A Correlational Investigation into Sub-skills of Reading Comprehension: Evidence from Thai-READS

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Abstract
A standardized test of English reading comprehension is typically well-constructed to permit a reliable classification of different achievers e.g., high, moderate and low. The Thai-READS or Thai Reading Evaluation and Decoding System is one of the tools used to trace the EFL undergraduate students' reading comprehension abilities. The test system of the Thai-READS had been designed to show the abilities of students in reading comprehension with three sub-skills, namely, Literal, Reorganization, and Inferential. The sub-skills have been proved to have correlation with each other but lack of tangible evidence has shown. However, it also has a strength to illustrate students' abilities in each sub-skill with three levels of difficulty e.g., low, moderate, and high. The need to take a closer look at relationships in different levels of difficulty in each sub-skill is a missing gap the area of language assessment. With the functional availability in the Thai-READS, therefore, this study aims to investigate correlations of three levels of difficulty within each sub-skill. This research was conducted with 190 English-majored undergraduate students at one public Thailand university in Bangkok. The main research instrument is the Thai-READS which was adapted for cultural-bias reduction. The participants took the Thai-READS via online system. The Pearson correlation was used to analyse the data. The results revealed that there were significant correlations between the three sub-skills. The three levels in Inferential sub-skill showed significant correlations. However, the three levels in Literal and Reorganization sub-skills had significant and insignificant correlations.

Keywords: Thai Reading Comprehension Evaluation and Decoding System (Thai-READS), Reading Comprehension, Literal, Reorganization, Inferential

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Introduction

Reading comprehension is considered as the vital component of the reading process (Gilakjani & Ahmadi, 2011). Several studies support great attention to assessing reading comprehension of the English language learners. Duke and Pearson (2009) raise the importance of reading comprehension explaining that both academic and professional success of an individual's life commonly relate to reading comprehension skills. In the process of reading comprehension, a writer encodes thought to language and a reader decodes language to thought. A current view of reading process perceives reading comprehension as a special kind of reading process (Jang, Dunlop, Park, & Van Der Boom, 2015). Having known to complicated process of comprehension, some theories perceive a wide-angle view of reading comprehension in goal term, while others try to distinguish them into different levels of separable sub-skills. Therefore, to expand our understanding of the students' abilities in reading comprehension with three sub-skills, this study will provide a fresh window to measure the undergraduates' English reading comprehension ability using a Thai version of READS (Thai-READS). With the functional availability in the Thai-READS, it aims to investigate correlations of three levels of difficulty within each sub-skill namely, literal, reorganization and inferential.

The findings of this study could inform whether the development of the Thai-READS could illustrate students' abilities in each sub-skill with three levels of difficulty e.g., low, moderate, and high as well as determine the relationships in the three different levels of difficulty in each sub-skill of reading comprehension.
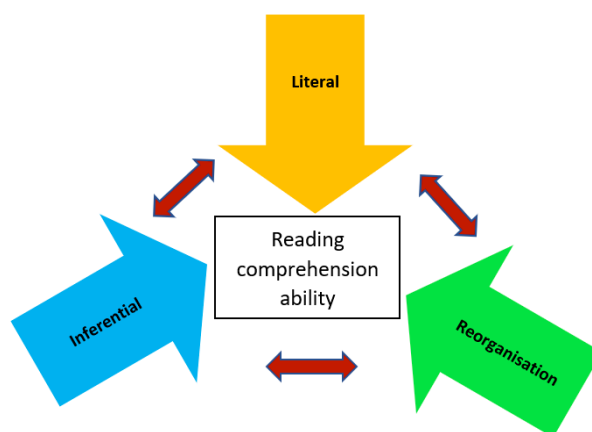

Figure 1: Correlations between Literal, Reorganization, and Inferential sub-skills in Reading Comprehension

Sub-skills of Reading Comprehension

The contribution in Benjamin Bloom and his associates' work in the Blooms Taxonomy, Barrett developed a taxonomy to analyze the cognitive and affective domains of reading comprehension. In terms of reading comprehension, the taxonomy developed by Barrett's (1968) assists EFL students to comprehend the text. According to Barrett (1968), five types of skill categories include (i) Literal, (ii) Reorganization, (iii) Inferential, (iv) Evaluation, and (v) Appreciation. They are very important for students to understand each genre of text. With regard to the objectives

of the study, however, the present study focuses on three sub-skills of reading comprehension which are (i) Literal; which concentrates on concepts and information unambiguously stated in the text, (ii) Reorganization; in which the reader is required to be able to evaluate, synthesize and establish concepts or information that are explicitly indicated in the text, and (iii) Inferential; in which the reader's ability to predict outcomes and interpret figurative language is also required at this level (Mohamed, Lin, & Ismail, 2010).

Research Objectives

The present study aims at determining correlations between Literal, Reorganization and Inferential sub-skills in reading comprehension as well as correlations between high, moderate and low levels in each sub-skill. This study is conducted with the main aim to provide answers for the following research questions.

