

USING CONCEPT MAPPING TO IMPROVE READING COMPREHENSION

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ABSTRACT

This study was done to find out if reading comprehension ability of students from class X at SMAN 1 Sawang could improve significantly by using the Concept Mapping technique in teaching-learning reading EFL. True experimental design was employed in this study in which the sample 25% (30 students) was chosen by random sampling from the total population (118 students). The sample was divided into an experimental group (EG) and a control group (CG); each with 15 students. The EG was taught reading comprehension using the Concept Mapping technique, whereas the CG was taught using a conventional teacher centered approach. Tests were used as instruments to collect data which was analyzed using SPSS version 16. A questionnaire with a Likert scale was used to find out the students' responses toward the use of Concept Mapping for learning reading comprehension. The t-test scores for the results from the pre-tests compared to those from the post-tests for both the EG and the CG were significant ($p=0.006$) which was lower than the degree of significance (0.05). The results indicated that the alternative hypothesis can be accepted and the null hypothesis rejected because the students of the EG achieved significantly better scores than those in the CG. Therefore, it can be concluded that using the Concept Mapping technique significantly improved the reading comprehension ability of students from class X at SMAN 1 Sawang.

Keywords: *Concept Mapping Technique, Teaching Reading Comprehension, Reading Skills.*

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INTRODUCTION

English is one of the compulsory subjects taught at senior high schools in Indonesia. Based on the Indonesian 2013 Curriculum, reading is an English skill that must be mastered by senior high school students especially to comprehend the meaning of recount texts both oral and written. In line with that, Jain and Patel (2008, p. 113) have said that reading is an active process which is important for academic success in order to comprehend written texts. Besides, reading means to understand the meaning of printed words i.e. written symbols.

Regarding the issues above, the researchers did a preliminary study at SMA 1 Sawang, South Aceh, on September 28th, 2015, to find out the reading comprehension ability of the students with English texts. The result of the study showed that the ability of these students to comprehend an English text was low; the mean score from the preliminary test was 22 out of 100. We assumed that these students needed a new technique in reading process.

Some studies have been done regarding the use of the Concept Mapping technique for teaching-learning reading comprehension. Sahin (2013) did an experimental study and found that students in the experimental group who were taught by using Concept Mapping had a greater improvement in their reading comprehension ability. Moreover, Phantharakphong and Pothitha (2014) conducted a study and found that the use of the Concept Mapping technique improved the English reading comprehension ability of the Thai students from 81% to 86%. Moreover, Doyle (2011, p. 119), Kommers (2004, p. 242), and Berry (2008, p. 90) have said that Concept Mapping is an appropriate technique to be used in teaching-learning reading comprehension. Concept Mapping is a technique that uses graphic diagrams for organizing and representing knowledge. Considering the above, the researchers decided to use the Concept Mapping technique to find out if it could significantly improve the reading comprehension ability of high school students at SMA 1 Sawang in South Aceh.

Research Question

1. Can the use of the Concept Mapping technique significantly improve the reading comprehension ability of high school students in terms of finding main idea, identifying specific details and recognising new words?

Research Objective

1. To find out if the use of Concept Mapping Technique can improve high school students' reading comprehension in terms of finding main idea, identifying specific details and recognising new words.

REVIEW OF LITERATURE

Reading Comprehension

Reading is the process of getting meaning from text through some process of interaction with the printed (or visual) media (Alderson, 2000). In line with that, reading is also defined as a process of getting understanding from written texts. It is a complex activity that involves both perception and thought (Fitriani, 2014; Fitriani, 2015).

Meanwhile, "comprehension is the process of making sense of words, sentences and connected grammatical knowledge, experience with texts and other strategies to help understand written texts" (Rao, 2004, p. 185). Comprehension is also a constructive process in which a student creates meaning based on her background knowledge (Gunning, 2010).

Also, Lacie (2003, p. 65) has claimed that "reading comprehension is the understanding of the meanings of written or printed words or symbols. It can be said that reading comprehension ability is a set of generalized knowledge acquisition skills which permit a person to acquire information gained as a consequence of reading printed or visualized language (eg on a computer screen)."

