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ผลของการสอนโดยใช้กลวิธีการอ่านแบบร่วมมือร่วมกับอินโฟกราฟิก
ที่มีต่อความเข้าใจในการอ่านของนักเรียน

THE EFFECTS OF COLLABORATIVE READING INSTRUCTION USING INFOGRAPHICS ON
STUDENTS' READING COMPREHENSION

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บทคัดย่อ

งานวิจัยชิ้นนี้เป็นงานวิจัยประเภทกึ่งทดลอง มีวัตถุประสงค์เพื่อ 1) ศึกษาผลของการสอนโดยใช้กลวิธีการอ่านแบบร่วมมือร่วมกับอินโฟกราฟิกที่มีต่อความเข้าใจของนักเรียน 2) เพื่อศึกษาคุณภาพของผลงานอินโฟกราฟิกของนักเรียนที่สร้างขึ้นเพื่อนำเสนอข้อมูลหลังการอ่าน กลุ่มตัวอย่างของงานวิจัยประกอบด้วยนักเรียนระดับชั้นมัธยมศึกษาปีที่ 5 ที่เรียนวิชาภาษาอังกฤษพื้นฐาน ประจำปีการศึกษา 2561 จากโรงเรียนรัฐบาลแห่งหนึ่งในกรุงเทพมหานคร จำนวน 18 คน โดยเข้าร่วมการวิจัยในครั้งนี้ด้วยความสมัครใจ (Intact group of volunteers) เครื่องมือที่ใช้ในการวิจัย ได้แก่ 1) ข้อสอบประเมินทักษะการอ่านก่อนและหลังเรียน 2) แผนการจัดการเรียนการสอน จำนวน 3 แผนการสอน 3) เกณฑ์การให้คะแนนของอินโฟกราฟิก (Infographic scoring rubrics) สถิติที่ใช้ในการวิเคราะห์ข้อมูลประกอบด้วย การทดสอบค่าที (Paired sample t-test), ค่าเฉลี่ย, ส่วนเบี่ยงเบนมาตรฐาน และ การวิเคราะห์ความเที่ยงระหว่างผู้ประเมิน (Inter-rater reliability)

ผลการวิจัยพบว่า 1) นักเรียนมีผลคะแนนหลังเรียนมากกว่าผลคะแนนก่อนเรียนหลังจากการสอนโดยใช้กลวิธีการอ่านแบบร่วมมือร่วมกับอินโฟกราฟิก อย่างมีนัยยะสำคัญทางสถิติที่ .05 2) ค่าเฉลี่ยผลงานอินโฟกราฟิกของนักเรียนอยู่ในระดับดี จึงสามารถสรุปผลการวิจัยได้ว่านักเรียนมีความเข้าใจในการอ่านดีขึ้นหลังการทดลอง และสามารถนำเสนอข้อมูลหลังการอ่านผ่านอินโฟกราฟิกได้อย่างมีประสิทธิภาพ

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Abstract

This study is a quasi-experimental research. The purposes of the study were to 1) investigate the effects of collaborative reading instruction using infographics on students' comprehension, and 2) to evaluate the quality of infographics created by students after reading the passages. The 18 participants of this research, grade 11 students who were enrolled in fundamental English at one public school in Bangkok in the academic year of 2018, were from an intact group of volunteers. The research instruments consisted of 1) reading comprehension test (pre-test and post-test), 2) three lesson plans, and 3) infographics scoring rubrics. The data were analyzed using paired sample t-test, means, standard deviation and inter-rater reliability analysis.

The results showed that 1) students' post-test scores after receiving collaborative reading instruction using infographics were higher than the pre-test scores at the significant level of .05, and 2) the overall quality of students' infographics was evaluated at a "good" level. It can be concluded that students' comprehension was improved by the experiment and the information presented through the infographics creation was effective.

