LEARN Journal: Language Education and Acquisition Research Network
ISSN: 2630-0672 (Print) | ISSN: 2672-9431 (Online)
Volume: 16, No: 1, January – June 2023

Language Institute, Thammasat University
https://so04.tci-thaijo.org/index.php/LEARN/index

Relationship between the Reading Strategy, Reading Self-Efficacy, and Reading Comprehension of Thai EFL Students

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APA Citation:
Oranpattanachai, P. (2023). Relationship between the reading strategy, reading self-efficacy, and reading comprehension of Thai EFL students. *LEARN Journal: Language Education and Acquisition Research Network*, *16*(1), 194-220.

Received
29/07/2022

Received in revised form 05/11/2022

Accepted
16/11/2022

ABSTRACT

Numerous studies have found that students' reading strategy and their reading self-efficacy play important roles in enhancing English reading comprehension in the context of English as a second/foreign language. This study attempts to investigate whether a relationship exists between the reading strategy and perceived self-efficacy of Thai EFL students and their comprehension. The participants consist of 31 Thai engineering students attending a TOEIC course at a public university in Thailand. A reading strategy questionnaire, a reading self-efficacy questionnaire and TOEIC reading comprehension test were used for data collection. According to the descriptive statistics, the reading comprehension ability of the participants is below average. Pearson's correlation coefficient test showed the existence of a significant relationship between their reading ability and their overall reading strategy ($p \leq .05$) and a significant relationship was also revealed between their reading comprehension ability and the top-down strategies ($P \leq .05$). However, no significant relationship exists between reading ability and bottom-up strategies. Furthermore, the descriptive results reveal that the participants' perceived reading self-efficacy is at a moderate level. In addition, Pearson's correlation coefficient test showed

a significant relationship between reading comprehension ability and self-efficacy in reading (P ≤ .01). Pedagogical implications are also presented in this study.

Keywords: reading strategy,
reading comprehension ability, bottom-up strategies,
top-down strategies, reading self-efficacy

Introduction

Reading in English, especially in the EFL/ESL context, plays a crucial role in gaining information from original printed English and digital texts. To achieve success, students and professionals need to master English reading skills. This is because most of the academic information in various fields, such as engineering, medicine, science, architecture, finance, and so forth, is in printed and digital forms of English. At university, students are required to read English textbooks and articles in their disciplines, both in printed and digital formats. Additionally, reading in English can help the students improve their English proficiency. While reading in English, the students can gain implicit English grammatical and vocabulary knowledge (Waring & Nation, 2004). The knowledge of English grammar and vocabulary makes a great contribution to the students' English reading comprehension ability.

However, the English reading comprehension ability of Thai students was found to be unsatisfactory (OECD: 2019, as cited in Mala, 2019). According to the Program for International Students Assessment (PISA) examination, which takes place every three years, Thai students were ranked 66 for reading. They recorded a score of 393 points for reading, far below the OECD (Organization for Economic Co-operation and Development) average of 487 points. As a Thai teacher of English, I would like to improve my students' reading comprehension ability. To help students improve their reading comprehension ability, many researchers and educators focus on the reading processes and self-efficacy of students.

Several previous studies have investigated students' reading processes or reading strategy use when reading texts and examined whether or not their overall reading strategy use and reading subscale strategies correlates with their reading comprehension ability (Do & Phan, 2021; Par, 2020; Rastegar et al., 2017; Sheorey & Mokhtari, 2001; Tobing, 2019). Most of the studies found a significant positive relationship between the frequency of strategy use and reading comprehension ability. In addition, a number of previous studies have investigated the association between students' reading self-efficacy and their comprehension ability and found a significantly positive correlation between the two (Fitri et al., 2019; Mohammed, 2022; Naseri & Zaferanieh,

2012; Nonsawang, 2019; Okyar, 2021; Shang, 2010; Shehzard et al., 2019, as cited in Okyar, 2021; Tobing, 2019; Urfalidadandi & Dadandi, 2022).

According to the existing literature, although the relationship between reading strategy use and reading comprehension ability of students and the relationship between perceived reading self-efficacy and reading comprehension ability were studied in the context of EFL and ESL, to the best of the researcher's knowledge, there is still a dearth of studies on the association between reading strategy use and the reading comprehension ability of students and their reading self-efficacy and reading comprehension ability from the Thai perspective. The present study is therefore an attempt to contribute to the existing literature on teaching students to read in English as a foreign language.

Literature Review

Reading Comprehension

Many reading experts and researchers have shared their own definitions of reading comprehension. For example, Snow and Sweet (2003, p. 11) defined reading comprehension as the process of simultaneously extracting and constructing meaning through the interaction and involvement with written language. Veeravagu et al. (2010, p. 206) gave a long definition of reading comprehension as a thinking process by which a reader selects facts, information, or ideas from printed materials, determines the meanings the author intended to transmit, decides how they relate to previous knowledge, and judges their appropriateness and worth for meeting their own objectives. Furthermore, McKee (2012, p. 46) stated that reading comprehension is the ability to understand a text, analyze the information, and interpret correctly what the writer is stating. Based on these definitions, three common elements are required to comprehend text: the text, the reader, and the reading activity in which comprehension is a part (Snow & Sweet, 2003, p. 11).

To help understand the reading process, reading theorists have developed models of reading. There are three main reading models: 1) bottom-up, 2) top-down, and 3) interactive.

