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The Effect of Learner Constructed, Fill in the Map Concept Map Technique, and Summarizing Strategy on Iranian Pre-university Students' Reading Comprehension

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Abstract

Concept maps (CM) are powerful tools which have different uses in educational contexts; however, this study limited its extension and explored its impact on the reading comprehension skill of Iranian EFL students. To this purpose, a proficiency test was employed and 90 intermediate pre-university students were chosen and divided into three groups: learner constructed CM group, fill in the map CM group, and summarizing strategy group. The whole study was conducted within three months. At the beginning of the study, a reading comprehension test (as a pre test) was administered to measure the comprehension ability of the subjects. During the five-session treatment period, the assigned strategies were taught and practiced in each group. Then, another reading comprehension test (as a post test) was employed to compare the effect of treatment on the comprehension skill. The results of the study showed that despite the efficacy of all three strategies, the fill in the map version of CM was the most influencing one. It suggested that in general, CM technique might be regarded as an alternative or even as an effective replacement of the summarizing strategy for reading comprehension skill.

Keywords: reading comprehension strategies, learner–constructed Concept Map, fill in the Map Concept Map, summarizing strategy

1. Introduction

In the educating context, based on the idea of learning how to learn and investigating the process of students' learning, the idea of concept map (CM) was emerged. It is defined as "graphical tool for organizing and representing relationships between concepts indicated by a connecting line linking two concepts" (Novak & Canas, 2007, p. 1). In another definition Novak (2010) described it as a new model for education (Novak, 2010). The technique of CM was developed by Joseph D. Novak and his research team at Cornell University in the 1970s as a means of representing the emerging science knowledge of students. In his study, Novak and his team sought to follow and understand changes in children's knowledge of science. It has subsequently been used as a tool to increase meaningful learning in the sciences and other subjects as well as to represent the expert knowledge of individuals and teams in education, government and business.

As Novak demonstrates, the technique of CM is rooted in Ausubel's Assimilation Theory. The fundamental idea in Ausubel's assimilation theory is that "learning takes place by the assimilation of new concepts and propositions into existing concept propositional frameworks held by the learner" (Novak & Cañas, 2008, p. 2). Three distinctive features can be assigned to CMs which include hierarchical structure, cross links and specific examples. The most important and a basic feature of a CM is the hierarchical structure. In the process of creating a concept map, the broadest, most inclusive concept should be first determined and written either in the top or in the middle part of the map while detailed concepts will be positioned below the top or around the central concept (as a node). Other concepts which are less important will be deleted or moved away from the map. The other important feature is cross links between separated concept nodes. In drawing a concept map, different kinds of arrows will be used to show the relationship between different concepts. Providing specific examples is the last feature of CM. According to Mintzes, Wandersee, and Novak (2000) the purpose of providing examples is to clarify the meaning of a given concept (Mintzes, Wandersee, & Novak 2000). Additionally, there are different versions of CM which includes expert- constructed concept map, learner – constructed concept map, fill in the

map concept map and cooperative concept map.

Reviewing the literature reveal that CMs are powerful tools which have different uses in educational contexts such as learning or comprehending tools, evaluation tools, study skills, advance organizer, recalling, and facilitator of learners who have language difficulty to mention some. On the other hand, as studies indicate the ability to read and comprehend is considered as one of the most important and basic skill for a person to learn and educate. More specifically and to my knowledge, Iran can be considered as one of those countries in which for its most users English has the role of library language; in other words, among the all other skills, reading comprehension is considered as the most important and basic skill; hence, in the present study, the researchers limited CM's extension and explored the possibility of CM to be influential on reading comprehension. Based on the fact that students' comprehension ability could be enhanced as their teachers provide appropriate strategies that match their learning styles; it is sought to explore whether introducing this novel and flexible tool will enable them to tackle the challenging texts with greater independence.

A wealth of studies has been conducted to investigate the impact of CM on education; however, a brief review of its impact on reading comprehension is mentioned to support the claim for the implementation of this study. In the English reading field, CM technique is beneficial for students in terms of reading comprehension, recalling and organization. In one study, Chang, Sung and Chen (2001) compared the two versions of computer-based concept mapping: 'construct-on-scaffold' and 'construct-by-self' on student learning. Construct-on-scaffold' is the same as 'fill in the blank version' of concept map in which an incomplete framework of an expert concept map with some blanks are provided as a scaffold for the students. Students had to fill in the blanks to complete the framework. And in the 'construct-by-self', students were provided with the opportunity of constructing their concept maps freely and without scaffolding aid. The result indicated that concept mapping with scaffoldfading instruction provided a more positive effect on student learning (Chang, Sung & Chen, 2001).

