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The Development of a Reading Comprehension Model by Using Mind Mapping with "Edmodo" Program for First-Year English Majors of URU

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Abstract
The research objectives were to: 1) study learners' needs, as well as content and environment affecting the model; 2) develop and test efficiency of the model based on 75/75 standard criterion; 3) compare students' English reading comprehension ability before and after using the model, including investigate into an effect size; 4) compare students' mind map writing abilities before and after using the model and its effect size; and 5) investigate the students' opinions on the model. The sample consisted of 30 first-year English majors, Faculty of Education, Uttaradit Rajabhat University. The research instruments using were: 1) pre and post-tests on reading comprehension and mind mapping abilities, 2) 10 units of reading comprehension lessons, and 3) questionnaires to acquire students' opinions. The obtained scores from the pre-tests and post-tests were compared using paired sample t-test. Cohen's effect size was used to determine the value of the effect size. The questionnaire investigating students' opinions was then distributed to sample groups. Descriptive statistics were employed to analyze the data derived from five-point Likert scale items in the questionnaires. The results revealed that: 1) the model was efficient at 78.40/78.33; 2) the students' English reading comprehension ability was significantly higher at .05 level with the effect sizes level of 2.52; 3) the students' mind map writing ability was significantly higher at .05 level with the effect sizes level of 1.74; and 4) the students' opinions toward the model were rated high ($\bar{x}$ =4.45; S.D.=0.14).
Keywords: *Reading Comprehension, Mind Mapping Technique, "Edmodo" Program*

1. Introduction

Reading comprehension is one of the most important life skills. Therefore, reading comprehension teaching techniques have been continuously developed. Most teaching techniques and strategies encourage students or readers to understand content by focusing on metacognitive reading skills (Weaver, 2002: 235), emphasizing learner's background knowledge. Metacognitive reading skill is composed of activation of background knowledge, hypothesis, questioning, analysis, and evaluation, or picture interpretation to grasp the main idea. Such a skill can be integrated with various strategies. It was also said that the process of systematically linking background knowledge is the first subskill of reading comprehension. Teachers can apply the skill in their teaching and learning techniques by using mind mapping to be more effective. Mohammad's (2017: 36) research work on the effect of mind mapping to students' comprehension shows that the use of mind mapping techniques--linking individual ideas with certain steps--can increase creativity and make note-taking easier. In the same light, Jonassen (1993: 65) presented that mind-mapping or conceptualization techniques, developed by Novak based on Ausubel, help learners to develop the following systematic learning. 1) Brainstorm ideas or knowledge. 2) Design conceptual layout according to the learner's ability. 3) Link ideas and contents that are formatted and customized. 4) Connect ideas and integrate various content with previous knowledge. 5) Analyze and understand the content as well as edit the content from the chart that one does not understand.

Learning in the 21st century is prone to online learning. Kandappan, Jaykumar, and Leena (2014: 421) studied students' behavior using Edmodo Program as a learning source. The results of the study showed that using Edmodo can help students obtain more useful information through discussing, inquiring, and transferring information. Therefore, more learned data leads to the synthesis of information that the learners received. With such a technique, learners can enjoy learning through online social systems and creating online social relationships at the same time. This fact can inspire teachers to apply Edmodo to make their teaching effective in thier language classes.

For this reason, the researcher is interested in conducting research on the development of a reading comprehension model by using mind mapping technique with "Edmodo" program, which emphasizes on social networks, including learners' reading achievement, and students' opinions on the model.

2. Research objectives

The research objectives were to: 1) study the learners' needs as well as content and environment that affect the model; 2) develop and test the efficiency of the model based on the 75/75 standard criterion; 3) compare students' English reading comprehension ability before and after using the model, including investigating into an effect size; 4) compare students' mind map writing abilities before and after using the model and its effect size; and 5) investigate the students' opinions on the 'Reading Comprehension Learning Model'.

3. Research Methodology

This part presents the research population and sample, research instrument, data collection, and data analysis as follows.