คำสำคัญ: การอ่านแบบร่วมมือ / อินโฟกราฟิก / ความเข้าใจในการอ่าน

KEYWORDS: COLLABORATIVE READING / INFOGRAPHICS / READING COMPREHENSION

Introduction

Recently, new methods of communication have increasingly been developed to convey messages among people in the community. Languages are used as the primary tool for learning and communication among people around the world. Since English is considered to be the primary international language, it is undeniable that everyone has to learn English in order to communicate and search for information in this era of increasing globalization. English has become a significant tool for international communication in a variety of fields such as transportation, commerce, banking, tourism, entertainment, technology, diplomacy, research, and publishing, as well as its usefulness for information sharing on the Internet (Kachru, 2010; McKay, 2012 as cited in Brown & Lee, 2015). As one of the core communication skills, reading plays an important role in obtaining knowledge and new information available from various sources. In addition, reading is one of the major skills that learners use to acquire knowledge from English written text (Grabe, 1991). Reading seems to be difficult for students in countries where English is considered to be a foreign language. In Thailand, particularly, English is used only in some specific situations, such as in the classroom or at professional events (Wannathong, 2016). Hence, Thai students rarely need to read English outside the classroom.

The Ordinary National Educational Test (O-NET) is a standardized test taken by all students in Thailand. In analyzing the O-NET paper test, reading comprehension appears to be an essential skill because there are about 30 reading items which is considered as a major part on the test. However, the average English score of Grade 12 students in academic years

2014 – 2017 was below than 50 percent. The latest O-NET score announcement of academic year 2018 results for 373,148 test takers shows that the average score in the English subject was 31.51, which, obviously, was also less than 50 percent (“O-NET Statistic”, n.d.). It can be seen that reading comprehension is a significant skill that students need to develop, in part, because it comprises the majority part of the key national standardized test.

Concerning the study of grade 11 students at one public school in Bangkok, the achievement of students in the English subject was, prior to the study, lower than the school’s target, which is that at least 65 percent of students are able to achieve a grade of three or higher. Furthermore, the school administration’s goal is that the mean score on the O-NET national test in English subject earned by its students be higher than the mean score at the national level. From the school’s perspective, it is the duty of its teachers to develop students’ English abilities through instructions in the classroom in order to achieve these aims. Based on classroom observations, most of the students in the study have previously faced difficulties in reading. For example, they do not understand the message that a given writer is trying to convey in a story or the meaning of vocabulary used in the passage. This may be because of the students’ lack of background knowledge, the use of reading strategies that do not link with the story, the teacher’s instructions, the instructional media, or a classroom atmosphere which does not match students’ preferences.

Moreover, in previous studies, researchers have tried to identify the best reading strategies for improving students’ reading comprehension. Many of them applied collaborative reading strategies, such as Collaborative Strategic Reading (CSR) into their research (Gani, Yusuf, & Susiani, 2016; Nosratinia & Fateh, 2017; Rattanaseng, 2011; Vaughn & Klingner, 1999). The results illustrated that Collaborative Strategic Reading (CSR) positively affected students’ reading comprehension. The findings indicated that CSR can be implemented to enhance reading comprehension among various age groups and levels of proficiency. Furthermore, the primary purpose of collaborative reading is to engage students in co-constructing meaning from texts through the use of small group discussion. It has been concluded that this instruction encourages interactive learning, which creates a positive learning atmosphere and causes students to enjoy and engage in their study of English reading. For example, one research study about the Effectiveness of Collaborative Reading in Tertiary Level EFL Teaching in Iran revealed that the reading comprehension of low level reading proficiency students was enhanced through the use of collaborative reading (Momtaz, 2012).

Integration of visual aids and similar strategies, however, were rarely found in reading comprehension research studies; it seems that it would be better to make use of infographics as visual aids to foster students’ reading comprehension. An infographic is defined as a graphic design that provides a comprehensive description of complex information by combining data visualizations, illustrations, text, and images (Krum, 2014). In addition, infographics provide new

ways of engaging a logical sequence of the information in order to present the content in an interesting way. Krauss (2012) suggested that infographics can present data and ideas visually through pictures. Many parts of brain are then engaged to investigate the problem from various angles. Furthermore, there has been some research that integrated infographics into the instructions. For instance, Hsiao, Laquatra, Johnson, & Smolic (2019) studied the use of infographics to teach Evidence Analysis Process to senior undergraduate students. The results revealed that the students accepted infographics as a method of learning, and that they found it more enjoyable to create than a traditional research poster. Similar to Fadzil (2018), the study found that students agreed with the idea that their understanding of scientific concepts can easily be enhanced through the use of infographics, and the process of creating infographics was *“especially great for displaying unexciting or complex data in a way that is more visually engaging and easier to understand”*. Ozdamli, Kocakoyun, Sain, & Akdag (2016) also noted that students were better able to create schema in mind and present complex data quickly and clearly in a visual presentation after learning through the use of infographics.