Interestingly, in another study (2002) they investigated the effect of concept-mapping strategies (map correction, scaffold fading, and map generation) on students' text comprehension and summarization abilities. Results indicated that the map correction method enhanced text comprehension and summarization, and the scaffold-fading method facilitated summarization. The findings also suggested that combining a spatial learning strategy with a correction method or scaffolding instruction might be a potential approach for optimizing the effects of concept-mapping (Chang, Sung & Chen, 2002).

Dolehanty (2008) studied the effect of concept mapping technique on the students reading comprehension. In this study, students who participated in concept mapping instruction completed a survey both prior to and at the completion of the instruction period. Furthermore they practiced concept map on six chapters of their books and then participated on a reading comprehension test. The result indicated that concept mapping had no significant impact on the students' reading comprehension. However; most of the students reported that they had positive attitudes about the concept map (Dolehanty, 2008).

Lambiotte and Dansereau (1992) proposed that students with low prior knowledge benefit more from concept maps than those with high prior knowledge (as cited in Nesbit, Adesope, 2006). The process of creating concept map for a domain helps learners to gain insight into how they learn (Canas et al., 2003). In addition, concept mapping promoted reflection, a self- regulatory process related to motivation, self- control, and self-efficacy (Coulthard, 2005).

Liu (2009) investigated the effectiveness of the concept mapping learning strategy on learners' English reading comprehension. The result indicated that the concept mapping learning strategy was more effective for the low-level group than for the high-level group, in terms of their performance on reading comprehension (Liu, 2009). In the same vein, Dias (2010) examined the effect of strategy of concept map on the second language learners' reading comprehension. Results showed that the construction of meaning by the creation of concept maps could be an effective reading strategy in English as an L2 (Dias, 2010).

O'Donnell, Dansereau, and Hall (2002) believed that the property of concept maps in comparison with prose-form summaries is that they are reviewed more quickly. In this respect concept maps may be similar to other concise summary formats such as lists and indented outlines (as cited in Nesbit & Adesope, 2006). Nesbit and Adesope (2006) also proposed that concept map is particularly helpful for acquiring main ideas, but poor for acquiring detailed, nuance-laden knowledge (Nesbit & Adesope, 2006).

Concept mapping has been used widely in "hard" science fields such as physics, chemistry, and biology. Several researches have demonstrated that the use of concept mapping technique is an effective tool for aiding student's comprehension and retention of science material. Furthermore they illustrated that students using concept maps have better performance than students receiving more traditional types of instruction. For instance, Patrick (2011)

in one study examined the use of concept mapping as study skill on students' achievement in biology. The result indicated that there was no significant difference in immediate Post achievement test scores between students who used concept mapping as a study skill and those who reviewed and summarized in their studies. However, in respect to retention a significant difference was found between students who used concept mapping as study skill and those who summarized after review; in other words, using concept mapping technique helped learners to retain knowledge for a longer period of time. In addition he believed that by the help of concept map students can enhance their achievement tests scores (Patrick, 2011). BouJaoude and Attieh (2007) also conducted a study in which the effect of concept maps as study tools on achievement in chemistry was investigated. Finding of a study revealed that although there were no significant differences on the achievement total score, there were significant differences favoring the experimental group for scores on the knowledge level questions (BouJaoude & Attieh, 2007).

As mentioned above, there is a rich body of researches showing that CM enhance learning by encouraging students to think both deeply and critically, as well as by improving comprehension (Nesbit & Adesope, 2006). However, there is still a lack of research regarding the use of CM in L2 in general and in L2 reading comprehension in particular (Jiang & Grabe, as cited in Rosenberg et al., 2010). Nonetheless, it should be mentioned that reading comprehension and CM are similar in that both stress the importance of assimilating new information with previously learned information. Being familiar with this technique and feeling it's necessitate in our (Iranian) educational context stimulated me to explore it in the current study.