The bottom-up reading model is a data-driven process and a form of decoding, according to Gough (1972), the most prominent bottom-up theorist. To achieve reading comprehension, readers build meaning from the smallest units and work up to the highest conceptual level. In other words, readers need to identify letter features and then link them for letter recognition. After that, they combine the letters to recognize spelling patterns and proceed to words, sentences, paragraphs, and text-level processing. In

this reading model, the teachers encourage the students to understand the meanings of every word in the reading text and go over it sentence by sentence without using the students' background knowledge to help enhance their reading comprehension.

The top-down reading model emphasizes the background knowledge readers use to comprehend the written text. The main theorists of this model are Goodman (1967; 1995) and Smith (1982), who believe that to understand the reading text, readers selectively sample the information in the text and then predict what is coming next. After that, they use subsequent information in the text to confirm or disconfirm their prediction. An example of students using the top-down process in the classroom is when they are asked to predict what the text is about or skim it in the prereading activity.

The interactive model of reading has been widely accepted until now because it provides the best explanation. According to this interactive model, developed by Rumelhart (1977) and Stanovich (1980, 1981), reading comprehension occurs through the interaction between the text and reader. Specifically, to be able to understand written material, this interactive model focuses on both the role of language and the readers' background knowledge. Based on the interactive model, this study categorizes reading strategies into bottom-up and top-down and investigates the relationship between these two categories and the participants' reading comprehension ability. The relationship is also examined between overall reading strategy use and reading comprehension ability.

ESL/EFL Reading Strategies and Reading Ability

The term "reading strategy" has been defined by several researchers in the field of teaching English as a second/foreign language. For instance, Singhal (2001, p. 1) defined reading strategy as the process used by readers to enhance their comprehension and overcome failures. Pritchard (1990, p. 275) defined reading strategy as a deliberate voluntary action taken by readers to develop an understanding of what they read. Likewise, Olshavsky (1977, as cited in Ngoc & Ly, 2019, p. 420) defined reading strategy as purposeful means of comprehending the author's message. Moreover, Aarnoutse and Schellings (2003, p. 391) stated that reading strategy can be defined as a specific heuristic method or procedure which readers more or less apply intentionally to adequately process and understand the information presented in a text.

Based on the definitions of the foregoing reading strategies, some common aspects arise: They are deliberate actions. Simply put, they are conscious and intentional. They are used to tackle reading problems to enhance comprehension.

A number of research studies have been conducted on the relationship between reading strategy use and reading comprehension in various contexts. The study by Sheorey and Mokhtari (2001) appears to be the earliest to investigate the perceived reading strategy use of L2 learners. It was carried out on 302 college students. These researchers developed a questionnaire called a survey of reading strategies (SORS) which was adapted from the Metacognitive Awareness of Reading Strategies Inventory (MARSI) originally developed by Mokhari and Richard (2002) to examine the perceived reading strategy use of the participants. The SORS measures involve three reading subscale strategies: cognitive, metacognitive, and supporting. The study indicated a correlation between students with high reading proficiency and a high frequency of reported reading strategy use in the ESL context. This provided the foundation for subsequent studies on reading in a second/ foreign language, examining the perceived use of reading strategies by means of a questionnaire.

Several studies have employed the SORS method developed by Sheorey and Mokhtari (2001) as a data collection instrument to examine perceived reading strategy use in the EFL context. However, unlike the study by Sheorey and Mokhtari (2001), which categorized reading strategies into cognitive, metacognitive, and supporting, other studies divided reading strategies into problem-solving, global, and supporting. For example, Rastegar et al. (2017) explored the relationship between reading strategy use and the reading comprehension ability of Iranian EFL university students. Two instruments were employed: SORS (Sheorey & Mokhtari, 2001) and a TOEFL reading comprehension test. The results of the study revealed a significant positive relationship between the use of overall reading strategies and comprehension ability of the participants.

In the Indonesian context, at the school level, Tobing (2019) examined the relationship between the use of reading strategy and reading comprehension of 138 high school students in Indonesia. The SORS was applied to collect data on the reported reading strategy use of participants with a reading test to measure their reading comprehension ability. The overall use of reading strategies had a significant relationship with reading comprehension ability, although the individual categories did not. This finding is consistent with an investigation of the correlation between the use of overall reading strategies and reading comprehension ability of 56 EFL Indonesian English-major students in Indonesia in a study of Par (2020), who employed the SORS to elicit their reported reading strategy use. Furthermore, in this study the participants reported that they tended to use problem-solving rather than global and supporting strategies. Likewise, in the Vietnamese context, a significant relationship between the overall reading strategy use of 123 EFL Vietnamese university students and their reading comprehension

ability was also found in a study of Do and Phan (2021) using an adapted version of SORS. In other words, in this study, good readers reported more reading strategy use than poorer readers.

In Thailand, to the best of the researcher's knowledge, there seems to be no correlational studies investigating the relationship between the two constructs: overall reading strategy use of the participants and their reading comprehension ability.