In an attempt to improve the students’ reading comprehension, this research is designed to explore the effects of collaborative reading comprehension using infographics on students’ reading comprehension, while not only developing students’ comprehension, but also encouraging students to be more engaged in the lesson. Moreover, it is believed that integration of infographics and collaborative reading instruction in the classroom can enhance 21st century teaching and learning. Therefore, applying collaborative reading instruction using infographics in the classroom in a way that suits students’ learning styles and preferences may increase their reading ability and enhance their reading comprehension.

Research Objectives

1. To investigate the effects of collaborative reading instruction using infographics on students’ reading comprehension.
2. To investigate the quality of infographics created by students after reading a given passage.

Methodology

Research Framework

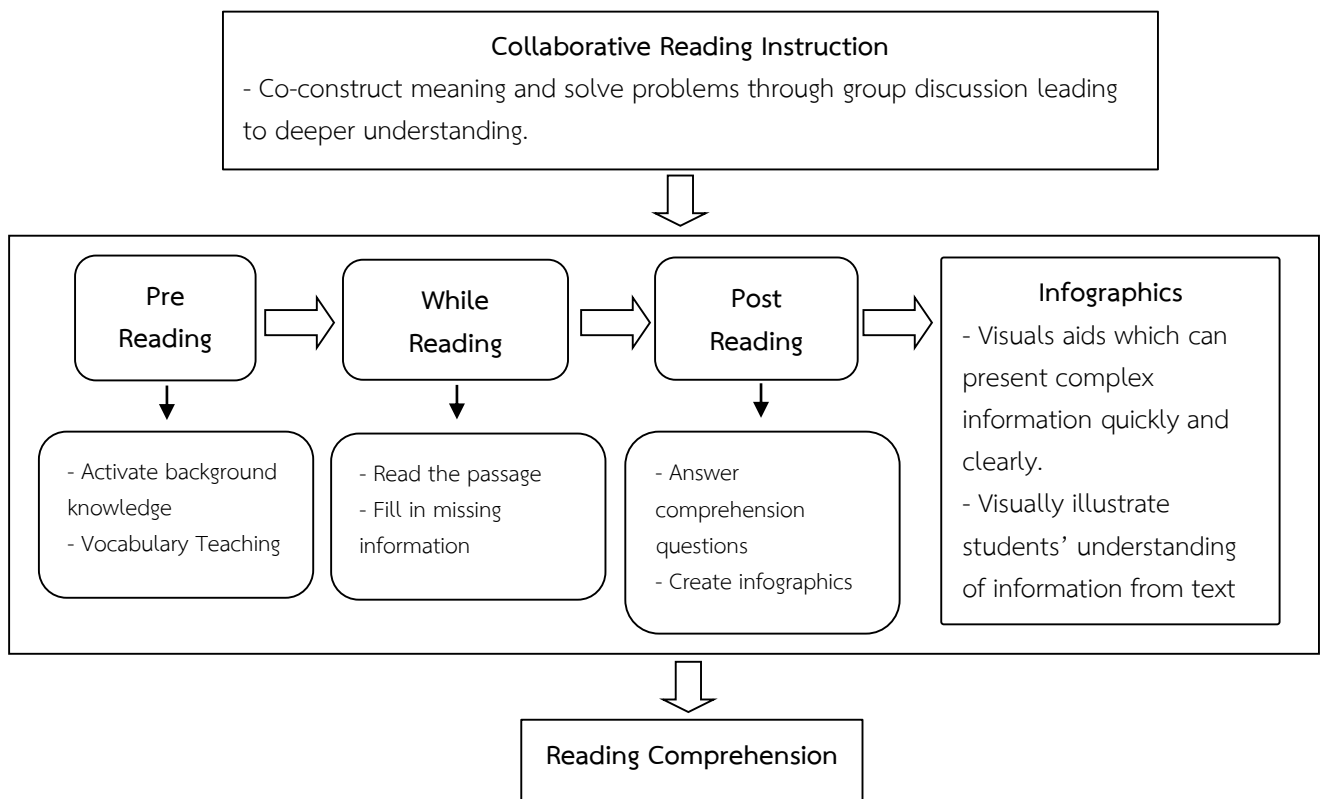


Figure 1. Research framework for collaborative reading instruction using infographics

Participants

The 18 participants of this study were from an intact group of volunteers taken from a pool of grade 11 students enrolled in fundamental English at one public school in Bangkok in the 2018 academic year.