3.1 Research population and sample

3.1.1 Research population

The population consist of 50 first-year English majors from section one and two, Faculty of Education, Uttaradit Rajabhat University.

3.1.2 Research sample

The research sample was obtained using purposive selection in three different phases according to the following details:

3.1.2.1 Needs analysis includes thirteen English subject students (from group 1) using purposive sampling.

3.1.2.2 The pilot study consists of an experiment in using reading comprehension and mind mapping techniques with Edmodo program. The study consisted of thirteen first-year students from section two, Faculty of Education. The samples were selected using purposive selection.

3.1.2.3 The experiment includes thirty first-year English majors from section one, Faculty of Education, Uttaradit Rajabhat University.

3.2 Research instruments

The experiment was carried out for ten weeks and 30 hours. The following are tools used in this research.

3.2.1 Reading comprehension ability and mind mapping ability pre-test and post-test.

3.2.2 Ten units of reading comprehension lessons according to TQF (Thailand Qualifications Framework) and CEFR (Common European Framework of Reference for Language) standards. Teaching steps include warm-up, pre-reading, reading practice, language study, and extended activities. Ten topics contained in this research were biography, environment, technology and science, food and drink, education and career, recreation, places, health, entertainment, and weather.

3.2.3 Nine mind mappings synthesized from the document were used in this research: flowchart/timeline, brainstorming diagram, listing, Venn diagram, matrix, map/web/cluster, cause and effect chart (fishbone), data flow diagram, and problem-solution chart.

3.2.4 Questionnaire which were used to acquiring students' opinions toward the reading comprehension model consisted of content and language, activity and teaching technique, and learning evaluation.

3.3 Data collection and analysis

In data collection and analysis, the reading comprehension ability test and mind mapping ability tests were administered before and after the implementation of the reading comprehension learning model. Both tests were operated in the pilot study and experimental phase by using the effectiveness criteria of the model (E1 / E2 = 75/75). Additionally, the questionnaires were measured using Likert Scale.

4. Result and Discussion

4.1 Results of the study

Research results from the data analysis were summarized according to the research objectives. The research results are presented according to the sequence of the research report, which can be divided into five parts as in the following.

4.1.1 Learner's needs for the model

The study of the need for reading comprehension teaching by using mind mapping technique through Edmodo program consisted of English reading sub-skills, topics, and themes for reading comprehension learning and teaching, as well as students' familiarity with mind mapping.

In respect to sub-skills, the top-rated sub-skills which need to be promoted in students were as follow. The first in rank was supporting detail; the second was cause and effect; and the third, which includes two sub-skills (with equal scores) were interpreting mood, emotion reaction, and pronoun reference.

For topics and themes for reading comprehension learning and teaching according to CEFR standard, the top three topics and themes which received most rating were as follow. The first topic was biography (of important figures in the country); the second was Environment (Global Warming); and the third was Science and Technology (Thailand 4.0).

In light of mind mapping familiarities, the top three mind maps which received most rating were as follow. The first was 'Flow Chart'; the second was 'Brainstorming Diagram'; and the third was 'Listing Chart'.

4.1.2 The efficiency analysis of the model.

The results of the efficiency analysis of the reading comprehension model by using mind mappings through Edmodo program (with criteria 75/75) show the following.

The lesson in which students got the highest score was lesson 6 (10 Facts about Stonehenge), with an average score of 81.33. The second was chapter 3 (Thailand 4.0: what do you need to know?), with the average score at 80.33. The third consists of two chapters with the same average score: chapters--chapter 1 (His Majesty King Bhumibol Adulyadej of Thailand) and chapter 2 (Climate Change). The average score was at 78.33. The lowest score was chapter 9 (Fast Food May Stunt Your Child's Academic Performance), with an average score of 76.33.

The total scores of each lesson tested on 30 students were 2,352 points out of the total score of 3,000 points or 78.40 percent. The sum of the scores from the post-test for the experimental group was 1,880 points, which accounts for 78.33 percent. It can be concluded that the efficiency of the model used in this experiment is at E1 / E2 = 78.40 / 78.33, which is higher than the specified criteria of 75 / 75 (Chaiyong, 2013:1-20).