In contrast, some studies revealed no correlation between overall reading strategy use and the reading comprehension ability of participants (Hoang, 2016; Meniado, 2016). Hoang (2016) attempted to clarify the association between reading strategy use and the reading comprehension ability of 85 Vietnamese EFL students at British universities in the UK. A questionnaire adapted from Oxford et al. (2004) and Sheorey and Mokhtari (2001) was used as the main instrument to collect data on the participants' self-reporting of reading strategy use. The study found no significant relationship between strategy use and the reading comprehension ability of Vietnamese students in the UK. Moreover, Meniado (2016) found no correlation between metacognitive reading strategies and reading comprehension ability. This study was conducted with Saudi college-level EFL students using a questionnaire adapted from Sheorey and Mokhtari (2002) to collect data on reading strategy use of participants.

Since the findings of the reviewed correlational studies are inconclusive and as far as the researcher's knowledge extends, there seems to be no Thai study conducted to find the relationship between the student participants' overall reading strategy use and their reading comprehension ability, the present study attempts to investigate the same line of inquiry. Hopefully, the findings of the present study will bridge the gap in the literature on reading in a foreign language, particularly in the Thai context.

Reading Self-Efficacy and Reading Ability

Self-efficacy is a motivational construct developed by Bandura (1997, as cited in Bandura, 2006), who defined it as people's beliefs in their capabilities to produce given attainments (Bandura, 1997, as cited in Bandura, 2006, p. 307). In relation to the definition of reading self-efficacy, Schwanenflugel and Knapp (2016, p. 230, as cited in Okyar, 2021, p. 118) defined reading self-efficacy as "a person's judgment of their ability or competence in reading." Likewise, Boakye (2015, p. 2) gave a definition of reading self-efficacy as the belief students have in their ability to read successfully.

So far, there has been no single measure of reading self-efficacy (Caroll & Fox, 2017). Previous studies do not focus on a single measure of

reading self-efficacy (Kosar et al., 2022) since it is highly domain-specific and must run in parallel to the reading tasks (Carroll and Fox, 2017). Consequently, many researchers on the topic have developed their own reading self-efficacy measures/reading self-efficacy questionnaires (e.g., Henk & Melnick, 1995; Shang, 2010; Shell et al., 1989; Tobing, 2013).

According to the literature, reading self-efficacy questionnaires developed by various researchers consist of different domains and response rating scales. Henk and Melnick (1995) developed a reading self-efficacy questionnaire entitled the Reader Self-Perception Scale, consisting of four domains: 1) progress, referring to one's perception of present reading performance compared with past performance; 2) observational comparison, defined as the perception of a student toward her/his reading performance in comparison to that of their classmates; 3) social feedback, relating to the direct or indirect input on reading from teachers, classmates, and students' family members; and 4) physiological states, referring to the physiological feelings/experiences of students during reading. The Reader Self-Perception Scale used a 5-point Likert rating (from 1 "strongly disagree" to 5 "strongly agree).

Shell et al. (1989) developed a reading self-efficacy questionnaire involving two domains: reading tasks and reading component skills. Their reading self-efficacy questionnaire used a 100-point scale (from 0 "no chance" to 100 "complete certainty"). Tobing (2013) developed her own reading self-efficacy questionnaire with one domain: reading tasks and used can do statements, reflecting the tasks measured in the reading assessment based on suggestions from Bandara (2006). Her questionnaire used a 100-point scale (from 0 "cannot do" to 100 "highly certain can do"). The reading self-efficacy questionnaire developed by Shang (2010) involved two domains: 1) confidence in general English reading ability, and 2) students' perceptions of competence in using general reading strategies. This questionnaire used a 5-point rating scale (from 1 "not confident at all" to 5 "completely confident"). Numerous studies have investigated the relationship between reading self-efficacy and reading comprehension ability in the ESL/EFL context. Naseri and Zaferanieh (2012), for example, explored the relationship between reading self-efficacy beliefs and reading comprehension level of Iranian EFL learners using the Michigan reading comprehension test and reading self-efficacy beliefs questionnaire. The result revealed a significant strong positive correlation between reading self-efficacy beliefs and reading comprehension ability. Additionally, Boakye (2015) examined the relationship between the reading self-efficacy and reading comprehension ability of first-year university students in South Africa employing the self-efficacy questionnaires adapted from Grabe and Stoller (2002) and Guthrie et al. (2000). Her study disclosed

a relationship between reading self-efficacy and the reading comprehension ability of participants.

Likewise, in the Indonesian school context, an investigation to find out the connection between the student participants' reading self-efficacy and reading comprehension ability was later explored with 138 Indonesian high school students in a study by Tobing (2013), who developed a self-efficacy questionnaire to measure the student participants' self-efficacy beliefs. The results demonstrated that self-efficacy in reading had a significant relationship with reading comprehension ability, contributing as much as 20% to the performance outcome. In addition, Fitri et al. (2019) conducted a study to explore the correlation between reading self-efficacy and the reading comprehension ability of Indonesian school learners using a reading self-efficacy questionnaire adapted from Li and Wang (2010) and a TOEFL reading test as research instruments. They found a significantly positive correlation between reading self-efficacy and reading comprehension ability. Meanwhile, in the Saudi Arabian context, the association between the reading self-efficacy and reading comprehension ability of 188 Saudi EFL university students was examined by Shehzard et al. (2019). A reading self-efficacy questionnaire adapted from Usher and Pajares (2009) and Tobing (2013) was used to collect the participants' data on their perceived reading self-efficacy. The findings reveal a significant positive relationship between reading self-efficacy and reading strategy use. This finding is supported by the study of Mohammed (2022), who explored the relationship between the reading strategies, self-efficacy, and comprehension ability of Saudi university students. The results revealed a positive and statistically significant correlation between reading self-efficacy and reading comprehension ability.