Instruments

To achieve the objectives of this research, three instruments, including Reading Comprehension Test, Lesson Plans and Infographics Scoring Rubrics, were used.

1. Reading comprehension test (Pre-test and Post-test)

The reading comprehension test was adopted from Mega Goal 5 O-NET Reading Comprehension Test, developed by a reliable publisher, and guaranteed by the Ministry of Education of Thailand. The test was used to assess the reading comprehension of participating students before and after utilizing collaborative reading instruction using infographics. The test consisted of 20 multiple choices questions with a total score of 20 points. The students were given 50 minutes to complete the test.

2. Lesson plan

Three lesson plans were developed to teach students. The students attended six lessons, one time per week for six weeks, 100 minutes per lesson plan, and 50 minutes a week. The lesson plans were validated by 3 experts from the field of teaching English as a Foreign Language. The results showed that all of the items were rated at 0.83, which is higher than 0.5 of an index of item objective congruence (IOC), meaning that they were related to the research objectives. The procedures were as follows.

In the pre-reading stage, in order to activate their background knowledge, the students were asked to work in a group and brainstorm about the topic presented in the text using these questions:

- 1) What do you already know about the topic?
- 2) What are you going to read?

Then, the teacher prepared the students, introducing the necessary vocabulary by showing the words, example sentences and related pictures. After completing the vocabulary introduction, student had to match the words with their correct definitions.

For the “while reading” stage, students read the passage twice and discussed it as a group. They were encouraged to share ideas, and to complete the given worksheet after finishing the reading.

The second period of the lesson plan focused on post-reading stage. Students were asked to work in the same group to play a game, *Kahoot!*, as part of the lesson. The game consisted of questions that reviewed the passage they had read during the last period. After reviewing the lesson, each group was assigned to create an infographic to conceptualize ideas from the passage.

3. Infographic scoring rubrics

The scoring rubrics were created to assess the quality of students’ infographics. The criteria included on the rubrics are content, focus, visual appeal, information organization and grammar. They were validated by 3 experts from the field of teaching English as a Foreign Language. The results showed that all of the items were rated at 1.00 which was higher than 0.5 of an index of item objective congruence (IOC), meaning that they were related with the research objectives.

Data collection

The data were collected for eight weeks from March to April, 2019. The procedures were as follows:

1. The 18 participants were each asked to sign a consent form to participate in this research study, and then took the pre-test a week before starting the first lesson. They had to choose the correct answer after they finished reading each passage.

2. After conducting the pre-test, the researcher utilized collaborative reading instruction using infographics with the participants over six weeks, once a week, 50 minutes per session.

3. After all the lessons were completed, a post-test was given to the same participants to investigate the results of collaborative reading instruction using infographics with regard to reading comprehension.

Data analysis

This study was based on quasi-experimental research. Scores from both pre-test and post-test were computed to find descriptive statistics such as means and standard deviations of the collected data. Moreover, the mean scores of both pre-test and post-test were used to compute the paired sample t-test in SPSS, at a significance level of .05. Although this study contained a small group of 18 participants, the t- test was accepted for analysis of a small sample group of less than 30 participants where the population variance is not identified (Tangdhanakanond, 2012). Furthermore, the students' infographics were evaluated by two raters using the Infographics Scoring Rubrics. The scores from the Infographics Scoring Rubrics were also calculated to find the means and standard deviations to examine the quality of students' infographics as they relate to reading comprehension. Furthermore, inter-rater reliability analysis was adopted to ensure the reliability of the raters by using Pearson Correlation Coefficient to find the correlation between the raters.

Results

The findings of this research are presented, based on the research questions, as follows:

Research Question 1: To what extent does collaborative reading instruction using infographics affect students' reading comprehension?