4.1.3 The comparison of reading comprehension abilities

The results of the reading comprehension abilities before and after learning through the model by using a t-test analysis and the effect size calculation are displayed in Table 1.

Table 1: Comparison between pre-test and post-test on reading comprehension abilities

Test	$\bar{X}$	**S.D.**	$\bar{d}$	$S.D._d$	**t**	**Sig.(2 tailed)**	**Effect Size**
Pre-test	50.27	5.79	12.40	4.91	13.83	0.00	2.52
Posttest	62.67	4.14					

*Statistical significance at .05 level

From Table 1, the mean score of the students' reading comprehension abilities from the pre-test was 50.27, while the post-test was 62.67. This indicated that the students gained higher scores in their English reading comprehension abilities. Therefore, the t-test analysis showed that there was a statistically significant difference between the pre-test and post-test at the level of .05 ($t=13.83$, $p<0.00$). The effect size was 2.52; this indicated that the differences between the pre and post-test were significantly different (Cohen, 1992:98).

4.1.4 Comparison of mind mapping writing abilities.

The results of mind mapping writing abilities before and after learning through the model by using t-test analysis and the effect size calculation were shown in Table 2.

Table 2: Comparison between pre-test and post-test on reading comprehension abilities

Test	$\bar{X}$	S.D.	$\bar{d}$	$S.D._d$	t	Sig.(2tailed)	Effect Size	D
Pre-test	17.53	2.87	2.57	1.48	9.51*	0.0000	1.74	2.57
Posttest	20.10	1.95						

*Statistical significance at the .05 level

From Table 2, the mean score of the students' mind mapping writing abilities from pre-test was 17.53, while post-test was 20.10. The scores indicated that the students gained higher scores in their mind mapping writing abilities. Therefore, the t-test analysis revealed that there was a statistically significant difference between the pre-test and post-test at the level of .05 ($t=9.51$, $p<0.00$). The effect size was 1.74, which shows that there's a significant difference between the pre and post-test (Cohen, 1992:98).

4.1.5 Students' opinions toward the model.

Questionnaires were employed to acquire students' opinions toward the reading comprehension model by using the mind mapping technique with Edmodo program. The results are shown in Table 3.

Table 3: Comparison between pre-test and post-test on reading comprehension abilities

Opinions toward the model	$\overline{X}$	S.D.	Interpretation	Rank
Content and language				
1. The content is interesting and suitable for learners.	5.00	0.00	Highest level	1
2. Transitional Words	4.93	0.25	High level	2
3. What is the difference between "Whether" or Weather"?	4.87	0.43	High level	3
4. Comparison and Contrast Paragraph	4.07	0.25	High level	4
5. The content appearing in each textbook covers the stated objectives.	4.00	0.00	High level	5
Total mean of content and language	**4.44**	**0.04**	**High level**	
Activity and teaching technique				
1. Students can express their opinions during class.	5.00	0.00	Highest level	1
2. There are not too many activities in the lessons.	4.97	0.18	Highest level	2
3. Materials and technologies are useful for learning.	4.93	0.37	Highest level	3
4. The method of presentation is suitable for the content and the learners.	4.90	0.40	Highest level	4
5. The activities are organized according to the sequence and procedures appropriately.	4.03	0.18	High level	5
The total mean of activity and teaching technique	**4.93**	**0.29**	**Highest level**	
Learning evaluation				
1. The exercise covers all the content.	5.00	0.00	Highest level	1
2. Students are able to know the results of their assessment, both individually and in groups.	4.90	0.31	Highest level	2
3. The test covers all content.	4.57	0.50	Highest level	3

4. The assessment is consistent with the learning objectives.	4.57	0.57	Highest level	4
5. There is a clear evaluation of learners done by group and individual.	4.13	0.35	High level	5
Total mean of learning evaluation	**4.34**	**0.29**	**High level**	
Total mean of the three aspects	**4.45**	**0.14**	**High level**	

From Table 3, the results showed that the students' opinions toward the model were highly positive ($\bar{x}$=4.45, S.D.=0,14).