Recently, in the Turkish context, at the university level, Okyar (2021) explored reading comprehension ability in relation to the reading self-efficacy of 121 Turkish university students in Turkey using a reading self-efficacy questionnaire adopted from Hanci and Bumen (2012). Her study demonstrated a positive relationship between students' reading strategy use and self-efficacy. On the other hand, at the school level, Urfalidadandi and Dadandi (2022) conducted a study on Turkish EFL school students using PISA data, disclosing a significant relationship between reading self-efficacy and the reading comprehension ability of participants.

In Thailand, to the researcher's knowledge, only one correlational study appears to have been conducted on the association between reading self-efficacy and reading comprehension ability. Nonsawang (2019) investigated the relationship between self-efficacy in reading comprehension and the reading comprehension ability of 12th-grade Thai students using a reading self-efficacy questionnaire adapted from Henk & Melnick (1995). The

finding indicated a significant positive relationship between the participants' self-efficacy in reading and their reading comprehension ability.

The existing literature on the relationship between L2 learners' perceived reading self-efficacy and their reading comprehension ability consistently reports the existence of such an association between the two variables regardless of their language backgrounds (Boakye, 2015; Fitri et al., 2019; Mohammed, 2022; Naseri & Zaferanieh, 2012; Nonsawang, 2019; Shang, 2010; Shehzard et al., 2019, as cited in Okyar, 2021; Tobing, 2013; Urfalidadandi & Dadandi, 2022).

Based on the foregoing literature review, there is a dearth of data on the correlation between reading strategy use and reading self-efficacy and reading comprehension ability in the Thai context. The present study thus aims to investigate these issues. In accordance with the objectives of the present study, the following questions are addressed:

1) What are the students' reading comprehension ability levels?

2) Is there a significant relationship between the students' reading comprehension ability and their use of overall reading strategies?

Hypothesis 1: There is a significant positive relationship between the students' reading comprehension ability and their use of overall reading strategies.

3) Is there a significant relationship between the students' reading comprehension ability and their top-down strategy use?

Hypothesis 2: There is a significant positive relationship between the students' reading comprehension ability and their use of top-down strategies.

4) Is there a significant relationship between the students' reading comprehension ability and their bottom-up strategy use?

Hypothesis 3: There is no significant negative relationship between the students' reading comprehension ability and their use of bottom-up strategies.

5) What are the students' perceived reading self-efficacy levels?

6) Is there a significant relationship between the students' reading comprehension ability and their perceived self-efficacy in reading?

Hypothesis 4: There is a significant positive relationship between the students' reading comprehension ability and their perceived self-efficacy in reading.

Methodology

Research Design

The quantitative research design was used in this study. This study aimed to investigate the relationship between three variables (reading comprehension ability, reading strategy use, and perceived self-efficacy in reading). The descriptive method was employed to examine the participants' perceived reading self-efficacy and their reading comprehension ability. On the other hand, the correlational method was applied to investigate potential relationships among reading strategy uses, reading comprehension ability, and perceived self-efficacy in reading.

Participants

The participants of the study consisted of 31 engineering students taking a TOEIC course in the second semester of the 2019 academic year at the College of Industrial Technology, a private university in Bangkok, Thailand. The TOEIC program is an extra course with no credits aimed at helping to build the English skills of engineering students in workplace situations. The selection of 31 participants from a population of 50 students taking the TOEIC course was conducted through the convenience sampling technique. The reading proficiency of the participants ranged from A2 to B1. They were all males aged between 19 and 22 years old.

Instrumentation

Three research instruments were used in this study:
1)A mock TOEIC reading test selected from material published by Longman. The TOEIC multiple-choice reading test was used as a research instrument to measure the participant's reading comprehension ability. This test is used to help students prepare for a professional setup by measuring their reading comprehension ability. Nowadays, TOEIC scores are used by international programs at educational institutions in Thailand (e.g., King Mongkut's University of Technology North Bangkok, King Mongkut's University of Technology Thonburi, Srinakharinwirot University, King Mongkut's University of Technology Ladkrabang) as well as other countries using English as a foreign language (e.g., Taiwan, Japan, and Vietnam) as an admission requirement. Furthermore, TOEIC scores can provide comparable data on English proficiency by being mapped to the CEFR (Common European Framework for Reference).

The mock TOEIC reading test in this study consisted of 100 items organized into three parts: 1) incomplete sentences, 2) text completion, and 3) reading comprehension. Although tasks 1 and 2 are designed to measure the students' vocabulary and grammatical knowledge, they also contribute to the assessment of their reading comprehension ability. According to Nielsen (2011), cloze reading, even at the sentence level, does indeed indicate reading comprehension.

The mock reading test contains 100 items in total, so the total raw scores amount to 100 marks. When converted into an official TOEIC reading score, the raw scores change to 495, according to the TOEIC conversion table. The official TOEIC reading scores range from 5 to 495.

