



The Use of Flashcards with Numbered Heads Together to Improve Students' Vocabulary Knowledge

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Abstract

This quasi experimental study aims to find out the effectiveness of the use of Flashcards collaborated with Numbered Heads Together compared to the use of only Flashcards to improve seventh grade students' vocabulary knowledge in one Junior High School in Batang. The data was obtained through pre-test and post-test. Conventional change score data analysis showed that the control group achieved better vocabulary knowledge improvement result with 3.42 compare to 2.66 improvement result of experimental group. Likewise, the data analysis using process-oriented change score by Frost (2014) also favour the control group with 22% improvement than the experimental group with 19% improvement. Thus, Flashcards is more effective than Flashcards collaborated with Numbered Heads Together to improve students' vocabulary knowledge.

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INTRODUCTION

Vocabulary knowledge is considered as a very important knowledge required for students who wish to learn a foreign language. Consequently, learning vocabulary has become a major concern in learning a foreign language (Barkat & Aminafshar, 2015). Hamzehbagi and Bonyadi (2015) referred learning vocabularies of a foreign language, in addition to reading skill, as a fundamental skill in the course of learning a language. Furthermore, Başoğlu and Akdemir (2010) assumed that learning vocabulary is a crucial part of learning a foreign language.

Learning vocabulary is essential in learning a foreign language, yet many students still find it difficult to be comprehended. As the result, lack of vocabulary knowledge has become one of the difficulties faced by students in learning a foreign language such as English (Barkat & Aminafshar, 2015). In addition, Aslan (2011) believed that meaningful communication couldn't be able to achieve due to the students' lack of vocabulary knowledge.

Many ways are available to overcome students' lack of vocabulary knowledge as well as to improve it in learning English as a foreign language (Aslan, 2011; Barkat & Aminafshar, 2015; Başoğlu & Akdemir, 2010; Erbey, McLaughlin, Derby, & Everson, 2011; Hamzehbagi & Bonyadi, 2015; Mechling, Gast, & Thompson, 2008; Orawiwatnakul, 2013; Yousefi & Bonyadi, 2014). The use of Flashcards is among those taken into consideration as an effective approach in learning vocabularies (Aslan, 2011; Hamzehbagi & Bonyadi, 2015). The use of Flashcards is effective to improve students' vocabulary knowledge (Aslan, 2011). Flashcards are also effective in improving students' vocabulary knowledge in collaboration such as with reading racetrack (Erbey, McLaughlin, Derby, & Everson, 2011). However, Flashcards is considered as less effective when compared to technological based media such as Smart Board Technology and Computer Assisted Language Learning (Barkat & Aminafshar, 2015; Mechling, Gast, & Thompson, 2008).

The use of Flashcards is effective to improve students' vocabulary knowledge. Aslan (2011) indicated that using Flashcards could be very useful as well as effective for the students in learning English vocabulary especially for young learners. In addition, Hamzehbagi and Bonyadi (2015) confirmed that Flashcards can improve students' English vocabulary knowledge significantly of Iranian first grade high school female students. Furthermore, the effectiveness of Flashcards in improving students' vocabulary knowledge has been shown in study conducted by Savaiano, Lloyd, and Hatton (2017) in which they found that Flashcards instruction was effective for teaching the meanings of words studied in Braille.

On the other hand, Flashcards is considered as less effective when compared to technological based media. Mechling, Gast, and Thompson (2008) confirmed that both Flashcards instruction and SMART Board technology were effective in teaching target sight words in a small-group instructional arrangement; nonetheless, students read a greater percentage of observational words when words were presented using SMART Board. In the same way, Barkat and Aminafshar (2015) found that Computer Assisted Program (CAP) was more effective as well as useful for learning new vocabularied at the elementary level students compared to Flashcards.

Flashcards was still considered effective when in collaboration. Erbey, McLaughlin, Derby, and Everson (2011) confirmed that Flashcards intervention combined with reading racetracks to teach phonics, sight words, and math facts improved the students' number of corrects for each subject-matter area.

Meanwhile, Cooperative Learning, which is a teaching method recommended by the 2013 Curriculum, is an effective method for English learning for English as a Foreign Language students. Zarei and Keshavarz (2011) demonstrated that vocabulary Post-test of Iranian English learners of elementary students receiving Cooperative Integrated Reading and Composition (CIRS) performed significantly better than the non-cooperative learning students.