In general, several reasons may be the source of students' difficulty in reading comprehension. Factors such as lack of appropriate reading strategies, lack of background knowledge related to the topic of the target language or lack of attitudes toward reading are examples of source of that difficulty. Moreover, there are few teachers who are familiar with the recent strategies to provide some effective opportunities for their students. According to my own knowledge and on the basis of what actually occurs in most Iranian classrooms, the strategy which is frequently applied by most Iranian teachers and students is the summarizing strategy. Regarding the vast improvements in the domain of reading comprehension strategies in the world, it seems there is a need to call for those new strategies to provide some improvement in this domain. In an attempt to achieve this goal, the impact of two versions of the concept mapping technique i.e. fill in the map and learner-constructed concept mapping were compared with summarizing strategy to determine if CM could be regarded as a effective alternative or even replacement of the summarizing strategy. Therefore, the purpose of this study is twofold: to investigate whether concept map is effective and has advantages on the summarizing strategy and if it has advantages, which version of concept map is more appropriate; learner constructed or fill in map. So to meet the requirements of the study, the following research question was addressed:

Research Question: Is there any significant difference between the reading comprehension of the students who use concept map techniques and summarizing strategies?

Null Hypothesis: There is no significant difference between the reading comprehension of those students who use fill in the map, learner-constructed concept maps, and summarizing strategies.

2. Method

2.1 Subjects

The subjects of this study were selected from among 125 high school students from five classes of three schools in Babol. All of them were pre-university students and all were majoring in science. All of them were girls and their age range was about 17 -18 years old. Since only intermediate students were required for the purpose of the study, a standard proficiency test was administered and 90 students were selected as the subjects of the study. Then they were divided into three intact groups each consisting of 30 subjects. When they were interviewed about their process of learning English, almost all of them mentioned that they had experience of learning English as a foreign language in language institutes.

2.2 Materials

2.2.1 Data Collection Tools

To conduct the present study different kinds of tools were administered to collect the required data in different steps.

2.2.1.1 Placement Test

A standardized language proficiency test named as Oxford Solution Proficiency Test by Linda Edwards (Oxford University Press 2007) was employed for the purpose of choosing students with intermediate level and ensuring

their homogeneity.

2.2.1.2 Reading Comprehension Pretest

A reading comprehension test as pretest was administered to measure the comprehension ability of the students before applying the treatment. The pretest involved three passages of comparable length (average of 600 words) with the same readability level along with the total of 30 multiple choice questions. Topics of pretest's passages were Biospheres in Space, Ecotourism and You Can Be a World Memory Champion respectively. The reliability coefficient of the pre test based on Alpha Cronbach was .90. All passages that were used in this study including the reading comprehension pre test were selected from two best selling reading comprehension books entitled Reading and Vocabulary Development 3 Causes and Effect by Ackert and Lee (2004) and Active Skills for Reading: Book 3 by Anderson (2009).

2.2.1.3 Teaching Passages

As mentioned above the passages that were used to teach and test in this study were selected from two best selling reading comprehension books entitled *Reading and Vocabulary Development 3 Causes and Effect* by Ackert and Lee (2004) and *Active Skills for Reading: Book 3* by Anderson (2009). The rationale for choosing the passages from these books were that since only students in the intermediate level were subjects of this study, books with series of levels were more suitable to select passages from them. In such books the passages are graded according to the CEF levels (The Common European Framework of Reference: Learning, Teaching, Assessment), so allow the users to choose those books which are at the required language level. Hence, there was a verification that the selected passages were at the intermediate level, i.e. at the same level of the students. Five passages from these two books were selected to practice in the classroom, which were the same for all groups and contain an average of 550 words for each passage. Topics of the passages were the Dangers of Dieting, Headaches, the Garbage Project, Homeschooling, and Afraid to Fly.

2.2.1.4 Reading Comprehension Posttest

A parallel reading comprehension test similar to pretest was used as a post test to assess the efficacy of the treatment on the students. It also contained three passages of comparable length (average of 600 words) with the same readability level and with the total of 30 multiple choice questions. Topics of posttest's passages were Photovoltaic Cells: Energy Source of the Future, Endangered Animal Success Stories, and Skyscrapers respectively. These passages were also selected from the same book as used for the pretest and the teaching passages. The reliability coefficient of the post test based on Alpha Cronbach was .69.

2.2.1.5 Cmap Tools

In order to create the blank CMs for the subjects in the fill in the map group, the CmapTools software, a free software developed at the Institute for Human and Machine Cognition (IHMC at http://cmap.ihmc.us/conceptmap.html) was used. This software offers a style which allows mappers to shape their maps with colors, shadows, background images, different types of lines and arrowheads for indicating directions, different types of sizes and fonts, and text alignments.