2) A reading self-efficacy questionnaire to elicit the participants' responses regarding their perceived self-efficacy in reading English text. The reading self-efficacy questionnaire was developed by the researcher on the basis of the suggestions from Bandura (2006 as cited in Tobing, 2013), who suggested that the statements in the questionnaire use can do statements to reflect the tasks that the researcher would like to measure. Additionally, the suggestions from Pijares (1997 as cited in Li & Wang, 2010, p. 147), who suggested that reading the self-efficacy questionnaire should reflect various specific tasks within that domain, was used to develop the reading self-efficacy questionnaire. Due to the specificity of the reading self-efficacy in this present study, the self-efficacy questionnaire therefore was constructed by the researcher. The self-efficacy questionnaire used in the present study contained 10 items (statements) designed to reflect the current Thai engineering EFL context, particularly the Thai engineering at my college. The participants were asked to rate ten statements using a five-point Likert scale ranging from "strongly agree" to "strongly disagree" with 5 = strongly agree, 4 = agree, 3 = unsure, 2 = disagree, 1 = strongly disagree. The following are 10 statements contained in the reading self-efficacy questionnaire.

1. I can deal with English reading difficulties.
2. When reading English, I can comprehend it very well.
3. I can read fluently.
4. I can read and understand textbooks in my disciplines when I am assigned to do so.
5. I can read and understand English manuals.
6. I can read and understand scientific English short stories.
7. I can read and understand research articles in my disciplines.
8. I can read and understand English reading passages in TOEIC Test.
9. I can read and understand digital texts on the Internet.
10. I can read and understand English newspapers.

In this study, for the reliability of the reading self-efficacy questionnaire, the Cronbach alpha indicated .82, which is acceptable. Content validity was checked by three English teachers who teach reading in English as a foreign language. Based on their feedback, some items were modified accordingly. Their suggestions were used to improve the statements in the questionnaire. The questionnaire was written in Thai to avoid any misunderstanding.

3) A reading strategy questionnaire, developed by the researcher, involved close-ended questions containing 29 items to elicit the participants' responses regarding their perceived use of reading strategies while reading text in English.

Almost all the reading strategies were taken from the study by Oranpattanachai (2004), who used the think-aloud technique to investigate the reading strategy use of Thai engineering students when reading general text and text relating to their disciplines. In addition, one strategy, namely understanding the meaning of every word in the text, was taken from the study by Oranpattanachai (2010), who used a metacognitive questionnaire to identify the reading strategies used by Thai pre-engineering students when reading text. The strategy of understanding the meaning of every word in the text was originally taken from Carrell (1989). Two more reading strategies from the literature were added to the questionnaire used in this present study: scanning and identifying the fact or opinion strategies because the researcher expected that these two strategies are used by the participants.

The participants answered the questionnaire by rating the degree of frequency they tend to use these strategies while reading English on a five-point Likert scale, ranging from "very often" to "never" with 5 = very often, 4 = often, 3 = sometimes, 2 = seldom, 1 = never.

These 29 reading strategies are categorized into two types: bottom-up and top-down. The bottom-up strategy involves the reader decoding the linguistic features to comprehend the text (Oranpattanachai, 2010). The following bottom-up reading strategies are included in the questionnaire.

1. While reading the text in English, I skip words or parts I do not understand.
2. While reading the text in English, I work out the meanings of words by understanding some parts of them.
3. While reading the text in English, I make use of the grammatical structure to get meaning.
4. While reading the text in English, I look up the unknown words in a dictionary.
5. While reading the text in English, I pronounce the words loudly.
6. While reading the text in English, I use a finger to point to the words.

7. While reading the text in English, I write down the meaning of unknown words that appear in the dictionary.
8. While reading the text in English, I need to understand the meaning of all the vocabulary.

Top-down strategies are those where readers make use of their previous and operational knowledge on how to approach the text to construct the meaning (Oranpattanachai, 2010). The following top-down strategies are included in the questionnaire. meaning from the texts.

1. I try to get the main ideas while reading.
2. I recognize when I do not understand something while reading.
3. While reading, I go back to a prior part that I understand to help me work out the part I cannot understand.
4. I predict what will come next while reading.
5. I slow down when I have difficulty in reading.
6. I use my general knowledge to work out the meaning while reading.
7. I ask myself questions about the meaning of words or phrases while reading.
8. I re-read what I do not understand while reading.
9. I guess the meaning of the unknown words from the context while reading.
10. I work out a fact that is not mentioned directly to understand what the text implies.
11. I have feelings and reactions emotionally to the text.
12. I go back and correct what I could not understand earlier.
13. I continue reading even though I do not understand while reading.
14. I link the present information to the other pieces of the text while reading.
15. I form a mental picture of the text while reading.
16. I identify facts or opinions in the text.
17. I correct misunderstandings made in reading the text.
18. I assess the degree of my understanding in relation to the text.
19. I confirm my earlier understanding or interpretation.
20. I make a survey of the text before reading it, such as looking at the pictures and length of the text, skimming it, etc.
21. I scan the text.

The internal estimate of questionnaire reliability was .83, indicating that it was appropriate for use. The content was checked for validity by three experts in the field of teaching reading in English as a foreign language, and revisions

made accordingly. The questionnaire was translated into Thai to avoid misunderstanding.

Data Collection Procedure

The data collection in the present study was carried out in the second semester of the 2019 academic year. The data collection process consisted of three steps. In step one, all 50 students taking the TOEIC course took the mock TOEIC test, administered by the researcher for 1 hour. In step two, participant selection began with convenience sampling. The participants were informed by the researcher that the data from the questionnaire and test would remain confidential and used only for this research. The 31 participants who volunteered to participate in the present study answered the reading self-efficacy questionnaire within 5 minutes. In step three, all 31 participants answered the reading strategy questionnaire distributed by the researcher within 10 minutes.