4.2 Discussion of the study

This part will explain the discussion of the study in response to the research objectives as follows.

4.2.1 The teaching model consists of six steps that focus on students' background knowledge before reading. The six steps were incorporated in the model to link the students' knowledge with the passage reading and their abilities to interpret new vocabularies correctly. This corresponds with Debat (2006:13) and Juyeon & Michael (2016:74). From their studies investigating into reading comprehension teaching model and development of reading comprehension techniques and strategies, they stated that, in light of reading comprehension, readers would be able to understand and interpret only when the reader has background knowledge about the passage. Such must be incorporated with good language ability, which will give a clear interpretation of the story. In addition to Livianni (2017:263), who conducted a study on processes and activities for reading comprehension teaching for EFL (English as a foreign language) students, the results revealed that readers' familiarity with the outline, content, and background knowledge greatly affects students' reading ability. If teachers want their students to improve their English reading skills, they need to build their students' background knowledge and familiarity with the outline of the passage. This allows students to develop English reading comprehension skills in various subjects efficiently. The results also correspond with the concepts proposed by Taba, Saylor, Alexander & Levis, Oliva, Skilbeck, and Rubin regarding the process of reading comprehension teaching. The reading comprehension teaching should focus on giving background knowledge before reading, as well as teaching the students to apply problem-solving skills during reading.

4.2.2 A comparison of reading comprehension ability before and after learning of the sample group that was able to develop reading comprehension ability effectively is consistent with research done by Haisen Zhang, Wei song and Jack Burston (2011: 210). They studied on teaching reading comprehension with Edmodo. The results showed that learning vocabulary--an important skill for one to comprehend what they read--through Edmodo via mobile is more effective than learning through conventional teaching materials. As a result, students can easily access knowledge via mobile devices. This allows students to learn anytime and anywhere continuously. Such is an advantage for the students to consistently use their free time to study on thier own. By this, they can also use the application to kill time when they are in subways or at bus stations. Students can also read frequently and memorize vocabulary anytime they wish. As for the use of Edmodo, the program is considered an effective teaching and learning model. Such is

consistent with the research work of Kandappan, Jaykumar, and Leena (2014: 420) on students' behavior towards the use of Edmodo program as a source of learning. The research found that using Edmodo can help students gain more useful information than regular classes can. The reason is that students can learn through their discussion, posing questions, and transferring the information they received. It can be said that building friends network online and the fact that they enjoyed doing so through the use of the program contributed to students' successful learning. This study may be able to inspire teachers to use Edmodo program in their teaching and to promote students' effective learning. Huang (2013: 718) conducted a study on the comparison between online and paper-based reading comprehension teaching and learning strategies for students at the university level. The samples were divided into two groups. One group used online-based, while another group used paper-based learning. Before the experiment, students with equal reading ability were tested on their reading comprehension abilities. The research presented that online-based teaching and learning is a useful strategy, in particular, reading comprehension. The reason is that it encourages learners' access to various media, which can help them understand the passage more deeply. Moreover, the study supported that online-based teaching is more effective than paper-base teaching since paper-based teaching improves students' reading comprehension abilities only at a moderate level.

4.2.3 In light of the comparison of students' mind mapping writing ability before and after using the model, it was found that the students' mind mapping writing ability before learning was higher than after learning. Such is related and consistent with the research conducted by Feldsine (1988: 177) and Lehman, Carter, and Kahle (1985: 663). They studied the teaching and training on how to build a conceptual framework. In the studies, the students were trained to create conceptual frameworks until they can come up with their own. It was found that the students were able to create a diagram showing relationships within the mind mapping, revealing their better understanding of the content. This confirms that mind mapping can be used to help students to completely understand the passage. In addition, mind mapping can also be used as an evaluation tool. For reading comprehension ability, the skill can only be acquired through continuous practice--creating their own conceptual framework or mind mapping. This will ensure the persistence of knowledge even after they were tested long after the test had ended. In the same respect, Mohammad and Anita (2015: 1093) also conducted a study on the effects of using mind mapping for reading comprehension for students. It was concluded that the best way to promote students' reading skills comes from continuous practice and letting the students build a conceptual framework on their own. Such would affect students' long term memory.