Paired-sample t-testing was employed to investigate whether there was significant difference between pre-test and post-test scores.

Table 1 The comparison of pre and post-test of the participants, analyzed by a Paired Sample t-test

	Mean (M)	Min	Max	SD	t	Sig (2- tailed)
Pre-Test	8.50	6	10	1.10	16.429	.000*
Post-Test	14.89	13	17	1.57		

Note. $p < .05$

After implementing the collaborative reading instruction using infographics, students' mean score of the post-test ($M = 14.89$) was higher than the mean score of the pre-test ($M = 8.50$). According to the table above, the lowest pre-test score was 6 and the highest was

10, whereas the lowest post-test score was 13 and the highest was 17. The mean difference was 6.39. These results show that there was a significant difference between the pre-test and post-test mean scores, at the significance level of .05. Thus, it can be inferred that the students' reading comprehension was improved after implementing collaborative reading instruction using infographics.

Research Question 2: What is the quality of infographics created by students after reading the passage?

Descriptive statistics were used to compute the mean scores and standard deviations of the students' infographics scores to investigate how well they were able to perform after participating in collaborative reading instruction using infographics.

Table 2 Means and standard deviations of the students' infographics based on each criterion of infographics scoring rubrics.

	Mean (<i>M</i>)	Min	Max	<i>SD</i>
Content	3.50	3	4	0.52
Focus	3.00	2	4	0.43
Information Organization	3.17	2	4	0.58
Visual Appeal	3.00	2	4	0.43
Grammar	2.68	2	4	0.78
Total	3.07			

Note. The infographics scoring rubrics overall evaluation is as follows:

1 = need improvement, 2 = Fair, 3 = good, 4 = Excellent.

According to the table above, the overall quality of students' infographics was evaluated at a "good" level, with a grand total score mean of 3.07. The Content criterion received the highest mean score of 3.50, indicating that students were able to present the detail and information of the story they had read accurately through the infographics. With respect to the Focus criterion, students showed that they could identify the appropriate main idea of the topic and use illustrations that complemented the purpose of the visual aid, with a mean score of 3.00. Moreover, the Information Organization criterion revealed that students were able to organize the information systematically to support the readers' comprehension of the main message, with an average score of 3.17. Furthermore, the Visual Appeal criterion, with a mean of 3.00, showed that students used suitable font and color choices that enhanced the visibility of the infographics and made the text readable. On the contrary, the Grammar criterion had the lowest mean score of 2.68, revealing that there were many errors in spelling and grammar in the students' infographics.

Table 3 Inter-rater reliability based on Pearson Correlation Coefficient.

	Pearson Correlation Coefficient
Rater 1	.709
Rater 2	

In order to ensure the reliability of the raters, inter-rater reliability was determined in this study. The Pearson Correlation Coefficient was employed to find the correlation between the two raters. The result was a high correlation level of 0.709, meaning that the raters evaluated students' infographic almost at the same level. It can be concluded that the scores given by the two raters are reliable.

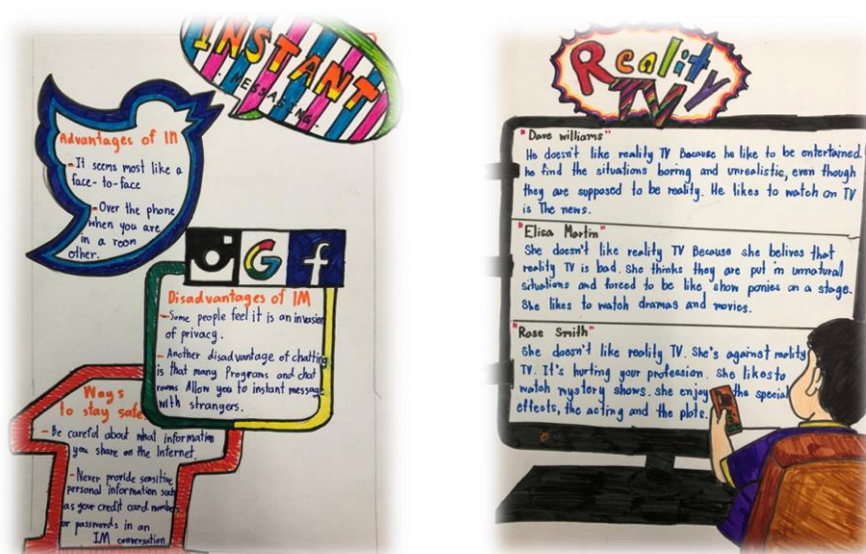


Figure 2. Examples of infographics created by students to illustrate reading comprehension

