The Effect Of Mind-Mapping On Efl Reading Comprehension

Trần Thị Ngọc Yến

ABSTRACT

The study examined the effects of mind mapping as a pre-reading technique on EFL learners' reading comprehension. The participants were EFL learners at a language center. In each of the 10 treatment sessions, the mind mapping technique was used as a pre-reading activity and the number of correct answers that each participant made was recorded. The results showed that overall the treatment groups had better reading comprehension than the control groups. A pre-test and a post-test were also utilized to see if the treatment groups could maintain their reading comprehension gain after the experiment. It was found that both categories made increases but the treatment groups outperformed the control groups.

Key Words : mind-mapping, mind maps, reading comprehension, reading, pre-reading activities, pre-reading technique, EFL reading comprehension

Introduction

1. Reading comprehension

The nature of comprehension in reading has been explored in numerous studies. Some researchers see it as a state of having questions answered (Smith, 1978) in which readers have to find a configuration of hypotheses which offer a coherent account for the various aspects of the text. In order to comprehend a text, readers modify the organisational structure of the texts for their own purposes (Calfee & Curley, 1984). While reading they keep making predictions, or questions based on their theories about the world, and if the questions are answered while or after reading, comprehension is achieved (Smith, 1978).

A large and growing body of literature has investigated the components of comprehension. One of the main themes in the literature is the simple view of reading, which holds that comprehension can be decomposed into linguistic comprehension and reading comprehension (Dombey, 2009). Linguistic comprehension refers to the action of using vocabulary knowledge to interpret the text and reading comprehension is the same ability, which, on the other hand, relies on printed information arriving through the eye. In order to assess linguistic comprehension, testers should ask questions about the contents of a text presented orally while to test

reading comprehension, they must ask questions about a text in printed form. Some other researchers divide comprehension into two components: comprehension and interpretation (Urquhart, 1987). Comprehension involves what the reader utilizes according to his reading aims. Interpretation concerns the differences between people who read the same text, or within one person when reading different texts. These differences may be due to such factors as background knowledge and cultural presuppositions.

Past research also attempted to explore factors that affect reading comprehension as well as methods or techniques to increase reading comprehension. In L1 reading among young children (Schwanenflugel et al., 2006) or EFL reading among adults (Chang, 2010; Tran, 2012), reading comprehension depends to some extent on reading fluency and autonomy. However, the role of these factors in L1 reading decreases as age increases (Schwanenflugel et al., 2006) and once a reader has reached a fluent level in English, factors other than fluency affect reading comprehension. These include metacognitive skills (Oakhill & Cain, 2000), motivation and interest (Saarnio et al., 1990). Among techniques or methods to increase reading comprehension are rapid decoding training (Tan and Nicholson, 1997), extensive reading programs (Bell, 2001), concept oriented reading instruction (Guthrie et al, 2004) and speed reading (Macalister, 2008; Tran, 2012).

2. Mind-mapping in English language teaching

Mind-mapping has been used as an effective method for generating ideas, taking notes, organizing thinking, memorizing, sorting out complicated ideas, solving problems, developing concepts and so forth (Budd, 2003; Murley, 2007). This technique utilizes graphic organizers that contain a topic and related ideas connected to each other via relationship hooks (Murley, 2007).

In language teaching, mind maps have been used to introduce a theme, brainstorm a topic, create powerful classroom presentations and innovative handouts, or help students develop critical thinking (Al-Jarf, 2011). Language teachers use this technique in their class for different purposes. It is promoted as a way to collaborate in color pen creativity sessions, facilitate better understanding of relationships and connections between ideas and concepts, assist students brainstorm and explore ideas, concepts, or problems, make it easy to communicate new ideas and thought processes, and allow students to recall information (Budd, 2003). In addition, it seems that understanding the 'map' in a mind map is easier, which is apparently beneficial as it saves time and increases productivity (Murley, 2007). Mind-maps also accommodate different learning styles while they are especially helpful for visual EFL learners. This technique helps learners connect their prior knowledge to the new information, which in turns facilitates learning transfer. It enhances learning

as it provides a powerful tool for managing thought, directing learning, and making associations (Al-Jarf, 2009).

