit. This interpretation helps the reader to create interpretations that correctly represent the aspect of the intended message of the author that is explicitly mentioned. Understanding of interpretation, Stage 2, is text-implicit. In addition to unstated cause-effect relations or similarities, interpretation of nuance, and/or symbolic usage of vocabulary and concepts, readers are expected to draw conclusions. Applied interpretation, Stage 3, is schema or experience-based. Readers are expected to incorporate the new data into their previous experience at this stage, from which new relationships will then arise.

The interpretation of a text by the reader relies on the link between what the reader has already learned and what is found in the text (O'Donnell & Wood, 1992). When readers know little about the topic, comprehension does not take place because they have no past experience to interact with the new material. Being a successful reader, though, requires two components: reading speed and comprehension level. If learners can reach a high degree of understanding in a very short time, they can be called successful readers who translate the essence of what they read using their experience and waste less time reading the text. These readers read for relevance, according to Rubin and Thompson (1994), they do not spend time interpreting each letter or word in the language. Instead, they take in whole chunks of the text, relying on their knowledge of the language and of the subject matter to interpret the meaning and to make predictions as to what is likely to follow.

Effective interpretation of reading depends on the existence of certain criteria, namely the coordination of reading decoding and word awareness (Kintsch, 1998; Sideridis et al., 2006; Snow, 2002), along with the development of a cohesive mental image that may involve background knowledge of textual information in the light of

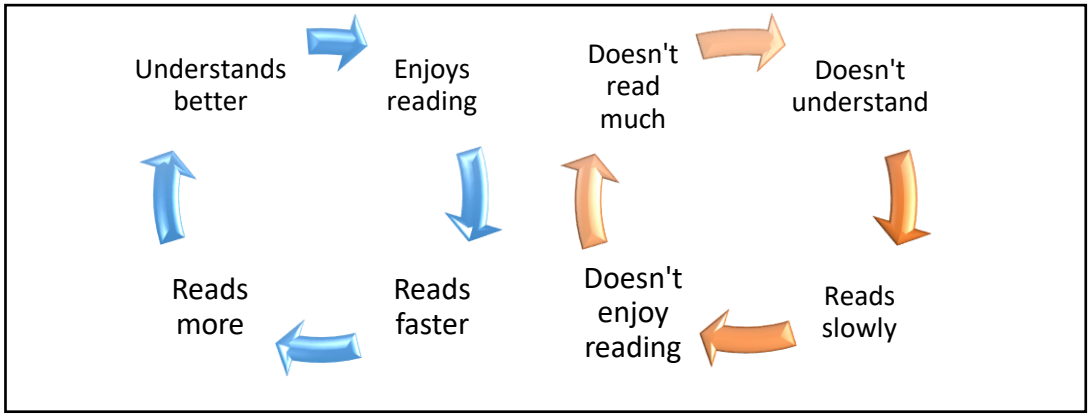
semantic relationships (Kendeou et al., 2014). Moreover, appropriate strategy use and directed cognitive effort as cognitive and metacognitive reading strategies and schemata that readers utilize play important roles in constructing meaning from text (Taguchi et al., 2004).

According to Hosenfeld (1977), less successful foreign language learners had a fragmented approach to the text, while successful learners went for overall meaning, guessing, or skipping language and information. Several theories on the role of language and skills were checked, as alluded to in Alderson (1984), showing that poor reading in a foreign language is partially due to poor reading in L1, along with insufficient knowledge of the foreign language. The learners need to reach the threshold level of L2 before they are able to transfer any L1 skills to their L2 reading tasks.

Figure 2.1 suggests the virtuous circle (cycle of growth) of a proficient reader as opposed to low-level readers. For a proficient reader, speed, entertainment, and comprehension are intently related to one another, alongside the quantity of practice a reader does. Alternately, low-level readers never increase their enjoyment and curiosity in what they examine.

Figure 2.1

The Virtuous Circle of the Good and Slow Reader (Nuttall, 1996)



They examine as little as feasible because they do not revel in it. Disadvantaged of practice, they continue to find it tough to recognize what they examine, so their reading ability and comprehension do not grow; and as a result, they remain slow readers (Nuttall, 1996: p. 127).

L2 reading development success is achieved through integrative interaction of the ability to read and the ability to comprehend meaning (Koda, 2007). Similar findings confirmed that when a learner can strengthen his or her weaknesses in L2 reading, it will directly enable the learner to improve his/her reading skills (Singhal, 2000). Afflerbach et al. (2008) described reading abilities as "automatic actions that bring about the decoding and comprehending of texts with pace, performance, and fluency, usually without the reader's recognition of the additives or controls involved" (p. 15). It was contended that with sufficient practice, a consciously deployed reading approach could grow to be a mechanically employed studying talent. Many students failed to recognize what they were supposed to do as they learnt how to read strategically. As a result, the use of studying techniques appears to influence EFL student's performances (Zemelman et al., 2016).

Strategies are most critical for students to analyze as they improve their comprehension (abid, 2016) :

1. Monitoring comprehension - Actively preserving the rhythm of ones thinking and adjusting strategies to the text at hand
2. Connecting/Schema - Linking what's within the textual content to privately revel in, global occasions, or other texts
3. Inferring - Predicting, hypothesizing, deciphering, and drawing conclusions about the textual content