Moreover, Cooperative Learning is more effective compare to another teaching method such as competitive learning. For example, Seifoori and Haradashi (2015) indicated that cooperative learning had a significantly more effective impact on the vocabulary retention of the 60 EFL students from VIP language schools in Iran compared to competitive learning.

In addition, Numbered Heads Together, which is a teaching method commonly used in accordance with 2013 curriculum, is effective in improving students' vocabulary. Iwai (2014) confirmed that although the analysis of the overall quiz scores revealed no statistical differences between the Numbered Heads Together and teacher-fronted approach used to teach vocabulary in a beginning JFL class, student opinion questionnaires revealed that most students felt that group work helped to create a favourable social and affective environment for learning.

However, Numbered Heads Together is produce less equality of participation and participation levels of group members per turn taken. Lange, Costley and Han (2016) demonstrated that Numbered Heads Together is produce less equality of participation and participation levels of group members per turn taken than Think-Pair-Share.

In terms of combination, Cooperative Learning is able to enliven vocabulary lessons. Wilkinson (1994) stated some benefits of combining Cooperative Learning with story development such as stimulates brainstorming, reinforces the vocabulary words, encourages a feel of narrative writing, and helps shy students to develop confidence in classroom participation.

Based on previous studies mentioned above, it can be concluded that the areas that have been explored by other researchers are the effectiveness of Flashcards and Cooperative Learning for teaching vocabulary. Flashcards was studied and compared to other modern media such as the use of Computer Assisted Language Learning (CALL), and Smart Board Technology. Similarly, Cooperative Learning structures such as Cooperative Integrated Reading and Composition (CIRC), Numbered Heads Together, and Think-Pair-Share were investigated of their effectiveness for teaching vocabulary. Cooperative Learning structures were studied and compared to competitive learning, traditional methods, and another Cooperative Learning structure. Another conclusion of previous studies above is that both Flashcards and Cooperative Learning are improved when they are in combination such as with reading racetrack with Flashcards and story development with Cooperative Learning. The area that has not been explored is the effectiveness of combining Flashcards with Cooperative Learning structure, Numbered Heads Together, for teaching vocabulary in junior high school classes.

This present study is conducted based on theory of Dual Coding Theory (Jared, Poh, & Paivio, 2013) which strongly related to Picture Superiority Effect (Crutcher & Beer, 2011), and Behaviourist Learning Theory (Ellise, 1997) for the Flashcards related activities. Meanwhile, for activities related to Cooperative Learning, theory of Sociocultural Learning (Stevens, 2008) and Kagan's Structure named Numbered Heads Together (Kagan, 1989) is used. In activities that involved both Flashcards and Cooperative Learning, all of the theories are used together as they complement each other. Additionally, in relation to vocabulary knowledge, theories that related to the definition of vocabulary (Lehr, Osborn, & Hiebert, 2004; Steffani & Huang, 2017), vocabulary knowledge (Chapelle, 1999; Lehr, Osborn, & Hiebert, 2004; Richards, 1976; Schmitt, 2014; Shen, 2008), and part of speech (Linse, 2006) are used in this study.

In terms of Flashcards, Dual Coding Theory (Jared, Poh, & Paivio, 2013) is used as a core theory for this present study as it is highly related to Picture Superiority Effect (Crutcher & Beer, 2011). Dual Coding Theory supported the use of Flashcards in retrieving memory as a certain word shown in a card can evoke the memory of its picture and vice versa. Additionally, Picture Superiority Effect support the use of pictures in Flashcards as this theory considered pictures to be better remembered than words. Furthermore, both pictures and words are used in the Flashcards for this study; one side

has picture and the other side has word, as this is following the argument of Haynes and Zacarian (2010).

Moreover, related to Flashcards activities, theory of Behaviourist Learning (Ellise, 1997) is used in conducting this study as it explain the nature of stimulus and reinforcement for learning activities. The implication of this study towards this present study then that in activities related to Flashcards, students are given reinforcement based on the stimulus given which is the Flashcards themselves.