Data Analysis

The quantitative data were analyzed using SPSS 11 as follows. Firstly, the descriptive statistics, including means and standard deviations, were computed to assess the student participants' reading comprehension ability and perceived reading self-efficacy. Secondly, a one-tailed Pearson's correlation coefficient test was used to determine whether or not a significant correlation existed between the participant's reading comprehension ability and their overall reading strategy use ($P \leq 0.05$). Thirdly, a one-tailed Pearson's correlation coefficient test was used to determine whether or not a significant correlation existed between the participant's reading comprehension ability and each reading strategy category (bottom-up and top-down) ($P \leq 0.05$). Finally, a one-tailed Pearson's correlation coefficient

Table 1

Interpretation of Pearson's Correlation Coefficient

Coefficient Interval	Degree of Interpretation
0.81–1.00	Strong
0.51–0.80	Moderate
0.21–0.50	Low
0.1–0.2	Very low
0.00	No correlation

test was used to determine whether or not a significant correlation existed between the participant's reading comprehension ability and their perceived reading ability ($P \leq 0.05$).

After analyzing the quantitative data using SPSS 11, the researcher interpreted the correlation of the product-moment correlation using the criteria shown in Table 1.

Results and Discussions

Research Question 1: What are the students' reading comprehension ability levels?

Descriptive statistics were applied to answer this research question. Based on the results of the reading part of the mock TOEIC reading test administered at the end of the TOEIC course, the average mean score of the participants was 121.94 from a total of 495. Based on the percentage score, below 50% of the total score, i.e., 495 points, was considered below average. In other words, scores below 247.5 points were considered below average. Hence, the mean score (121.94 points) was considered to be below average (247.5 points), as shown in Table 2, indicating that the participants exhibited a poor level of reading comprehension ability.

Table 2

Descriptive Statistics for Reading Comprehension Performance

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Reading Scores	31	40	355	121.94	72.683

Research Question 2: Is there a significant relationship between the student's reading comprehension ability and their use of overall reading strategies?

To answer research question 2, Pearson's correlation coefficient was applied to determine the relationship between the participants' overall reading strategy use and their reading comprehension ability. As shown in Table 3, there was a low positive correlation between the participants' overall reading strategy use and their reading comprehension ability, which was statistically significant ($r. = .334$, $n = 31$, $p. = .029$). Hence, the null hypothesis is accepted.

Table 3

Correlation between Reading Strategy Use and Reading Comprehension Performance

Variables		Overall Strategies	Reading Performance
Overall Strategies	Pearson Correlation	1	.344*
	Sig. (1-tailed)		.029
	N	31	31
Reading Performance	Pearson Correlation	.344*	1
	Sig. (1-tailed)	.029	
	N	31	31

*. Correlation is significant at the 0.05 level (1-tailed).

This finding is in line with those revealed in other studies, indicating a significant positive relationship between the overall use of reading strategies and reading comprehension ability (Do & Phan, 2021; Par, 2020; Rastegar et al., 2017; Sheorey & Mokhtari, 2001; Tobing, 2013). This finding suggests that, reading strategy use is a significant predictor of reading comprehension ability, although there was a low but significant positive relationship between the participants' overall reading strategy use and their reading comprehension ability. In other words, an increase in the frequency of reading strategy use would increase reading comprehension ability. The higher the frequency of reading strategy employed by the students, the higher their reading comprehension ability. One possible explanation for this may be that the participants with high reading proficiency in this study tended to use reading strategies frequently. Whereas the participants with low reading proficiency in this study tended to use reading strategies infrequently. The participants with low reading proficiency tended to have problems using reading strategies, especially when faced with reading difficulties, compared to those with high reading proficiency who use them to aid their understanding of the text. Furthermore, the participants with high reading proficiency tended to have a larger reading strategy repertoire to resort to when experiencing reading difficulties than the participants with low reading proficiency.

However, this result contradicts those of other studies, which revealed no relationship between overall reading strategy use and the reading comprehension ability of participants (Hoang, 2016; Meniado, 2016). The conflicting results may be caused by a variation in the participants' characteristics from context to context, such as academic, social, and cultural background, language background, etc. In addition, reading strategy use may

not be the only factor affecting reading comprehension ability; other factors such as reading anxiety, vocabulary knowledge, content schemata, motivation, and so forth can affect the participants' reading processes, which in turn may influence their reading comprehension ability.

Research Question 3: Is there a significant relationship between the student's reading comprehension ability and their top-down strategy use?

In this study, the participants reported that they tended to use the top-down strategy more than the bottom-up, as indicated in Table 4 (the mean of bottom-up strategy was 27.129, SD = 3.23256, whereas the mean of the top-down strategy was 77.293. SD = 9.519.8).