4.2.4 The students' opinions on the satisfaction of the model received highly positive ratings. Uzun's (2015:81-82) researched higher education students' attitudes towards using Edmodo as a tool to enhance teaching and learning efficiency. The purpose of the study was to examine the attitude of students towards using Edmodo program. The result of the study showed that the students had a good attitude towards the Edmodo program. The given reasons are that it is a good tool that can promote students' learning, provide them with opportunities to participate and communicate with friends in the classroom, and develop good relationships with teachers through the Edmodo program. Rinda (2017: 153) conducted a study on the evaluation of Edmodo in reading comprehension classes. This study evaluated Edmodo and Moodle programs. At the end of the study, the research sought to find out about students' attitudes towards using

Edmodo as a learning tool in reading classes. The results showed that the students had a good attitude towards Edmodo program. In terms of its usage, it can be concluded that interaction between students and teachers is positive. The study summarized that teachers should use Edmodo to teach reading comprehension in class. Fatimah's (2015: 199) study on the use of Edmodo affecting attitude of high school students studying English as a foreign language (EFL) in Saudi Arabia investigates the trends of using Edmodo in teaching at a Saudi female secondary school and the impact on the attitude of EFL students. A total of 42 participants were divided into two groups. The experimental group received traditional teaching mixed with social media sharing with Edmodo in their daily instruction for six weeks. On the contrary, the control group received only traditional teaching. The results of the post-test showed that the attitude of students to Edmodo was outstanding. Students have accepted and participated in using the program since it was convenient and easy to access for students in this generation.

5. Conclusion

As presented in this research, the researcher reported the development of a reading comprehension model by using mind mapping techniques with "Edmodo" program for first-year English majors students of Uttaradit Rajabhat University. The objectives were: 1) to study the learner's needs, content and environment that affect the model; 2) to develop and test the efficiency of the model based on the 75/75 standard criterion; 3) to compare students' English reading comprehension ability before and after using the model and investigate into the effect size; 4) to compare students' mind map writing abilities before and after using the model and its effect size and 5) to investigate students' opinions on the model. The results revealed that students' reading comprehension and mind mapping abilities after learning by using the provided model were higher than before learning. In addition, the students' opinions toward learning by using the model analysis were at a high level.

All the results confirmed that using the reading comprehension model through mind mapping techniques with "Edmodo" program had a great impact on students. It is also an exciting tool for teachers and students in the English reading classes since the model provided teachers and students opportunities to practice their reading anywhere and anytime. It also reduced the gap between teachers and learners. The students could interact with their teacher privately of face-to-face. Besides, the teacher could also provide their students with learning materials by using the online system and evaluate them by checking their mind mapping. Such was an easy technique for students to do and also covered the content that students have summarized. Consequently, this study could continuously be used in the English reading comprehension class for EFL students in the 21st century.

6. Limitations of the study

Considering the limitation of the study, the researcher recommends that the reading comprehension model using mind mapping techniques with "Edmodo" program contain various teaching steps. Therefore, teachers should genuinely understand each step as well as the students they are going to teach. In mind mapping step, creating mind mapping by using the online programs may not be something Thai students are familiar with since they mostly do it on a paper. Teachers should also examine their understanding regarding mind mapping and online programs before implementing the model.

7. Recommendations for further study

According to the results of this study, the following are the recommendations.

1. The model should be applied to the other reading skill teaching as well, such as critical reading.

2. The model can be further researched in terms of writing skills. The reason is that the main points students have identified in mind mappings can be used as an outline for writing summaries, which can later improve their writing skills.

3. Other mind mapping formats should be used to conduct an experiment on teaching-learning consistently, such as the use of E-map for critical reading development.

4. The teaching and learning style should be adapted to other skills as well, such as listening, speaking, and writing.

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