The Purpose of Reading Skills

In teaching reading skills, teachers must have a clear purpose of what they want to achieve with their students during the teaching-learning sessions. Having a clear purpose for teaching will help teachers to set the plan and apply the processes of teaching-learning reading easily. In doing so, the teacher will prepare the materials for teaching-learning in her class better because she knows the level of ability of her students. Hence, the teacher should select a suitable technique for teaching reading to use in her classroom so that the purpose of the reading comprehension lesson can be achieved.

Achieving the target level of reading comprehension skills in teaching-learning is influenced by the selection of a suitable approach

and technique to be applied by the teacher in the classroom. This notion is confirmed by Rivers and Temperly as cited in Nunan (2005) that reading involves one or more of seven main purposes: to obtain information for some purpose because we are curious about some topic; to obtain instruction on how to perform some task for our work or daily life such as knowing how an appliance works or how to do something legally; to act in or play a game, and to do puzzles e.g. cross-word puzzles; to keep in touch with friends by correspondence and to understand business letters; to know when or where something will take place and what will be available; to know what is happening or has happened such as in reports in a newspaper, a magazine and/or a report; and for personal enjoyment or excitement.

In line with that, Carnine et al. (1990, p. 45) have said that “a reader’s purpose determines the way in which she treats a passage and which comprehension skills she uses”. They also point out that there are some different purposes for reading (Carnine et al, *ibid*): to be able to identify and remember a main idea; to be able to follow instructions to reach a goal; to be able to explain the content of a passage to someone else; to enjoy the story of whatever is written eg a personal letter from a friend; to be able to accommodate the content into the reader’s schema; to critique the logic or data presented in a passage; to edit a passage according to stylistic and organizational criteria; and to study according to an assignment for test requirements.

Concept Mapping

Kommers (2004, p. 242) has said that “Concept Mapping constitutes a technique for the visualization of a certain knowledge structure in a graphical-diagrammatic form. Thus, Concept Mapping consists of nodes, representing concepts, and links representing relationships between concepts”. This technique is one of ways to promote metacognition (Samad, Raisha & Fitriani, 2017).

Similarly, Berry (2008, p. 90) has added “a Concept Map is a way for students to represent their understanding of the connections between and among the important concepts that they encounter in their learning”. Further, he argues that using Concept Mapping in learning will help students organize and understand more clearly new information to be learned. In doing so, students may link their new knowledge with their own previous, existing knowledge.

Teaching Reading by Using Concept Mapping

Concept Mapping can be very helpful for teaching-learning reading comprehension. Schwart (1988, as cited in Urquhart & Frazee 2012, p. 93) has said that Concept Mapping is a kind of graphic organizer for teaching students about the meaning of key concepts in their reading. This technique helps students understand the essential attributes, qualities, and characteristics of a concept or of word meanings. Thus, this technique can be used before, during, and even after reading to enhance students' comprehension of a text (Urquhart & Frazee, 2012).

According to Pannen (2001, p. 121), in language teaching, especially in teaching reading comprehension there are some procedures that can be used for building concept maps. Moreover, a concept map can be changed continuously, while always maintaining the same relationship with other ideas on the map. The procedures for building a concept map are as follows:

- 1) Start with the main idea, topic, or issue to focus on. A helpful way to determine the context of the concept map is to choose a focus question, - something that needs to be solved or a conclusion that needs to be reached. Once the topic or question is decided on, that will help with the hierarchical structure of the concept map.
- 2) Determine the key concepts. Find the key concepts that connect and relate to the main idea and rank them, the most general, most inclusive concept comes first, then link to smaller, more specific concepts.
- 3) Finish by connecting concepts. Creating, linking phrases and words. Once the basic links between the concepts are created, add crossed links, which connect concepts in different areas of the map, to further illustrate the relationships and strengthen the understanding and knowledge of the students about the topic.