Previous studies have confirmed the benefits of mind-mapping in teaching EFL reading. According to Davey (1983), mind-maps can be used to improve reading comprehension in both fiction and non-fiction texts, and across a variety of genres. These graphic organizers work effectively because they provide EFL readers with a visual way to process the information they get from the text. In order to understand the text, EFL learners need to have both background knowledge of language and background knowledge of the world (Stanovich, 1991). The use of mind maps allows EFL readers to develop their background knowledge of the text they are supposed to read, recall the existing knowledge and relate it with the text (Kaufman, 2010). In other words, this technique is a combination of the top-down and bottom-up processes in reading.

A number of attempts have been made to examine the effect of mind-mapping on EFL reading comprehension. Siriphanic and Laohawiriyano (2010), for instance, looked at the relationship between mind maps and reading comprehension. They employed a pre-test and post-test, a questionnaire and an interview to collect the data. The results showed that most of the participants increased their reading ability after being guided to use mind maps. Furthermore, they were satisfied with their own reading ability, enjoyed working groups and agreed that mind-mapping is a useful tool in reading. Along similar lines, Rizqiya (2013) suggested that this technique makes EFL learners recall their background knowledge and focus on their reading, and thus can be used as an alternative technique in reading lessons. Recently, Phatchara and Pothitha (2014) surveyed EFL learners' attitudes towards learning English reading comprehension by using concept maps and found that the participants appreciated the use of concept maps as they facilitated their comprehension of the texts. Earlier this year, Beydarani (2015) investigated the influence of concept mapping on reading comprehension of EFL learners. In this study, the control groups and treatments groups were asked to read persuasive and descriptive texts. The results suggested that the treatment groups outperformed the control groups in reading comprehension. Similarly, other researchers have also reported their findings that mind maps are a useful tool in EFL reading lessons (Tabatabaei & Khalili, 2014).

Although past research has looked at the effects of mind maps in improving EFL learners' reading comprehension in reading lessons, so far, very little attention has been paid to whether this effect can be maintained beyond the lessons. This study set out to determine the extent to which mind mapping as a pre-reading activity effects EFL learners' reading comprehension in reading lessons, and to see if this effect is sustainable after the treatment finishes.

Materials And Method

1. Research question

The study aimed to seek the answers to the following questions: Will the mind-mapping technique help to increase students' reading comprehension? If it does, will this effect maintain beyond the lessons?

2. Participants and procedure

The research participants were 80 EFL learners from five English classes at a language center in Vietnam. They were following an English course that consisted of reading, listening, speaking and writing lessons. The classes met for 90 minutes three times a week. Each class had 16 learners, whose English level was pre-intermediate at the time of the study. There were 24 males and 56 females. All of the participants were aged between 19 and 25 at the beginning of the study.

Three of the five classes were randomly chosen to be the treatment groups (hereafter named groups A, B and C) and the other two (hereafter named groups D and E) were the control groups. There were 32 learners in the control groups and 48 learners in the experimental groups.

Before and after the treatment, all the participants sat the pre-test and post test. They were asked to read a text and answer 10 comprehension questions that accompanied the text. The texts in both the pre-test and post-test had been put in the Vocabulary Profiler program (Cobb, Heatley & Nation, 1994) to make sure that they were at the same level of difficulty.

After the pre-test, the five groups followed the English course. In the eight reading lessons during the course, both the control and treatment groups experienced the same procedure, except for the pre-reading stage. For the control groups, the teacher first introduced the text and utilized conventional pre-reading activities, and then proceeded with while-reading, including answering comprehension questions, and finished with post-reading activities. Meanwhile, for the experimental groups, after introducing the text, the teacher utilized mind-mapping as a pre-reading activity before carrying out while-reading and post-reading activities. The number of correct answers to the comprehension questions that each participant had was recorded for analysis.

3. Materials

The texts in the speed reading course were taken from Asian and Pacific Speed Readings for ESL Learners by Millett et al. (2007). The book contains 20 texts, but only eight of them were used in the eight reading lessons. These passages were written at the 1000 word level. The only words appearing in the text but not in the 1000 word list were the words that are explained in the text, titles, content words like country names and animal names. Each of the passages was 550 words long and was accompanied by ten comprehension questions. The book provides a progress chart in which participants keep records of their comprehension scores, and an answer key. The pre-test and post-test texts were taken from graded readers at the 1000

word level. They contained around 550 words and had been modified and hence contained approximately similar numbers of total words, academic words, words at the 1000 word level, words at the 2000 word level, and off-list words.