2.3 Procedure

2.3.1 Placement and Pre test Administration

By applying a standard proficiency test students with intermediate level were selected as the subjects of the study. Then to determine the reading comprehension ability of the subjects before conducting the treatment, the mentioned pretest was administered to the all three groups. Subjects were supposed to answer to the all questions in 36 minutes. The procedure used in administering the pretest was exactly the same for all three groups.

2.3.2 Treatment

The whole study was conducted within three months. Two versions of CM including learner-constructed CM and fill in the map CM and a traditional reading comprehension strategy (i.e. summarizing strategy) were the selected strategies which were applied in the experimental groups 1 to 3 respectively. Once the pre test was administered to the three groups, a treatment procedure involving five-session instruction and practice of the particular strategy with a period of 20 minutes for each session was assigned to each group.

2.3.2.1 Experimental Group 1: Concept Map Drawing Instruction and Feedback Provision

In this group, subjects were supposed to learn how to draw CMs for the five passages which were taught to them. The first step in CM training was to introduce subjects with the ideas of CM and its advantages and uses. Subjects were provided with handouts that included the definition of CM and its uses and applications, the

procedure of drawing a CM by Novak and Gowin (1984) and a passage with a drawn CM as a model. The strategy was taught explicitly following Novak and Gowin's (1984) step-by-step procedure then students were taught the reading passages and were asked to draw CM of their own at home and submit them to teacher. One point which is worth to mention is the familiarity of one subject of this group with the issue of CM; this opportunity provided a helpful condition for the researchers in the process of instruction. In every five sessions the subjects' drawn CMs were collected and read and some feedback were provided for them. The purpose of the evaluating of CM and provision of feedback was helping students learn how to create a good CM progressively up to the last session. Having the scoring system of Novak and Gowin (1984) in their mind, the researchers used a holistic method of scoring with a scale of good, fair, and weak to assess students' concept map and provide feedback to them. At the end of the course, they received a complete feedback report including reviewing important points.

2.3.2.2 Experimental Group 2: Fill in the Map Concept Map Instruction and Feedback Provision

Instead of creating a concept map, subjects in this group were provided with the drawn CMs of their passages in which some concepts or linking lines had been left out and students were asked to fill in the maps based on the passages they were taught. Students of this group were also provided with the same handouts about CM as the first group. The difference was in the way they had to do their assignments as mentioned above. A holistic method of scoring with a scale of good, fair and weak was applied to assess students' process of filling of CMs and to provide appropriate feedback. In each of the five sessions, students had to submit their assignments and one of the researchers prepared some useful comments and feedback based on students filled maps and provided them orally to the all students.

2.3.2.3 Experimental Group 3: Summarization Instruction and Feedback Provision

Subjects of this group were asked to summarize the passages that were taught. To this purpose, handouts including information about the definition of summarization strategy and its applications on the reading comprehension were provided for them. After explicit instruction of the strategy based on Brown and Day (1983) general rules of summarization; the reading passages were taught in each session and subjects were asked to summarize the passages at home and summit their works to the teacher. Like the other groups, a holistic method, including scales of good, fair and weak was selected to assess their summarization. In each session based on the subjects' summaries and their questions and problems, the researchers prepared some comments and feedback and provided them orally to all of them.

2.3.3 Posttest Administration

At the end of the treatment, the post test was administered to the all groups. Based on the property of this study, there was a difference between the administration of the pretest and posttest. The difference between the pretest and the posttest was that on the pretest all groups answered reading comprehension questions without employing the strategies while on the posttest they employed the strategies that they learned and then answered the reading comprehension question in the multiple choice form. Because of limitation in the school time and for the purpose of handling the exhaustion of subjects, the posttest administration took place in two sessions for each group. To take them under control, the subjects were asked to submit the papers in which they applied their strategies; in this way the researchers were sure they had employed the required strategy to answer the reading comprehension questions.

3. Results

Before analyzing the results, it seems necessary to mention the findings collected from the applying of teaching strategies on the subjects and teachers:

Both teachers and subjects were more willing toward reading when they learned that there are different kinds of strategies they can use into their reading comprehension. Regarding concept map (CM) technique, the focus of the present study and a new and interesting technique to them, it was found that participating teachers and subjects were mostly motivated to learn this strategy and apply it into their lessons. In other words, after teaching for a while, the researchers realized that almost all subjects of CM groups were motivated to use the strategy even for their other courses especially the fill in the map CM group where their task was easier and faster to do.