RESEARCH METHODOLOGY

This was a true experimental study to observe and measure the effect of using the Concept Mapping technique to try to improve the reading comprehension ability of high school students. The improvement in reading was determined by comparing the results from pre-tests and post-tests of both the EG and the CG.

This study was done at SMA 1 Sawang, South Aceh from May 25th until June 1st 2016. The population in this study were all 118 first graders at SMA 1 Sawang that were distributed into 4 classes: X1, X2,

X3, and X4. The sample in this study was chosen randomly (random sampling) by writing each student's name from the population on a small piece of paper. Next, all the pieces of paper were collected and mixed up and then 30 (25 %) of those papers were chosen as the sample needed. Then, the sample students were divided into two equal sized groups called the Experimental Group (EG) and the Control Group (CG).

Data Collection

In collecting the data, two tests were involved. At first, the researchers gave the EG and the CG a pre-test to find out what was the students' prior ability in reading comprehension before beginning the treatments. The second test was the post-test which the researchers gave to find out the reading comprehension ability of the students after teaching the EG using the Concept Mapping technique and after teaching the CG by using conventional teaching reading comprehension techniques.

Data Analysis

This study used quantitative data analysis to analyze the data. The results from the tests were put into a table of distributed frequencies and were analyzed by using SPSS to get means, standard deviations, and t-test results.

FINDINGS AND DISCUSSION

In this study, the data was collected from the pre-test and the post-test results from the EG and from the CG which aimed to find out whether the students who were taught using the Concept Mapping technique achieved significantly better scores than those who were taught using the conventional teaching techniques.

Table 1. The Scores of the EG Students in the Tests

No	Sample	Score		Change in Score
		Pre-Test	Post-Test	
1.	Student 1	42	50	8
2.	Student 2	50	42	-8
3.	Student 3	25	67	42
4.	Student 4	17	67	50
5.	Student 5	25	58	33

6.	Student 6	17	75	58
7.	Student 7	25	67	42
8.	Student 8	33	58	25
9.	Student 9	50	33	-17
10.	Student 10	58	75	17
11.	Student 11	50	50	0
12.	Student 12	42	58	16
13.	Student 13	33	50	17
14.	Student 14	17	50	33
15.	Student 15	33	33	0
Mean		34.5	55.5	21

Table 1 above shows the scores from the EG in the pre-test and in the post-test and the changes in scores between the pre-test and the post-test. The mean of the pre-test scores was 34.5 while the mean score of the post-tests was 55.5 hence the students in the EG gained 21 points after the treatment.

Table 2 that follows shows the scores from the CG: the mean score from the pre-test was 29.4. After the CG were treated with conventional teaching their post-test mean increased 9.3 points to 38.7.

Table 2. The Scores of the CG in the Tests

No	Sample	Scores		Change in Score
		Pre-Test	Post-Test	
1.	Student 1	33	25	-8
2.	Student 2	33	33	0
3.	Student 3	42	50	8
4.	Student 4	33	50	17
5.	Student 5	17	33	16
6.	Student 6	50	25	-25
7.	Student 7	17	33	16
8.	Student 8	33	58	25
9.	Student 9	50	33	-17
10.	Student 10	17	42	25
11.	Student 11	25	50	25
12.	Student 12	25	33	8
13.	Student 13	33	25	-8
14.	Student 14	33	33	0
15.	Student 15	0	58	58
Mean		29.4	38.7	9.3

The next table and chart shows the mean scores for the main idea, specific details and word recognition from the EG and the CG in

teaching reading comprehension before and after the Concept Mapping technique was implemented with the EG, while the conventional technique was implemented with the CG.