In terms of Cooperative Learning, this present study is conducted by arranging the composition of students in each groups of Numbered Heads Together activities so that they consist of not only less competent students but also more competent students. These approach of students grouping in Numbered Heads Together activities is based on the theory of Sociocultural Learning as stated by Stevens (2008) that “for complex cognitive tasks, learners benefit from interaction with more competent peers, like those interactions in Cooperative Learning” (p. 189-190). This composition of students is determined by the results of the pre-test that they took before following Numbered Heads Together activities. The results of the pre-test were analysed and scored, then the students are ranked based on the results of their pre-test scores. This rank then determined which group they belong to. Furthermore, Stevens (2008) also added that “sociocultural theory revolves around the ability of peers to provide guidance and feedback to one another during the collaborative dialogue” (p. 190). Therefore, students’ interactions during such activities are monitored as well as guided so that they could engage in the collaborative dialogue.

In addition, Kagan’s Structure named Numbered Heads Together (Kagan, 1989) is used as an assistance of performing activities related to Numbered Heads Together in Cooperative Learning during the interventions of experimental group for this present study. The students were divided into eight groups consist of four students in each groups. Each member of the groups was assigned with number which range from 1 to 4. They were given a simple badge with a number on it which each of them hold to show their number.

In terms of vocabulary knowledge, vocabulary, defined for the purpose of this present study as gathered from statements of several experts (Lehr, Osborn, & Hiebert, 2004; Steffani & Huang, 2017), is a collection of words that the students know and understand at the very least as a receptive and print vocabulary. Furthermore, as this study is specifically focuses on vocabulary knowledge, it is worth mentioning that only one aspect of vocabulary knowledge (Chapelle, 1999; Lehr, Osborn, & Hiebert, 2004; Richards, 1976; Schmitt, 2014; Shen, 2008) is used here that is only vocabulary size. This aspect of vocabulary knowledge is defined as the number of words that the students know and understand. Additionally, in relation to vocabulary, part of speech (Linse, 2006) is also taken into consideration in this present study. Following the aspect of part of speech, words as used in this study are consisted of nouns, verbs, adjectives, adverbs, and prepositions.

Flashcards and the combination of flashcards and Numbered Heads Together are studied and compared in regards with their effectiveness in improving students’ vocabulary knowledge in this present study. Both Flashcards and Numbered Heads Together are demonstrated to be effective in improving students’ vocabulary knowledge. However, both are also considered as less effective when compared to certain media. On the other hand, the effectiveness of both are verified not only as individual but also when in collaboration. This collaboration might be the answer of improving both Flashcards and Numbered Heads Together which eventually are able to be used as an approach of improving students’ vocabulary knowledge. Thus, this present study seeks further evidences of the effectiveness of Flashcards to improve students’ vocabulary knowledge by collaborating it with Cooperative Learning which is a teaching method commonly used in accordance with 2013 Curriculum, specifically Numbered Heads Together.

METHODS

A quasi-experimental research design is used as a research design for this study as the objects are already in groups of classrooms. The object of the study is the seventh grade students of SMPN 1 Tulis in academic year 2017/2018. The population of this study is the seventh grade students of SMPN 1 Tulis in academic year 2017/2018. There are 192 students which divided into 6 classes so that each class consists of 32 students. The samples of this study are two classes, VII B as the experimental group and VII F as the control group. The study begins by giving pre-test for both control and experimental groups. After that, three interventions are given to each of the groups; 1st, 2nd, and 3rd Intervention. The interventions for experimental group are conducted by using Flashcards with Numbered Heads Together, while the control group by using Flashcards. Next, post-test is given to both groups. Finally, the results of both pre-test and post-test are analysed using a conventional change score and using a process-oriented change score by Frost for defining students' improvement in vocabulary knowledge.

Two tests are used as instruments for collecting data, namely Test A and Test B. Both tests are in the form of multiple choice consisting of 28 items with 4 options in each items; 1 correct answer and 3 distractors. The quality of a test is assessed by several aspects such as validity, reliability, and practicality. Analyses of the instruments used in this present study is conducted by examining the tests in terms of Item Facility, Item Discrimination, & Distractor Efficiency (Brown, 2004). Item facility or IF in short is the formula to determine whether certain test is easy or difficult for those who taken the test. Item Discrimination or ID is the formula to determine whether the item is able to distinguish or separate between the high-ability test-takers and low-ability test-takers (Brown, 2004). Distractor efficiency, according to Brown (2004, p. 60) "is the extent to which (a) the distractor 'lure' a sufficient number of test-takers, especially lower ability ones, and (b) those responses are somewhat evenly distributed across all distractors."