To provide the statistical analysis of the data, first a normality test was employed to evaluate the normality of the collected data. According to Soleimani (2009), the first step to decide upon the application of an appropriate statistical test is to numerically test the normality of the collected data. Since the data of the reading comprehension post test was normal, parametric statistic tests were applied to analyze the results. An analysis of variance *(ANOVA)* was applied between the three groups' posttest to explore whether there was a significant difference between them.

Table 1. Results of *ANOVA* of Reading Comprehension Post Test

Source of changes	Sum of Squares	*df*	Mean Square	*F*	Sig.
Between Groups	57.15	2	28.57	5.41	.006
Within Groups	459.16	87	5.27		
Total	516.32	89			

Note: Sig < .05 is significant

As Table1 indicates, there was significant difference between the performance of the three groups (Sig= .006). In other words, the null hypothesis that "there is no significant difference between the reading comprehension of three groups" was rejected. To do the further analysis of the data, the pair wise comparison had been done in order to figure out whether there was significant difference between reading comprehension of each pair groups. Table 2 also presents the results.

Table 2. Post Hoc Result for Multiple Comparison of Post Test

group(I)	group(J)	Mean Difference (I-J)	Sig.
1	2	-1.20	.135
	3	.73	.469
2	1	1.20	.135
	3	1.93*	.007
3	1	-.73333	.469
	2	-1.93*	.007

* The mean difference is significant at the 0.05 level.

Delving into the details of the use of the mentioned strategies on reading comprehension, it could be noticed that only in the case of the comparison of group two and three, the difference was significant *(MD=1.93; Sig.=.007)*. In other words, the fill in the map CM group performed significantly better than the summarizing group. As the first line (row) of Table 2 shows, the mean difference (MD) of groups one and two was -1.20 which revealed that group two was better than group one, however the difference was not significant (Sig.=.135). Additionally when groups one and three were compared the result showed that despite the better performance of group one than group three (MD=.73), again the difference was not significant (Sig. =.469). Overall, the finding of this study was in favor of CM technique on summarizing strategy with regard to reading comprehension skill. It further verified that the fill in the map version of CM was the most influencing strategy amongst all three strategies.

4. Secondary Findings

In addition to these results, the present study also revealed another aspect of the study which the researchers felt it was worth to mention. The purpose of this section is to report the effect of mentioned strategies on the reading comprehension of the three groups. Since this study was in pre- post test design, considering the effects of the treatment on the reading comprehension of each group could provide additional interesting findings. To achieve this goal, the *ANOVA* test was employed to determine whether there was any significant difference between the mean scores of the three groups. Although it was assumed that the three groups were homogenous according to the standard proficiency test, the result of *ANOVA* confirmed it. In other words, it revealed that there was no significant difference between the three groups (Sig=.69). Table 3 presents the result of *ANOVA* of the pretest.

Table 3. Results of *ANONA* for Reading Comprehension Pre Test

Source of changes	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.09	2	1.54	.369	.692
Within Groups	364.03	87	4.18		
Total	367.12	89			

Furthermore to determine the impact of each group's treatment on the students' reading comprehension, the "t" test was computed. Table 4 shows the results.

Table 4. Result of Paired- t test between Groups (Effects of Treatment)

Groups	N	Mean Differences (MD)	Standard Deviation (SD)	t	*df*	Sig.
Group 1	30	3.30	1.84	9.62	29	.001
Group 2	30	4.06	2.04	10.86	29	.001
Group 3	30	2.23	.29	7.58	29	.007

As Table 4 displays in all three groups there was significant difference between the performance of the subjects in reading comprehension pre and post tests of each group (sig_1=.001, sig_2 =.001 and sig_3 =.007). In other words all strategies (learner constructed and fill in the map CM technique and summarizing strategy) had positive effect on subjects' reading comprehension.

5. Discussion

As it was revealed in the data, there was relationship between the degree of reading comprehension ability and applying of the mentioned strategies. In other words subjects' comprehension ability improved when they used the required strategy in comprehending the texts. Another point of interest is that in general, CM performed better than the traditional reading comprehension strategy (i.e. summarizing strategy) and put it into more details the fill in the map version of CM had advantages over the learner constructed one.