Research Questions

Two main research questions (RQs) in this study include:
RQ1: Is there a statistically significant correlation between Literal, Reorganization and Inferential sub- skills in reading comprehension?
RQ2: Is there a statistically significant correlation between high, moderate and low levels in each sub- skill of reading comprehension?

Hypotheses

Null hypotheses (H_0) for the two corresponding research questions are formulated as follows:
$H_0 1$: There is no statistically significant correlation between Literal, Reorganization and Inferential sub-skills in reading comprehension.
$H_0 2$: There is no statistically significant correlation between high, moderate and low levels in each sub- skill of reading comprehension.

Research Methodology

The present study used quantitative research design to collect the participants' score in reading comprehension assessed by the Thai-READS. Descriptive statistics was used to present the participants' demographic information (i.e., gender, years of study, and age) while inferential statistics using the Pearson Correlation was used for the main data analysis to answer the two research questions and to decide whether reject or fail to reject the null hypotheses. The significant levels in the analysis of the Pearson Correlation were set at 0.05 and 0.01 respectively. Directions of correlation of two variables can be positive and negative with different levels of strength. Following Phakiti's (2014) criterion, there are seven levels of correlational analysis; 1.00-0.90 (Very Strong), 0.89-0.80 (Strong), 0.79-0.70 (Fairly Strong), 0.69-0.50 (Moderate), 0.49-0.30 (Fairly Weak), 0.29-0.20 (Weak), and 0.19-0.10 (Very Weak).

Participants

The participants were 190 English-majored undergraduate students in the Faculty of Liberal Arts at one public university in Bangkok, Thailand whom were chosen by

purposive sampling. There were 44 males (23.20%) and 146 females (76.80%) participating in the present study. They were made up of 58 first-year students (30.50%), 56 second-year students (29.50%), 58 third-year students (30.50%) as well as 18 fourth-year students (9.50%). Their average age at the period of data collection was 20 years old.

Research Instrument

The Thai-READS adapted by Khemanuwong, Mohamed, and Ismail (2018) was used to determine the Thai undergraduates' reading comprehension ability. It can be explained with three components of the Thai-READS– the encoder or the test instrument, the reading matrix and the decoder or the performance standard. The encoder comprises 60 multiple-choice questions to measure the test-takers' reading comprehension proficiency. The decoder determines the performance of the test-takers based on their given answers as shown in Figure 2.
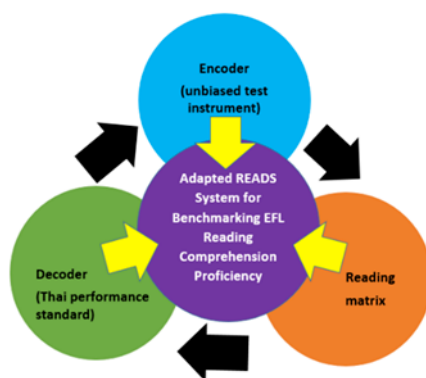

Figure 2: Thai Reading Evaluation and Decoding System (Thai-READS)

According to Boopathiraj and Chellamani (2013), questions in a test should indicate a level of difficulty. In the Thai-READS test, 60 questions are distributed proportionately with three difficulty levels, namely, easy (25%), average (50%) and difficult (25%) (Mok, 2000), as well as with three sub-skills, that is, literal, reorganization, and inferential. Moreover, they are incorporated in the Malaysian public examination to fulfill the requirements of reading comprehension section and are also based on Barrett's taxonomy of reading comprehension (Lim, Eng, & Mohamed, 2014). The study of Hui, Saeed, and Khemanuwong (2020) which used the Thai-READS to examine 751 Thai engineering freshmen suggested that the Thai-READS is applicable to assess university students' reading performance at any levels.

In line with the reading matrix, this component acts as a cross-reference for the analysis of the test-takers' reading comprehension ability in which the test-takers would be classified as "Below Standard" or "Academic Warning". The Thai-READS also could illustrate students' abilities in each sub-skill with three levels of difficulty (e.g., low, moderate, and high). By administering the test to the EFL students, the analysis of the reading comprehension ability could provide insights on which specific sub-skills of reading comprehension that the students would need to improve (Khemanuwong, Hui, Mohamed, Ismail, Saeed, & Uampittaya, 2020).

Data Collection Procedure

The onset of data collection, the researchers requested an official permission from the university and the participants' consent for their participation. The steps taken to ensure an ethical consideration in conducting this research. Before the participants took the test, the researchers conveyed a brief orientation session presenting the main purpose of the research. The participants were informed that their information was kept confidential and anonymous and used for research purpose. Anonymity was used in test results of the participants. During the test, the procedures in using the Thai-READS followed a guideline of time allocation in Mohamed et al.'s (2010) study which provided 70 minutes for test-takers to complete the test. One of different sets of the test was assigned randomly to each participant.