Results

Participants' reading comprehension during the course

To determine whether mind mapping as a pre-reading activity had any effect on the participants' reading scores during the English course, the average score for all the lessons of each group was calculated and then compared among the five groups. Table 1 shows the average score of each group for all the eight reading lessons and Table 2 presents the average score that the treatment groups and control groups had.

Table 1 Mean scores in the course for all groups

	Group A	Group B	Group C	Group D	Group E
Mean	7.7	7.5	7.3	6.5	6.8
SD	0.4	0.4	0.3	0.2	0.2

Table 2 Mean scores for the three treatment groups and the two control groups

	Average score of treatment groups	Average score of control groups
Mean	7.5	6.7
SD	0.4	0.2

$p<0.05$

It can be seen from Table 1 that group A, group B and group C respectively made an average score of 7.7, 7.5 and 7.3 out of 10 during the English course while group D and group E had 6.5 and 6.8. The difference between each treatment group and the control groups is at least 1.5. As Table 2 shows, there is a significant difference ($p = 0.00$) between the treatment and control groups. The treatment groups had 7.5 out of 10, outperforming the control groups which had only 6.7 out of 10. These results suggest that the use of mind mapping as a pre-reading activity had a positive effect on the participants' reading comprehension.

The scores that the participants made in the first reading lesson were also examined. The result (see Table 3) shows that both the

treatment groups and control groups had similar scores ranging from 6.4 to 6.6. The difference was not significant. One of the control groups even had the same score as two of the treatment groups. One possible explanation for this result is that in the first lesson, the participants in the treatment groups were not familiar with the mind mapping technique yet and thus did not make any bigger gain in comprehension than the control groups.

Table 3 Mean scores in the first lesson for all groups

	Group A	Group B	Group C	Group D	Group E
Mean	6.6	6.6	6.4	6.5	6.6
SD	0.5	0.6	0.5	0.5	0.6

On the contrary, an analysis of the average score that each group made in the last reading lesson indicated that the treatment groups progressed during the course. As shown in Table 4, group A made the highest score in comprehension and the other treatment groups both made 8.3. This is almost 2 points higher than the score they made in the first lesson. It can therefore be hypothesized that once the participants had become accustomed with the mind mapping technique, they could do much better in comprehension. Meanwhile group D did not make any progress compared with their first lesson and group E did make an increase but the difference was not significant.

Using one-way ANOVA to compare the groups' mean scores in the first and the last reading lessons, we found a significant difference for the treatment groups but no significant difference was found for the control groups. Post hoc comparisons (Tukey HSD) indicated that group A, group B and group C made significantly ($p<.05$) higher scores than group D and group E. These results reinforce the hypothesis that mind mapping works better when learners have become accustomed with it and that learners who are given an opportunity to use it in the pre-reading stage gain more comprehension than others.

Table 4 Mean scores in the last lesson for all groups

	Group A	Group B	Group C	Group D	Group E
Mean	8.5	8.3	8.3	6.4	7.0
SD	0.5	0.8	0.6	0.6	0.6

In addition to the above examination, an analysis of the average score that the treatment groups had in each lesson was also carried out. The result demonstrates that the treatment groups outperformed the control groups in all of the eight lessons except for the first one, and that they progressed throughout the course (see Figure 1 and Table 5). As it can be seen from Figure 1, groups A, B and C were always at a higher level of comprehension than groups D and E. Moreover, they also tended to increase their comprehension toward the last reading lessons. It could therefore be claimed that mind mapping facilitates learners' reading comprehension and may help them comprehend the text better as they get used to using it.