For years, and more recently, summarizing strategy has been called as an important tool in reading comprehension but as indicated in this study there are other strategies which is worth to put emphasize on them. Although CM and summarizing strategy are similar in a way in which both play the role of taking notes; they are different in some fundamental aspects. One reason for the difference in comprehension could be due to the way they approach the texts. CM technique allows learners to get use of their visual intelligence while summarizing strategy does little in this case. This graphical tool has shown that are helpful because in addition of paying attention on sequential structure of the text, its visual representation also allows them to get a holistic understanding of the text. Moreover it allows them to visualize a certain knowledge structure in a graphic form which helps them to take in all the data from an image simultaneously and recall the information easier and faster. Interestingly it is also helpful in a sense in which it reminds learners that they are equipped with multiple intelligences (Gardner, 1983) and visual intelligence is one of those intelligences which is highlighted by CM. So, the advantages of CM over summarizing strategy could be justified by referring to the opportunity of letting learners to get help of the visual ability as well as other abilities. Hence, consistence with this study one of the obvious reason of the superiority of CM groups over the summarizing strategy group would be its role in encouraging learners to get help of their visual intelligence.

To view it in another aspect, creativity can be considered as another advantage of CM over the summarizing strategy. As Novak and Gowin (2003) believe the act of mapping requires a creative activity in which the learners should exert to clarify the meaning of the text and finds the relationships between concepts. They believed that concept mapping is an excellent exercise for the promotion of creative thinking and identification of new problem-solving methods. It seems that encouraging creativity is another important feature of CM compared with summarizing strategy and as it is revealed in this study the CM groups benefited most from this opportunity.

Another reason for CM advantages is its provision of Meaningful learning. Several studies have showed that CM technique involves the activation of the prior knowledge and reorganization of the relationships between concepts. CM has the important role of activating learners' prior knowledge which is an effective stage for meaningful learning. Hierarchical organization (framework) of CM can also be effective for the retention of the knowledge. Novak believes that one of the reasons concept mapping is so powerful for the facilitation of meaningful learning is that it serves as a kind of template to help to organize knowledge and to structure it. Considering this point in this study, subjects in the CM groups first had to find a general and known concept of the text and relate their prior knowledge with the concept of the text and organize them in a hierarchical form to have a more clear understanding of the text while subjects in the summarizing group put much emphasize on the sequential information of the text. Hence, as finding of this study revealed the process of creating CM seems to be more beneficial than the process of applying summarizing strategy.

The findings of the research question are also in line with previous research in terms of the effectiveness of CM

on reading comprehension. In a study conducted by Liu, Chen and Chang (2009) the effects of a computer-assisted concept mapping learning strategy on EFL college learners' English reading comprehension was investigated. They found that the computer-assisted concept mapping learning strategy had greater reading benefit for the low-level group than for the high-level group. Dias (2010), also, carried out a research on the effect of CM to enhance students' reading comprehension in English as L2. He found that creation of a visual representation of a text can enable students to follow how authors organize and bring together their arguments around a specific topic in the texts they write and as a result can be an effective reading strategy. In another study conducted by Patrick (2011), the purpose of the study was to determine if the use of concept mapping as study skill can influence students' achievement in biology. Significant difference was found in estimated retention between students who used concept mapping as study skill and those who summarized after review, and all the students interviewed agreed that concept maps helped them to determine relationships among concepts, sharpened their understandings and increased their critical thinking. It was concluded that concept mapping could serve as an appropriate alternative for studying biology since what is learned through it can be retained for a longer time.

Another important point to be mentioned is that when the two versions of CMs are compared the fill in the map CM has advantages on the learner constructed CM. There may be several reasons why the fill in the map CM is the best group. To provide further discussion, first it's better to explain more about the completion strategy (Van Merrienboer, 1990). This strategy is based on a sequence of instructional procedures from fully worked out examples with complete task solutions to conventional problems. Provision of partial solutions of tasks or questions is the rationale behind this strategy. There are several studies which supported the rational of completion strategy and indicated that novice learners learn more from studying worked examples and as is revealed in this study, the fill in the map CM group members whose designed work was based on this strategy, performed better than the other groups. Furthermore concerning the findings, it can also be argued that since the skeleton blank map is provided for the students it was very helpful for them to have a holistic understanding of texts and as Chang et al (2001) have found because of the reduced workload on the students' mind, they were more ready to encounter with the texts and understand them better. As a result, this study demonstrated the importance of scaffolding instruction on the comprehension ability of the students. It has shown that students need to be helped by their teachers to improve their understanding and learn better. Another important reason of their success may be explained by referring to the fact that provision of blank map may help learners to get a general picture of what the text was about. And this opportunity helps them to implicitly be aware of the general organization of the text. Having a general picture of the text, not only help them to understand the text better but also make them to be more motivated and eager to read and their motivation may be indicated as one factor of their success.