Research Findings

The first research question investigated whether there was a statistically significant correlation between the three sub-skills in reading comprehension. The results in Table 1 show the three sub-skills were significantly correlated with each other in positive directions. Correlations in literal sub-skill with reorganization sub-skill (r=0.251) and inferential sub-skills were r=0.251 (weak level) and r=0.301 (fairly weak level), p<0.01. Moreover, reorganization sub-skill showed moderate correlation with inferential sub-skill, r=0.504 (moderate level), p<0.01. Hence, the first null hypothesis was rejected.

Table 1: *Results of Correlations between the Three Sub-skills in the Thai-READS*

Sub-skills		Literal	Reorganization	Inferential
Literal	Pearson Correlation	1	0.251**	0.301**
	Sig. (2-tailed)		0.000	0.000
Reorganization	Pearson Correlation	0.251**	1	0.504**
	Sig. (2-tailed)	0.000		0.000
Inferential	Pearson Correlation	0.301**	0.504**	1
	Sig. (2-tailed)	0.000	0.000	

Note. ** Correlation is significant at the 0.01 level (2-tailed).

The second research question aimed to find a significant correlation in three levels in each sub-skill of reading comprehension. As shown in Table 2, the results indicate that there was no significant correlation in the three levels in Literal sub-skills. The findings showed that moderate and low levels in Literal sub-skill was significantly correlated in a positive direction, r=0.156 (very weak level), p<0.05. On the other hand, the results indicate that high and moderate levels (r=0.062), high and low levels (r=−0.005) in Literal sub-skill were not significantly correlated with each other, p>0.05.

Table 2: Results of Correlations between the Three Levels in Literal Sub-skill

Levels		High	Moderate	Low
High	Pearson Correlation	1	0.062	-0.005
	Sig. (2-tailed)		0.394	0.950
Moderate	Pearson Correlation	0.062	1	0.156*
	Sig. (2-tailed)	0.394		0.032
Low	Pearson Correlation	-0.005	0.156*	1
	Sig. (2-tailed)	0.950	0.032	

Note. ** Correlation is significant at the 0.05 level (2-tailed).

Furthermore, the results in Table 3 reveal that high and moderate levels (r=0.298), moderate and low levels (r=0.238) in Reorganization sub-skill were significantly correlated in a positive weak direction, $p<0.01$. In contrast, low and high levels (r=0.015) were not significantly correlated in Reorganization sub-skill, $p>0.01$.

Table 3: *Results of Correlations between the Three Levels in Reorganization Sub-skill*

Levels		High	Moderate	Low
High	Pearson Correlation	1	0.298**	0.015
	Sig. (2-tailed)		0.000	0.840
Moderate	Pearson Correlation	0.298**	1	0.238**
	Sig. (2-tailed)	0.000		0.001
Low	Pearson Correlation	0.015	0.238**	1
	Sig. (2-tailed)	0.840	0.001	

Note. ** Correlation is significant at the 0.01 level (2-tailed).

In Inferential sub-skill, the results in Table 4 show the three different levels were significantly correlated with each other in a positive direction; high and moderate (r=0.324; fairly weak level), low and high levels (r=0.295; weak level) as well as low and moderate levels (r=0.342; fairly weak level), $p<0.01$. To sum up the findings for the second research question, therefore, the second null hypothesis was also rejected.

Table 4: *Results of Correlations between the Three Levels in Inferential Sub-skill*

Levels		High	Moderate	Low
High	Pearson Correlation	1	0.324**	0.295**
	Sig. (2-tailed)		0.000	0.000
Moderate	Pearson Correlation	0.324**	1	0.342**
	Sig. (2-tailed)	0.000		0.000
Low	Pearson Correlation	0.295**	0.324**	1
	Sig. (2-tailed)	0.000	0.000	

Note. ** Correlation is significant at the 0.01 level (2-tailed).

Conclusion

The key findings in the present study imply the conclusion which is can be separated into two main viewpoints based on the two research questions. Firstly, three sub-skills of reading comprehension among the participants' scores were significantly correlated. Secondly, the three levels in each sub-skill were significantly and insignificantly correlated. That can infer that the participants who was able to give correct answer for high difficulty level items might not give the correct answers for moderate or low difficulty level items. Although this study was subject to the English-major participants, the findings of the study have implications for both assessing and diagnosing undergraduates' English reading comprehension abilities. The findings are useful not only undergraduates themselves to self-perceive their abilities but also lecturers to understand their learners' performance in English reading comprehension. This is hoped to bring up more effective teaching and learning in English language classroom in Thai higher education at university level. Different teaching strategies should be promoted to improve sub-skills of reading comprehension with different levels of difficulty. It is cautious to make a generalization of the findings to other learning contexts with general English language learners since the number of the participants in this study was small and they studied in English major. Thus, their familiarity with the exposure of English usage may affect their performance in reading comprehension.

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