Table 3. The Scores for Reading Aspects from the EG

No.	Sample	Main idea		Specific details		Word recognition	
		Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
1.	Student 1	50	75	50	25	25	50
2.	Student 2	50	50	50	25	50	50
3.	Student 3	25	100	25	75	25	25
4.	Student 4	25	50	25	75	0	75
5.	Student 5	25	50	25	75	25	50
6.	Student 6	25	75	0	75	25	75
7.	Student 7	50	50	0	75	25	100
8.	Student 8	50	50	50	50	0	75
9.	Student 9	75	25	25	25	50	50
10.	Student 10	50	75	50	75	75	75
11.	Student 11	50	75	50	0	50	75
12.	Student 12	50	75	75	50	0	50
13.	Student 13	50	50	25	25	25	75
14.	Student 14	50	50	0	50	0	50
15.	Student 15	25	50	25	50	50	0
Means		43	60	32	50	28	58

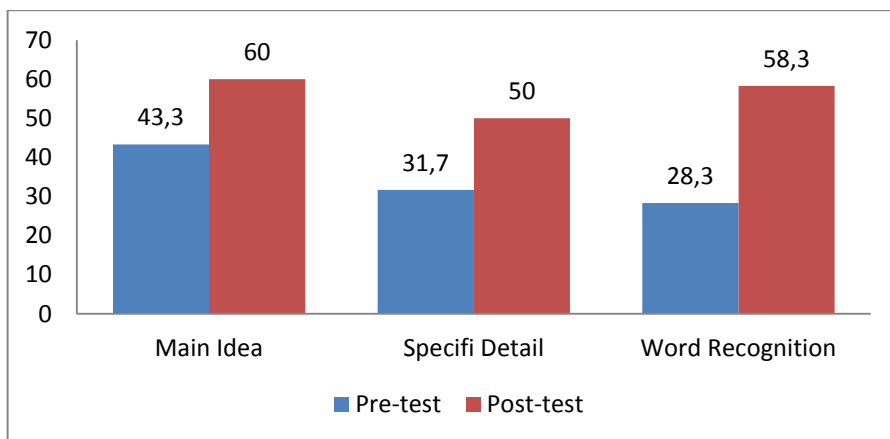


Chart1. Raw Scores for Aspects of Reading from the EG

Table 3 and Chart 1 show the raw scores from the EG pre-test and post-test for three aspects of reading comprehension. The mean score from the pre-test for the main idea was 43 and post-test was 60, gain 17. For specific details, pre-test was 32, post-test was 50, increase 18. Then, for word recognition, pre-test was 28, post-test was 58, improvement 30, very high.

Table 4. The Scores for Reading Aspects from the CG

No.	Sample	Main idea		Specific detail		Word recognition	
		Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
1.	Student 1	25	50	50	0	25	25
2.	Student 2	25	50	25	0	50	50
3.	Student 3	25	50	50	25	50	75
4.	Student 4	50	50	25	25	25	75
5.	Student 5	50	25	0	50	0	25
6.	Student 6	100	25	50	50	0	0
7.	Student 7	25	25	0	25	25	50
8.	Student 8	50	50	25	100	25	25
9.	Student 9	75	25	50	50	25	25
10.	Student 10	25	50	25	25	0	50
11.	Student 11	50	50	0	75	25	25
12.	Student 12	50	25	0	25	25	50
13.	Student 13	75	50	0	0	25	25
14.	Student 14	75	75	0	0	25	25
15.	Student 15	0	50	0	100	0	25
Mean		47	43	20	37	22	37

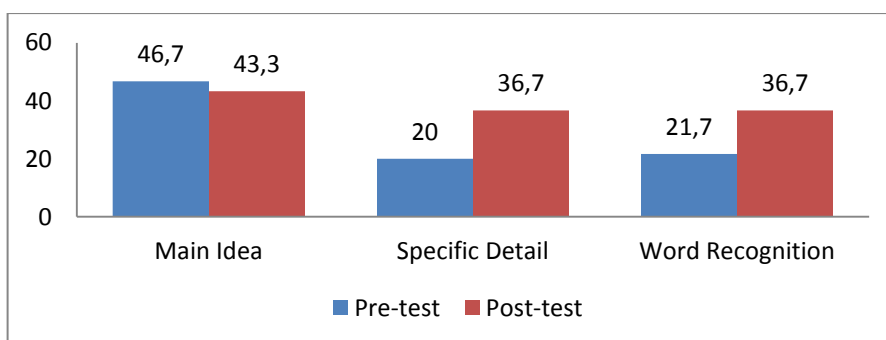


Chart 2. Mean Scores for Reading Aspects from the CG

Table 4 and Chart 2 show the scores from the CG Firstly, the mean score from the pre-test for the main idea was 47 while the post-test mean was 43, decreased 4. Second, for specific details, pre-test was 20, post-test was 37, increased 17. Lastly, for word recognition pre-test was 22, post-test was 37, gained 15.