Figure 1 The progress in reading comprehension during the course for all groups

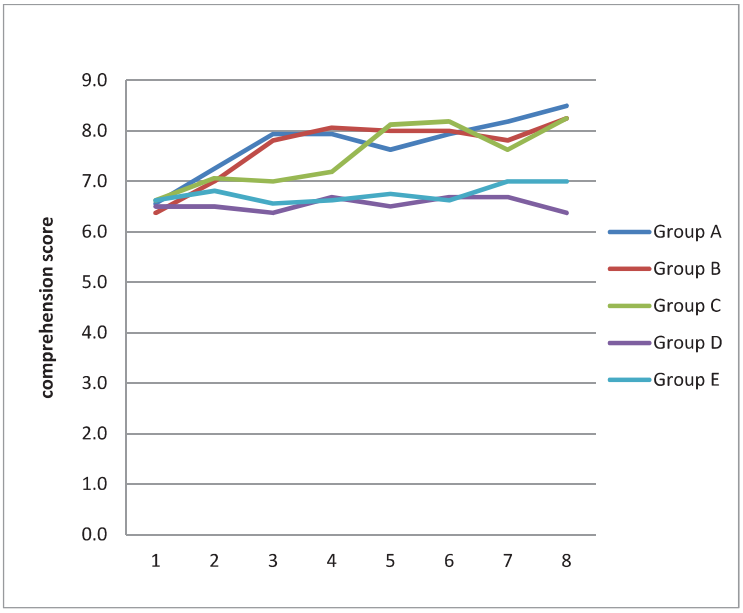

Table 5 Mean of comprehension in all lessons for all groups

Group/Lesson	L1	L2	L3	L4	L5	L6	L7	L8
Group A	6.6	7.3	7.9	7.9	7.6	7.9	8.2	8.5
Group B	6.6	7.1	7.0	7.2	8.1	8.2	7.6	8.3
Group C	6.4	7.0	7.8	8.1	8.0	8.0	7.8	8.3
Group D	6.5	6.5	6.4	6.7	6.5	6.7	6.7	6.4
Group E	6.6	6.8	6.6	6.6	6.8	6.6	7.0	7.0

Participants' reading comprehension outside the course

In this study, a pre-test and a post-test were also administered to determine whether mind mapping had any effect beyond the lessons in which it is utilized. Before and after the treatment, both the experimental and control groups sat a pre-test and a post-test. The pre-test and post-test were administered in such a way that the participants did not know that their reading comprehension was being tested. They were also told that the results of the tests would not be used for grading. This was to eliminate the possibility that some of them might cheat to get a higher score. The two tests were put into a Vocabulary Profiler to make sure they are at the same level of difficulty.

The results indicate that all the treatment groups and control groups had similar average scores for the pre-test. As shown in Table 6, the two control groups had the same mean scores as two of the three treatment groups. This suggests that all the five groups were at the same reading comprehension level before the treatment. However, on the post-test, there were significant differences in the treatment groups' performance and the control groups' performance (see Table 7)

Table 6 Mean scores on the pre-test for all groups

	Group A	Group B	Group C	Group D	Group E
Mean	6.4	6.5	6.7	6.4	6.7
SD	0.5	0.7	0.7	0.8	0.6

Table 7 Mean scores on the post-test for all groups

	Group A	Group B	Group C	Group D	Group E
Mean	7.7	7.8	7.8	6.6	6.8
SD	0.6	0.7	0.7	0.6	0.6

Using one-way ANOVA, we tested the null hypothesis that all the mean increases of the five groups were equal. We found that the treatment groups' mean scores and the control groups' mean scores were significantly different, $F(4, 75) = 12.15$, $p = 0.000$. Post hoc comparisons using Tukey HSD test indicated that the mean scores for group A ($M = 7.7$, $SD = 0.6$), group B ($M = 7.8$, $SD = 0.7$) and group C ($M = 7.8$, $SD = 0.7$) were significantly higher than the mean scores for group D ($M = 6.6$, $SD = 0.6$) and group E ($M = 6.8$, $SD = 0.6$).

Taken together, these results suggest that there is an association between the use of mind-mapping technique in the pre-reading stage and the participants' reading comprehension. Learners who had a chance to do mind mapping activities before reading the text tended to comprehend the text better than those who did other kinds of activities in the pre-reading stage.

Conclusions And Discussion

This study set out with the aim of exploring the effect of the mind mapping technique as a pre-reading activity on EFL learners' reading comprehension. The participants were EFL learners at a language center in Vietnam and were at the pre-intermediate level of English at the beginning of the study. There were five groups of 16 learners, who were following an English course at the center. Three of these five classes were chosen to be the treatment groups and the other two were the control groups. Before the experiment, all the five groups sat a pre-test, which required them to read a text and answer the accompanying comprehension questions. After than the treatment groups were given chances to take part in mind mapping activities in the pre-reading stage for every reading lesson. At the same time, the control groups had other conventional pre-reading activities in their reading lessons. Finally, all the five groups sat the post-test, the format of which was similar to that of the pre-test.