The data is analysed in two methods of measuring students' change score; a conventional change score and a process-oriented change score by Frost. Conventional change score calculated the students' improvement of vocabulary knowledge by calculating the difference between students' mean score of pre-test score and post-test score. The mean score of both pre-test and post-test of experimental and control groups are subtracted in order to find out the students' improvement of vocabulary knowledge. Process-oriented change score proposed by Frost, et al. (2014) divided the analysis of each items into one of the four categories based on the students results of pre-test and post-test. The categories are "consistently understood" in which students are able to respond correctly at the pre-test and post-test; "learned" in which students are respond incorrectly at the pre-test and then they are able to respond correctly at the post-test; "consistently not understood" in which students are respond incorrectly at both pre-test and post-test; and "inconsistent" in which students respond correctly at pre-test but respond incorrectly at post-test. Detail information of each items tested can be obtained by this process-oriented change score approach. See Table 1 of example of process-oriented change score analysis.

Table 1 Process-oriented Change Score Analysis

Item	Pre-test respond	Post-test respond	Category
	Correct	Correct	Consistently understood
	Incorrect	Correct	Learned
Park	Incorrect	Incorrect	Consistently not understood
	Correct	Incorrect	Inconsistent

Table 1 presented the example of Process-oriented change score analysis as proposed by Frost, et al. (2014). It divided the analysis of item “park” into one of the four categories based on the students’ results of pre-test and post-test. If the students are able to respond correctly at the pre-test and post-test, then they fall into “consistently understood” category. If the students are respond incorrectly at the pre-test and able to respond correctly at the post-test, then they fall into “learned” category. If the students are respond incorrectly at both pre-test and post-test, then they fall into “consistently not understood” category. If the students are able to respond correctly at the pre-test but respond incorrectly at the post-test, then they fall into “inconsistent” category.

FINDINGS AND DISCUSSION

Result of Pre-Test

The pre-test was conducted at both experimental and control group. It was performed on January 11th 2018 for both groups. This test was carried out in order to find out the students’ initial vocabulary knowledge prior to interventions. Moreover, the results of pre-test in also used as a guidance for students’ grouping for Numbered Heads Together activities at experimental Group.

Pre-test for the experimental group was carried out with 31 out of 32 students with the absence of student E-04. While the pre-test for the control group was carried out with all 32 students. However, the results of some students are not valid due to their absence of pre-test, Treatment 1, 2, 3, and post-test as well as the students’ failure of submitting the Test Code in which happened to student E-22 and C-22.

Table 2 Result of Pre-test

	Σ score	N	mean
Experimental	378	23	16.43
Control	395	27	14.62

Table 2 displayed the mean scores of pre-test of both experimental and control groups. The total pre-test score of experimental group was 378, so the mean score of pre-test for the experimental group with 23 students was 16.43. Meanwhile, the total pre-test score of control group was 395, so the mean score of pre-test for the control group with 27 students was 14.62.

Result of Post-Test

The post-test was conducted at both experimental and control group. It was performed on January 20th 2018 for both groups. This test was carried out in order to find out the students’ vocabulary knowledge improvement after the interventions.

Post-test for the experimental group was carried out with 28 out of 32 students with the absence of student E-04, E-18, E-19, and E-20. While the post-test for the control group was carried out with 31 out of 32 students with the absence of student C-16. However, the results of some students are not valid due to their absence of pre-test, Treatment 1, 2, 3, and post-test as well as the students’ failure of submitting the Test Code in which happened to student C-06.

Table 3 Result of Post-test

	Σ score	n	mean
Experimental	439	23	19.09
Control	487	27	18.04

Table 3 displayed the mean scores of post-test of both experimental and control groups. The total post-test score of experimental group was 439, so the mean score of post-test for the experimental

group with 23 students was 19.09. Meanwhile, the total post-test score of control group was 487, so the mean score of post-test for the control group with 27 students was 18.04.

Students' Vocabulary Knowledge Improvement

The improvement of students' vocabulary knowledge is analysed in two methods; a conventional change score which is the difference of mean of students' score of pre-test and post-test, and a process-oriented change score which is a detailed way of measuring students' change score of the tests by categorizing students' responses into four category; "learned words", "words inconsistently understood", "words consistently understood", and "words consistently not understood" (Frost, et al., 2014).

Conventional change score which is the difference of mean of students' score of pre-test and post-test is used to calculate the improvement of students' vocabulary knowledge. The following Table 4 presented the mean score of both pre-test and post-test of experimental and control groups along with their improvement which is calculated by subtraction of post-test with pre-test mean score.