To answer research question 3.1, Pearson's correlation coefficient was used to determine the relationship between the participants' top-down strategy use and reading comprehension ability. As can be observed from Table 5, a low positive correlation exists between the participants' top-down

Table 4

Descriptive Statistics of Bottom-Up, Top-Down, and Overall Reading Strategies

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Bottom-up	31	19.00	32.00	27.1290	3.23256
Top-down	31	56.00	95.00	77.293	9.51908
Overall Strategies	31	80	127.00	104.42	11.58

Table 5

Correlation between Top-Down Strategy Use and Reading Comprehension Performance

Variables		Overall Strategies	Top-down
Reading Scores	Pearson Correlation	1	.395
	Sig. (1-tailed)		.014
	N	31	31
Top-down	Pearson Correlation	.395	1
	Sig. (1-tailed)	.014	
	N	31	31

*. Correlation is significant at the 0.05 level (1-tailed).

strategy use and their reading comprehension ability, which was statistically significant (r. = .395, n = 31, p. = .05). Hence, the null hypothesis is accepted.

The finding seems to suggest that higher reading comprehension ability is associated with more frequent use of the top-down strategy by the participants. This result is similar to those revealed in other studies in that highly proficient readers tend to use top-down strategies more frequently than readers with low proficiency (Geladari et al., 2010; Oranpattanachai, 2010; Prichard, 2014). The finding suggests that top-down strategies are predictors of reading comprehension ability, although there was a significantly low positive correlation between top-down strategy use and reading comprehension ability. The more the students apply top-down strategies, the better their ability to understand the text. One likely explanation may be that the participants with high reading proficiency in the current study had good knowledge of English, so their bottom-up process was more automated, and they did not need to pay much attention to linguistic knowledge. This could result in them using top-down strategies to enhance their reading comprehension.

Research Question 4: Is there a significant relationship between the student's reading ability and their bottom-up strategy use?

To answer research question 3.2, Pearson's correlation coefficient was applied to determine the relationship between the participants' bottom-up strategy use and their reading comprehension ability. As indicated in Table 6, there was no correlation between the participants' bottom-up strategy use and their reading comprehension ability (r. = .353, n = 31, p. = .071). Hence, the null hypothesis is accepted.

Table 6

Correlation between Bottom-Up Strategy Use and Reading Comprehension Performance

Variables		Overall Strategies	Top-down
Reading Scores	Pearson Correlation	1	.071
	Sig. (1-tailed)		.353
	N	31	31
Bottom-up	Pearson Correlation	.071	1
	Sig. (1-tailed)	.353	
	N	31	31

Although no other studies appear to have been carried out to find the correlation between bottom-up strategy use and reading comprehension ability, some works indicated that readers with low proficiency tend to use bottom-up strategies more frequently than top-down strategies when reading text (Geladari et al., 2010; Salaci and Akyel, 2002; Kem, 1989).

Research Question 5: What are the students' perceived reading self efficacy levels?

Descriptive statistics were used in response to this research question. Table 7 shows the mean and standard deviation of the participants' responses in relation to reading self-efficacy. As can be observed from Tables 7 and 8, the participants exhibited a moderate reading self-efficacy level (Mean = 2.65, SD = 1.44; M = 2.65. SD = 1.44).

Table 7

Descriptive Statistics of Perceived Reading Self-Efficacy

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Reading self-efficacy	10	2.45	2.87	2.65	1.44

Note: N = 10 items

Table 8

Five-Point Likert Scale Response Level

Level	Arithmetic Average
Low	2.4 or lower
Moderate	2.5 – 3.4
High	≤3.5 or higher

Source: Oxford & Burry-Stock (1995 as cited in Par, 2020, p. 228)

This finding is supported by the results revealed by Mohammed (2022) and Okyar (2021), indicating that the participants had a moderate level of reading self-efficacy.

Research Question 6: Is there a significant relationship between the student's reading comprehension ability and their perceived self-efficacy in reading?

To answer research question 5, Pearson's correlation coefficient was applied to determine the relationship between the participants' perceived self-efficacy in reading and reading comprehension ability. As presented in Table 9, a strong positive correlation existed between the participants' perceived self-efficacy in reading and their reading comprehension ability, which as expected, was statistically significant (r. = .845, n = 31, p. = .000). Hence, the null hypothesis is accepted.

Table 9

Correlation between Reading Self-Efficacy and Reading Comprehension Ability

		Reading Self-Efficacy	**Reading Scores**
RSE Correlation	Pearson	1	.845**
	Sig. (1-tailed)		.000
	N	31	31
Reading Scores	Pearson Correlation	.845**	1
	Sig. (1-tailed)	.000	
	N	31	31

**. Correlation is significant at the 0.01 level (1-tailed).

Note: RSE = Reading Self-Efficacy

This finding is consistent with those of all the previous studies reviewed earlier in that a significant positive correlation exists between reading self-efficacy beliefs and reading comprehension ability. (Boakye, 2015; Fitri et al., 2019; Mohammed, 2022; Naseri & Zaferanieh, 2012; Nonsawang, 2019; Shang, 2010; Shehzard et al., 2019, as cited in Okyar, 2021; Tobing, 2013; Urfalidadandi & Dadandi, 2022). The finding of this study suggests that reading self-efficacy is a very important contributory factor in reading comprehension and vice versa due to the significant strong correlation between reading self-efficacy and reading comprehension ability. The higher the reading self-efficacy of the participants, the greater their reading comprehension ability and vice versa.

Students with high reading self-efficacy tend to persist in reading and make a greater attempt to work out the meaning of the text when faced with reading difficulties. Whereas students with low reading self-efficacy try to avoid reading difficult text. Consequently, students with high reading self-efficacy acquire more vocabulary and grammar, helping them to gain greater reading comprehension ability than those with low reading self-efficacy.
When the students' reading comprehension ability increases, their reading self-efficacy also increases, and vice versa.