Discussion

This research aimed to study whether collaborative reading instruction using infographics can enhance students' reading comprehension, and explored how well students could conceptualize ideas through infographics after reading. After six weeks of experiment, the results revealed that collaborative reading instruction of grade 11 students at one public school in Bangkok using infographics had positive effects on reading comprehension. Moreover, the findings were able to clearly answer the research questions.

For the first research question, the results indicated that students' reading comprehension was improved after the experiment. The post-test mean score of reading comprehension test was higher the pre-test mean score at the .05 significant level, meaning that students demonstrated improved reading comprehension.

Regarding the use of collaborative reading instruction, students were encouraged to work together in groups to solve problems they faced. Acharya & Sinha (2018) suggested that

collaborative learning could lead students to see other opinions that vary from their own. Furthermore, students from different background knowledge levels could learn from each other while doing the task. Moreover, these students also had a chance to exchange information after reading the passages, defend their ideas, and co-construct meaning from the texts through the group discussion, with the result that they had a deeper understanding of the reading passage. Thus, collaborative reading instruction not only enhanced students' reading comprehension, but also engaged students more fully in the lesson.

In addition, infographics help students effectively improve their reading comprehension. This is because they have to conceptualize the main idea and the details of the text through the process of creating the infographics. In other words, it is necessary for the students to analyze the information and discuss it in a group to find the agreement about what should be presented in their work. In order to create effective infographics to illustrate their understanding, students must also focus on the design and appropriate illustrations used in their work in order to enhance the clarity and usefulness of the infographics. Moreover, various skills were developed through the creation of the infographics, such as information analysis, summarizing skills, higher thinking skills, creative thinking skills and collaborative learning. This finding is congruent with various studies that have reported the positive effects of encouraging students to create infographics in learning (Damyanov & Tsankov, 2018; Dahmash, Al-Hamid, & Alrajhi, 2017; Davidson, 2014; Hsiao et al., 2019).

Based on the second question, infographics scoring rubrics were used to evaluate the quality of students' infographics in relation to the students' reading comprehension. The results showed that the average score of students' infographics was 3.07, meaning that their infographics were rated at a "good" level. It can be concluded that students comprehended the story quite well because they were able to identify the main idea of the passages and conceptualize, through the creation of infographics, the essential details that the writers tried to convey. Moreover, the average scores of the content, information organization, focus and visual appeal criteria were presented, demonstrating that students were able to create effective infographics to show their comprehension after reading. However, students had some issues in spelling and grammar accuracy, based on the average score of the grammar criterion on scoring rubrics, which was quite low.

Students got the highest score in the content criterion. It can be assumed that they were able to illustrate their comprehension through the infographics quite well because they were able to create infographics with accurate information and details that effectively supported the main idea of the story. Similar to the criteria of information organization, students organized the information presented on the infographics systematically, and in a way that demonstrated comprehension of the main message. In addition, students wisely used appropriate illustrations, as well as choosing fonts and colors that enhanced the visual appeal

of the infographics. Based on the Grammar criterion, that received the lowest score on scoring rubrics, it can be inferred that students had problems with grammatical accuracy, especially with regard to spelling and tenses used to deliver the messages in the infographics. The result in inaccurate grammar and spelling mistakes might be from the causes of time constant and student's language proficiency.

Recommendation for Future Research

With regard to the findings from this study, future research should explore students' opinions through the use of interviews to acquire more in-depth information after the implementation of collaborative reading instruction using infographics. Furthermore, the infographics can be created by using free online websites which provide various templates, symbols and illustrations for the users, which might be more comfortable for students who are not keen on drawing. In addition, future studies could be conducted based on students' proficiency levels -- either high or low -- to investigate the effects of collaborative reading instruction using infographics on reading comprehension of students with different levels of proficiency. In this current study, there was a time limitation. It would be better for future research conduct the experiment for a longer period of time.

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