Table 4 Students' Improvement based on Conventional Change Score Analysis

	Pre-test	Post-test	Improvement
Experimental	16.43	19.09	2.66
Control	14.62	18.04	3.42

Table 4 showed that the mean score of the pre-test for the experimental group was 16.43. Meanwhile, the mean score of the post-test of the experimental group was 19.09. Therefore, there was an improvement of 2.66 between the pre-test and the post-test scores achieved by the students of the experimental group. Likewise, Table 4 displayed that the mean score of the pre-test for the control group was 14.62. Meanwhile, the mean score of the post-test of the control group was 18.04. Therefore, there was an improvement of 3.42 between the pre-test and the post-test scores achieved by the students of the control group.

Thus, it can be concluded from the comparison of pre-test and post-test mean score that the control group improvement which interventions was using only Flashcards method was higher than that of the experimental group. Figure 1 showed the comparison of pre-test and post-test mean score from Table 4.

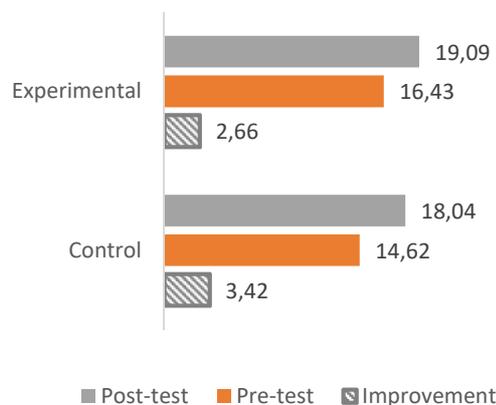


Figure 1 Comparison of Students' Improvement based on Conventional Change Score Analysis

Figure 1 displayed the comparison of students' improvement based on conventional change score analysis. It presented that the mean score of the pre-test for the experimental group was 16.43. Meanwhile, the mean score of the post-test of the experimental group was 19.09. Therefore, there was an improvement of 2.66 between the pre-test and the post-test scores achieved by the students of the experimental group. Likewise, Figure 1 displayed that the mean score of the pre-test for the control group was 14.62. Meanwhile, the mean score of the post-test of the control group was 18.09. Therefore, there was an improvement of 3.42 between the pre-test and the post-test scores achieved by the students of the control group.

Process-oriented change score by Frost which divided the items tested into four categories namely "words consistently understood", "learned words", "words inconsistently understood", and "words consistently not understood" is also used to analyse the improvement of students' vocabulary knowledge in this present study. The following Table 5 displayed the four category of process-oriented change score of experimental and control groups.

Table 5 Students' Improvement based on Process-oriented Change Score by Frost Analysis

	Experimental	Control
Consistently understood	58%	53%
Learned	19%	22%
Consistently not understood	15%	19%
Inconsistent	8%	6%
Improvement	19%	22%

Table 5 displayed that the experimental group has 58% of its total words tested falls into consistently understood category, 19% falls into learned category, 15% falls into consistently not understood category, and 8% falls into inconsistent category. Meanwhile, the control group has 53% of its total words tested falls into consistently understood category, 22% falls into learned category, 19% falls into consistently not understood category, and 6% falls into inconsistent category.

The improvement of vocabulary knowledge of experimental and control groups can be seen in learned category as it represents the words tested that the students failed to respond correctly during the pre-test but successfully able to respond correctly during the post-test. According to Table 5, the experimental group was able to improve 19% while the control group was able to improve 22% of vocabulary knowledge. Thus, it can be concluded that the vocabulary knowledge improvement was better achieved by the control group which interventions was using only Flashcards method. Figure 2 showed the comparison of the four category of process-oriented change score by Frost of the experimental and control group from Table 5.

Figure 2 displayed the comparison of students' improvement based on process-oriented change score analysis. It presented that the experimental group has 58% of its total words tested falls into consistently understood category, 19% falls into learned category, 15% falls into consistently not understood category, and 8% falls into inconsistent category. Meanwhile, the control group has 53% of its total words tested falls into consistently understood category, 22% falls into learned category, 19% falls into consistently not understood category, and 6% falls into inconsistent category.

Discussion

This present study is meant to answer the research question. It was to find out the effectiveness of Flashcards collaborated with Number Heads Together compared to the use of only Flashcards to improve students' vocabulary knowledge of the seventh graders of SMP Negeri 1 Tulis, Batang in the academic year of 2017/2018.