The research found that there is a strong relationship between using mind maps and learners' comprehension ability. The treatment groups gained substantially higher scores in comprehension in almost all the eight reading lessons. This result collaborates the findings of previous studies in the topic (Siriphanic and Laohawiriyano, 2010; Rizqiya, 2013; Tabatabaei & Khalili, 2014; Phatchara and Pothitha; Beydarani, 2015). The data demonstrated that the result was reliable. First, the treatment groups and control groups were at the same level of comprehending English texts at the beginning of the experiment. This was illustrated by the similar or same scores that they gained on the pre-test and in the first reading lesson. This result eliminates the possibility that the control groups did not perform as well as the treatment groups because they were at a lower level. It also confirms that the treatment groups' comprehension gains were genuine. Second, the treatment groups tended to increase their compre-

hension throughout the course. Their performance was getting better toward the end of the treatment. This not only strengthens the idea that mind mapping facilitates learners' comprehension but also indicates that the increase in comprehension is a gradual and meaningful improvement.

Examining the transfer of comprehension improvement from the English course to other contexts was another important goal of this research. A pre-test and post-test on reading texts were administered in order to seek the answer to this issue. For these tests, unlike what they did in the course, the participants were not asked to do mind mapping activities before reading the text. The data showed that the treatment groups outperformed the control groups and a comparison of the two categories showed a significant difference at the $p<.05$ level. The sufficiency of results in favour of a positive effect confirmed that the learners' reading comprehension ability was improved beyond the treatment. In other words, even when they were not attending a reading lesson with mind mapping activities in the pre-reading stage, they comprehended the text better than learners who were previously not trained to use the mind mapping technique. One possible explanation to this may be that learners who have been trained to use mind mapping will, even when they are not in a reading lesson, do some sort of mind mapping before reading any text, thus bring themselves a chance to understand the text better. To a broader scope, it can be assumed that the habit of taking part in mind mapping activities during the treatment had trained the treatment groups' brain to work more efficiently and effectively. Through doing those activities, their brain became more active and was enabled to perform more co-opperatively, which in turns, helped them comprehend the text better. This idea is supported by Sperry (1968)'s proposal, which stated that integrating mind mapping activities facilitates our brain's performance because we can practice and exercise the fundamental memory powers and information processing, and at the same time use our entire range of cortial skills.

The generalisability of these results is subject to certain limitations. For instance, since there were only eight reading lessons, the data withdrawn from the treatment might not have been suf-

ficient enough. Further research could be conducted with a bigger size of population to confirm the reliability of the findings. In addition, the reading lessons and other lessons of the English course were carried out simultaneously. Although all the participants attended all the reading lessons, there were no records of their attendance to the other lessons. It could therefore be assumed that some participants skipped one or more lessons of other skills and did not do well in the reading lessons because their English proficiency was falling behind other participants who attended the course fully. In future studies, a record of participants' attendance to the sessions they follow during the treatment should be included to increase the reliability of the result.

In conclusion, this study extends our knowledge of the benefits of mind mapping in EFL reading lessons. The most obvious finding to emerge from this study is that mind mapping as a pre-reading activity enhances EFL l earners' reading comprehension. It is therefore recommended that mind mapping should be used in reading lessons to enable learners to think and read effectively. Another significant finding of this investigation is that the effect of mind mapping activities goes beyond the training course. That is, the training of using the mind mapping technique not only assists learners in comprehending the texts they read while being trained, but also helps their mind to work more powerfully, which facilitates reading comprehension in other situations. This finding complement those of earlier studies, and add new knowledge to the literature. Taken together, the research offers some insights into the usefulness of mind maps and its findings have several practical implications, especially for English language teachers who are concerned with teaching the reading skill and developing EFL learners' reading comprehension.

References

[1] Al-Jarf, R. (2009). **Enhancing freshman students' writing skills with a mind mapping software.** A paper presented in the 5th International Scientific Conference, eLearning and Software for Education on April 9th-10th, 2009 in Bucharest.

[2] Al-Jarf, R. (2011). Teaching spelling skills with a mind-mapping software. **Asian EFL Journal Professional Teaching Articles,** 53, pp. 4-16.

[3] Bell, T. (2001). **Extensive reading: Speed and comprehension**. The Reading Matrix, 1(1), pp. 1-13.

[4] Beydarani, V. (2015). **The Influence of Concept Mapping on Reading Comprehension of Iranian English Students Employing Persuasive and Descriptive Texts.** Journal of Language Teaching and Research, 6(1), pp.196-203.

[5] Budd, J. W. (2003). **Mind maps as classroom exercises**. Minnesota: University of Minnesota.

[6] Calfee, R. C., & Curley, R. (1984). **Structures of prose in content areas**. In: J. Flood (Ed.), Understanding reading comprehension. Newark, DE: International Reading Association, pp. 161-180.