The tables below present the results from the t-tests of the pre-test and the post-test results from the EG and the CG.

Table 5. Results from the Pre-Tests from Both the EG and the CG

Sample		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pre-test Scores	Equal variances assumed	0.227	0.637	1.035	28	0.309	5.067	4.895	-4.960	15.093
	Equal variances not assumed			1.035	27.981	0.309	5.067	4.895	-4.960	15.093
Sample				n	Median	Min	Max	Mean±SD	p	
Pre-test Experimental Class				15	33	17	58	34±14	0.309	
Pre-test Control Class				15	33	0	50	29±13		

Table 5 compares the differences between the scores from both groups by using an independent t-test. The median of the pre-test scores from the EG was 33 the same as that from the CG. The mean of the pre-test scores from the EG was 35 and that from the CG was 29. The p value from the pre-test scores from the EG and the CG was 0.309. This result indicated that the difference between the results from both groups was not significant since 0.309 is higher than 0.05.

Table 6. Results from the Post-Tests for Both the EG and the CG

Significance	Post-test Scores
Mann-Whitney U	40.5
Asymp. Sig. (2-tailed)	0.002
Exact Sig. [2*(1-tailed Sig.)]	0.002

Sample	n	Median	Min	Max	Mean±SD	P
Post-test EG	15	58	33	75	56±14	0.002
Post-test CG	15	33	25	58	39±12	

Table 6 compares the differences between the post-test scores from both groups by using a Mann-Whitney independent sample t-test. The median of the post-test scores from the EG was 58 and that from the CG was 33. The mean of the post-test scores from the EG was 56 and that from the CG was 39. The p value from the post-test scores from the EG and the CG was 0.002. This result indicates that the difference between the data from both groups was significant because 0.002 is lower than 0.05 which means that the students who were taught using the Concept Mapping technique improved more in reading comprehension than those who were taught using the conventional teaching-learning technique.

The purpose of the next test was to find out whether or not Concept Mapping influenced the EG students' reading comprehension score more than the conventional technique influenced the CG by comparing the pre-test scores with the post-test scores from both groups.

Table 7. Results from Both Tests for Both the EG and the CG

Significance	Pre-test Control Class - Post-test Control Class	Pre-test Experimental class - Post-test Experimental Class
Z	-1.583	-2.731
Asymp. Sig. (2-tailed)	0.113	0.006

Based on Table 7, the scores from the two groups were compared through Wilcoxon paired independent sample t-tests where the level of significance was 0.05. It was found that the p value from the pre-test score compared to the post-test score from the EG was 0.006, but the p value from the pre-test score compared to the post-test score from the CG was 0.113. This result indicates that the difference between the pre-test score and the post-test score of the CG was not significant, but the difference between the pre-test score and the post-test score from the EG was significant. This means that the EG students had significantly better scores in reading comprehension after they had been taught using the Concept Mapping technique whilst the CG students scores were not significantly better.

Table 8. Results from Both Tests for Aspects of Reading from Both Groups

Significance	Main Idea Pre-test EG - Main Idea Post-test EG	Specific Detail Pre-test EG - Specific Detail Post-test EG	Word Recognition Pre-test EG - Word Recognition Post-test EG	Main Idea Pre-test CG - Main Idea Post-test CG	Specific Detail Pre-test CG - Specific Detail Post-test CG	Word Recognition Pre-test CG - Word Recognition Post-test CG
Z	-2.013 ^a	-1.754 ^a	-2.435 ^a	-.318 ^b	-1.437 ^a	-2.460 ^a
Asymp. Sig. (2-tailed)	0.044	0.079	0.015	0.751	0.151	0.014

The scores from the two groups in Table 8 above are compared through a Friedman paired independent sample t-test where the level of significance is 0.05. According to the level of significance, for the pre-test compared to the post-test data from the EG, the main idea and the word recognition aspects were significant (Main Idea = 0.044, Word Recognition = 0.015), but the specific detail aspect was not significant at 0.07.