The analysis of the pre-test data from both experimental and control group shown that the average score of experimental group was 16.43 while the control group was 14.62. This indicates their vocabulary knowledge prior to the interventions given to them.

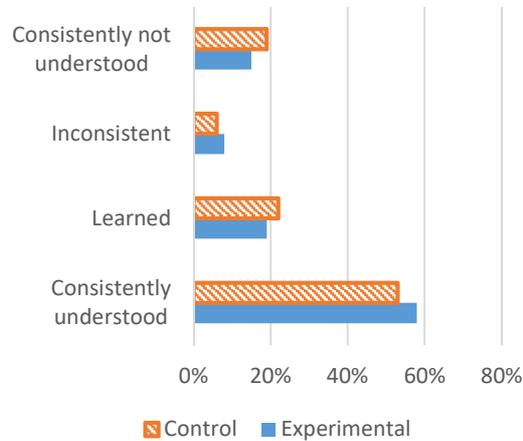


Figure 2 Comparison of Students' Improvement based on Process-oriented Change Score by Frost Analysis

After conducting the pre-test, three interventions are given to both groups. The experimental group was given interventions with Flashcards collaborated with Numbered Heads Together while the control group was given only Flashcards. Both groups were given exactly the same material from English book provided by the government.

After the interventions, the post-test was conducted to both groups. The analysis of the post-test results shows that the average score of experimental group was 19.09 while the control group was 18.04. This indicates some improvement of their vocabulary knowledge after given the interventions.

Further analysis of the pre-test and post-test results of both experimental and control groups shown that the control group which was given interventions of only Flashcards has achieved higher improvement score than the experimental group which was given intervention of Flashcards collaborated with Numbered Heads Together. The control group accomplished 3.42 improvement score compare to 2.66 improvement score of the experimental group. Thus, this is demonstrated that Flashcards is more effective than Flashcards collaborated with Numbered Heads Together to improve students' vocabulary knowledge. This finding is in line with research findings of Aslan (2011) which proved that Flashcards could be useful and effective for the students in learning English vocabulary. This finding is then further supported by research findings of Hamzehbagi and Bonyadi (2015) which demonstrated that Flashcards can significantly improve students' English vocabulary knowledge.

Additionally, the analysis of pre-test and post-test results of both experimental and control groups using process-oriented change score by Frost also implies the same results. It confirms that Flashcards is more effective than Flashcards collaborated with Numbered Heads Together to improve students' vocabulary knowledge. The process-oriented change score by Frost analysis shows that the experimental group achieved only 19% improvement compare to the control group improvement of 22%. This finding is consistent with research findings of Savaiano, Lloyd, and Hatton (2017) which verified that Flashcards instruction was effective for teaching the meaning of words. This finding is then further strengthened by research findings of Sage, Rausch, Quirk, and Halladay (2016) which validated that Flashcards was a viable option for the students in learning English words.

In conclusion, the analysis of pre-test and post-test results from both experimental and control groups using both conventional change score and process-oriented change score by Frost confirms

that Flashcards is more effective than Flashcards collaborated with Numbered Heads Together to improve students' vocabulary knowledge.

CONCLUSION

This present study was conducted on the purpose to find out the effectiveness of the use of Flashcards collaborated with Numbered Heads Together compared to the use of only Flashcards to improve students' vocabulary knowledge for the seventh grade students of SMP Negeri 1 Tulis, Batang in the academic year 2017/2018. Based on the results and the analysis of the data, it can be concluded that Flashcards is more effective than Flashcards collaborated with Numbered Heads Together to improve students' vocabulary knowledge.

SUGGESTIONS

The suggestions are categorized into three aspects such as theoretical, practical, and pedagogical. Theoretically, the results of this study is expected to be able to be used as a reference for further research in the future related to English vocabulary learning, teaching process and Cooperative Learning. Practically, the results of this study is expected to be able to help students in learning English vocabulary as well as motivating them to improve their interest in learning English by implementing Flashcards in their study. Pedagogically, the result of this study hopefully will enrich the way in teaching vocabulary for English teachers as teachers who was unwilling to use Flashcards for their teaching method may now implement Flashcards in teaching English vocabulary since the results of this present study verified that Flashcards is effective to improve students' vocabulary knowledge. As for the students, the result of this study is expected to encourage them in learning English vocabulary as well as open their mind of English learning activity.

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