[7] Chang, A. C. S. (2010). The effect of a timed reading activity on EFL learners: Speed, **comprehension, and per ceptions.** Reading in a Foreign Language, 22(2), pp. 284-303.

[8] Cobb, T. W. Vocabprofile [accessed 22 August 2010 from http://www. lextutor.ca/vp/] - an adaptation of Heatley & Nation's (1994) Range.

[9] Davey, B. (1983). Think-aloud : Modeling the cognitive process of reading comprehension. **Journal of Reading,** 27(1), pp. 44-47.

[10] Dombey, H. (2009). **The simple view of reading**. ITE English: Readings for discussion Retrieved 20 Dec 2010, from http://www.ite.org.uk/itere adings/simpleviewreading.

[11] Guthrie, J. T. et al., (2004). Increasing Reading Comprehension and Enga gement through Concept-Oriented Reading Instruction. **Journal of Educational Psychology 2004**, 96(3), 403-423.

[12] Kaufman, J. (2010). 3 Simple Techniques to Optimize your Reading Comprehension and Retention.In : **The Personal MBA.** Retrieved March 10, 2014, from http://personalmba. com/3-simple-techniques-to-optimize -your-reading-omprehensionand-retention/#ixzz0hj7mdIy2.

[13] Macalister, J. (2008). Effect of a speed reading course in an English as a second language environment. **TESOLANZ Journal**, 16, pp. 23-32.

[14] Millett, S., Quinn, E., & Nation, P. (2007). **Asian and Pacific speed readings for ESL learners**. Wellington : English language institute occasional publication.

[15] Murley, D. (2007). **Mind mapping complex information**.Illinois :Southern Illinois University School of Law Library.

[16] Nicholson, T. & Tan, A. (1997). Flashcards revisited: Training poor readers to read words faster improves their comprehension of text. **Journal of Educational Psychology**, 89 (2), pp. 276-288.

[17] Oakhill, J & Cain, J. (2000). Children's Reading Comprehension Ability: Con current Prediction by Working Memory, Verbal Ability, and Component Skills. **Journal of Educational Psychology**, 96 (1), pp. 31-42.

[18] Phatchara P. & Pothitha, S. (2014). Development of English Reading Comprehension by Using Concept Maps. **Procedia - Social and Beha vioral Sciences,** 116, pp. 497-501.

[19] Rizqiya, R. S. (2013). The use of mind mapping in teaching reading compre hension. **ELTIN Journal**, 1(1), pp. 32-43.

[20] Saarnio, D. A., Oka, E. R., & Paris, S. G. (1990). Developmental predictors of children's reading comprehension. In: T. H. Carr & B. A. Levy (Eds.), **Reading and its development : Component skills approaches. New York : Academic Press**, pp. 57- 79.

[21] Schwanenflugel, P. J., Meisinger, E. B., Wisenbaker, J. M., Kuhn, M. R., Strauss, G. P., & Morris, R. D. (2006). Becoming a fluent and automatic reader in the early elementary school years. **Reading Research Quarterly**, 41(4), pp. 496-522.

[22] Siriphanic, P. & Laohawiriyano, C. (2010). **Using mind mapping tech nique to improve reading com prehension ability of Thai EFL university students.** A paper pre sented in the 2nd International Conference on Humanities and Social Sciences on April 10th, 2010 in Faculty of Liberal Arts, Prince of Songkla University Strategies-Teaching.

[23] Smith, F. (1978). **Reading**. Cambridge: Cambirdge University Press.

[24] Sperry, R. W. (1968). **Hemisphere deconnection and unity in conscious awareness.** American Psychologist, 23(10), pp. 723-733.

[25] Stanovich, K.E. (1991). Word Recognition : Changing perspective. In: Barr, R., et al (Eds.) **Handbook of Research Volume II**. New York: Longman, pp. 418-425.

[26] Tabatabaei, O. & Khalili, S. (2014). The Effect of Concept Mapping on Iranian Pre-intermediate L2 Reading Comprehension. **Journal of Language Teaching and Research**, 5(6), pp. 1368-1380.

[27] Tran, Y. (2012). The Effects of a Speed Reading Course and Speed Transfer to Other Types of Texts, **RELC Journal,** 43(1) pp. 23-37.

[28] Urquhart, A. H. (1987). **Comprehensions and interpretations. Reading in a Foreign Language**, 3(2), pp. 387-409.