In addition, when comparing the pre-test and the post-test data from the CG, the main idea and the specific detail aspects were not significant (Main Idea = 0.751, Specific Detail = 0.151), but the word recognition aspect was significant (0.014).

To summarise the EG students had better scores in reading comprehension in all reading aspects after they were taught using the Concept Mapping technique compared to the scores the CG got after learning using conventional teaching techniques.

Discussion

After implementing the Concept Mapping technique, it was found that the scores obtained by the EG students increased significantly in the reading comprehension post-test. This indicated an improvement in comprehending recount text.

While in the CG it was found that the difference in results was not significant. This means that the EG students had significantly improved scores after they learnt reading comprehension using the Concept Mapping technique while the CG students only improved slightly by using the conventional teaching reading technique.

The findings above have been also found by other previous researchers. Firstly, in a study done by Yusrizal (2014) the results showed that Concept Mapping can improve the ability of students in reading comprehension where the mean scores of the students gradually improved. Khajavi and Abbasian (2013) found from their study that the ability of the students in reading comprehension improved significantly as a consequence of using the Concept Mapping technique. Their data showed that the ability of the students in reading comprehension was higher after teaching-learning using the Concept Mapping technique.

Futhermore, the students were able to increase their comprehension in finding main ideas, identifying specific details and recognition of words. The p value for the EG of the main idea and of word recognition aspects was significant (Main Idea = 0.044, Word Recognition = 0.015), but the specific details aspect was not significant (0.07). However, the mean score results for specific details from the EG increased markedly (pre-test was 32, post-test was 50). While in the CG, improvements in the main idea and in specific details were not significant (Main Idea = 0.751, Specific Detail = 0.151), but improvement in word recognition was significant (0.014).

The findings above mean that the students had better scores in reading comprehension for each aspect of reading comprehension after they were taught by implementing the Concept Mapping technique than by implementing the conventional teaching reading technique. The result of these findings is in line with Yusrizal (2014) who found that Concept Mapping could improve students' ability in reading comprehension especially for the main ideas and for supporting detail aspects. Pannen (2001) has also added that organizing ideas or concept flows for lecturing and studying books using a concept map enables the ideas to be connected by task analysis, therefore the students could construct their main ideas from the text.

Next, the results are also in line with those from Vaklifard et al. (2006) who have claimed that Concept Mapping facilitates the learning of vocabulary by taking again the most important concepts and the existing relationships between them as shown in their finding that the mean score from their EG was 75 which demonstrated better performance in comprehension tasks including vocabulary than their CG with the traditional approach which got a mean score of only 55.

CONCLUSION AND SUGGESTIONS

Conclusion

The Concept Mapping technique improved the reading comprehension ability of students significantly ($p = 0.006$). The Concept Mapping technique significantly improved the ability of the students in finding the main idea and in recognizing words (Main Idea = 0.044, Word Recognition = 0.015), but the specific details aspect was not significant (0.07). However, the mean score result for the specific details aspect from the EG increased a lot viz: Pre-test = 32, post-test = 50.

Suggestions

Teachers should make sure that they are able to select and apply proper techniques for teaching reading comprehension; one of the techniques which teachers may use is Concept Mapping. By implementing the Concept Mapping technique students are able to learn actively during the teaching-learning process, this technique is also effective in improving students' comprehension skills. Teachers may be able to reach their learning goals by using the Concept Mapping technique in their teaching-learning processes.

This study can be an additional reference related to the implementation of the Concept Mapping technique for researchers who are conducting similar studies in other schools. This study was still limited by the number of meetings for the teaching-learning processes. Therefore, if there can be more meetings when doing another study the time should be sufficient for getting more data.

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