Conclusions and Pedagogical Implications

The findings of the present study indicate that the participants tend to exhibit poor reading comprehension ability due to the scores being below average and the existence of a significantly positive correlation between the participants' reading comprehension ability and their overall reading strategy use ($p \leq .05$). In addition, there is a significantly positive correlation between the participants' reading comprehension ability and the use of top-down strategies ($p \leq .05$). Furthermore, the participants' self-efficacy in reading is at a moderate level, and a significantly positive correlation exists between their reading comprehension ability and perceived reading self-efficacy ($p \leq .01$).

Four pedagogical implications arise from the findings of the present study. Firstly, the findings indicate a significantly positive correlation between the participants' use of reading strategy and their reading comprehension ability ($p \leq .05$). English instructors at the university where the present study was conducted should explicitly integrate reading strategy training into the syllabus. English instructors should train and demonstrate how to use various reading strategies to help learners improve their reading comprehension ability and reading self-efficacy because several studies show that they play an important role in increasing students' reading self-efficacy (Li et al., 2022; Mills et al., 2006; Mohammed, 2022; Naseri & Zaferanich, 2012; Okyar, 2021; Shang, 2010; Shehzad et al., 2019; Zare & Mobarakeh, 2012) and reading comprehension ability (Do & Phan, 2021; Li et al., 2022; Par, 2020; Rastegar et al., 2017; Sheorey & Mokhtari, 2001; Tobing, 2013; Vista, 2020). Apart from introducing reading strategies into the classroom, instructors should train students to become strategic readers. Students should be trained on the proper use of reading strategies. They should know when and how to use reading strategies successfully. Furthermore, reading textbooks should contain activities to help students practice a variety of reading strategies to ensure they have a sufficient repertoire for tackling reading difficulties and help students develop reader autonomy.

Secondly, since the findings reveal a significantly positive relationship between reading comprehension ability and top-down strategy use ($p \leq .05$), explicit reading strategy training should emphasize top-down reading strategies. English instructors are strongly recommended to use materials such as engineering text, science text, agricultural text, and so on to accommodate the students' various disciplines while allowing them to use their background knowledge or schema content to tackle reading difficulties, thereby enhancing their reading comprehension ability.

Thirdly, another factor that reading teachers should not ignore is the improvement of students' reading self-efficacy because this study reveals a

significantly strong positive correlation between the participants' reading self-efficacy and their reading comprehension ability. Teaching support helps students improve their reading self-efficacy. Teachers should encourage students by using affirmations like "You can do it" or "You are smart enough to understand this text." Moreover, teachers should praise the students when they gain higher reading comprehension scores. When giving praise to the students, teachers should compare their current reading scores with the previous ones rather than the performance between students. In addition to support from teachers, it is important that the reading text is not too easy or too difficult for students. If the text is too easy, the students are likely to find it boring and feel that the teachers doubt their reading ability. On the other hand, if the text is too difficult, it will undermine the students' reading self-efficacy.

Last but not least, in addition to intensive reading, English instructors should suggest to their students that they read extensively outside the classroom. Extensive reading helps students to become better readers because they will encounter new vocabulary and grammar in different contexts and have sufficient time to digest it, which is not always possible in a classroom environment. Therefore, the students' vocabulary and grammar knowledge will grow, contributing to the achievement of better English language proficiency and reading ability, thereby promoting students' reading self-efficacy (Tangkijmongkol & Wasanasomsithi, 2022).

Limitations of the Study

Since the participants of this study are Thai university students from only one university in Thailand, the results of the study are inadequate for generalizing to other universities. The second limitation is that other variables associated with reading comprehension ability, such as motivation, aptitude, vocabulary knowledge, grammar, content schemata, and so on, would add to the study outcome. Finally, since this study uses a questionnaire to collect data on reading strategy use, it is difficult to know if the students actually applied the reading strategies as reported. The use of triangulation with other qualitative instruments, such as interviews, would provide more reliable results.

Recommendations for Further Study

Given the limitations of this study, further research on the topic is recommended. Firstly, to better understand what hinders students' reading comprehension, adding other variables such as motivation, teachers' support, aptitude, vocabulary knowledge, grammar, background knowledge relating to

the reading text, and so on is recommended to investigate whether they are likely to contribute to the improvement of students' reading comprehension ability.

Secondly, future research studies may consider replicating the present study using the reading self-efficacy questionnaire developed by the researcher with a larger sample of engineering students from different universities, such as private universities. Their findings may be similar or different from the findings of the present study, which can shed more light on teaching English reading in the context of English as a second/foreign context.

Thirdly, the underlying problems associated with students' reading comprehension ability should be investigated in the context of school students since reading English as a foreign/second language is an essential skill that should be developed at a young age. By gaining insight into the reading processes of school students, teachers of English can find ways to help them improve their reading comprehension ability before they enter university.

Finally, a mixed-method study involving both qualitative and quantitative techniques would provide more reliable results. Think-aloud protocol, semi-structured interviews, and observation are suggested as qualitative components for future study.

Acknowledgements

I would like to thank all the participants taking the TOEIC Course at the College of Industrial Technology, King Mongkut's University of Technology North Bangkok, who participated in the present study voluntarily.

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