This Finding is consistent with previous research in terms of the effect of two versions of fill in the map and learner constructed CM on comprehension ability of the students. Research has revealed that comparing the two version of CM, the fill in the map CM has advantages on the learner constructed one. Chang, Sung and Chen (2001), for instance conducted two similar studies and the findings suggested that combining a spatial learning strategy with a correction method or scaffolding instruction is a potential approach for optimizing the effects of concept-mapping. In one study they compared the effectiveness of the 'construct-by-self', 'construct-on-scaffold', and 'construct by paper-and pencil' concept mapping on students' biology learning. They found that the 'construct-on-scaffold' (which is the same as fill in the map CM) had better effect for learning on biology. Based on the Paas's idea of completion strategy; they suggested that concept mapping with scaffold fading instruction may be optimized to be more adaptable and efficient learning. They argued that the reduced workload of the scaffold aid will be the reason of the effectiveness of construct-on-scaffold CM.

In another study they designed three concept-mapping approaches—map correction, scaffold fading, and map generation—to determine their effects on students' text comprehension and summarization abilities**.** They found that the map correction method is the best method for reading comprehension. They believed that by asking a learner to correct concepts and links in the partially incorrect expert map, the researchers forced them (a) to fully "encode" and understand the concepts and the connections between them from the entire map and (b) to use critical and analytical thinking to detect the improper relationships between concepts. In this study, the students using the 'construct-on scaffold' version outperformed the students using the 'construct-by-self' version, yet the 'construct-by-self' version evoked the highest percentage of students who wanted to use concept mapping in their future studies.

At the end it should be noted that as Novak stressed in creating a concept map it is the process which is important not just the final product and it is this property which is very fruitful for learners and educators in the language learning domain. Generally, the results of the present study indicated that comprehension skills can be improved by getting help of appropriate strategy. Strategy instruction would help learners to think thoroughly

about the strategies they could use to improve their reading comprehension and become better reader.

6. Conclusion

As discussed previously, the core interest of this study was to compare the effect of the two versions of CMs; fill in the map and learner constructed CM technique; and summarizing strategy on reading comprehension. As the result showed this study put emphasize on the importance of visual tools in the education. To shed more light in this respect it is worth to consider the general properties of teaching context. In traditional teaching context all learners are viewed as sequential learners and Concepts are introduced in a step-by-step fashion and practiced with drill and repetition, while in the recent teaching methods all learning styles including the visual special style, should be considered to provide a thorough context for teaching. CM technique is most in favor of visual special learners since they comprehend concepts quickly when they are presented within a context and related to other concepts. Conducting a study, Spanish researchers (2002) have found that substantial percentage of school population would learn better when they use the visual- special learning methods. In their study, they found that one third of the school population emerged as strongly visual-special, 30% has shown a slight preference for the visual-special style and only 23% were strongly auditory-sequential (Silverman & Freed 2002). Having these points in our mind, this study suggests that there is a need to provide a method of teaching in which it is in favor of all learners; in other words all learners' styles and intelligences should be take into account in order to have the best method for teaching.

Furthermore this study also supported the importance of students' meaningful learning. In fact as Novak (2010) believes "the central purpose of education is to empower learners to take charge of their own meaning making" and Visual representations such as concept maps are powerful tools to serve such requirement. The last point which is worth to mention is that provision of feedback is an important stage for the students to create CMs. In fact practice and explanation of the technique are not enough and students need to be provided with appropriate feedback to ensure their understanding.

7. Limitations and Suggestions for Further Research

Owing to the practical limitation regarding doing assignments, the present study focused on a small sample of female participants. However, another study can be conducted with a larger sample and with both sexes to examine whether such possibilities will provide different results. Furthermore, it should be interesting if future research focus on the two other versions of CM which are expert constructed and cooperative CM. Additionally it might be better if the future studies investigate CM on the other contexts such as in ESP (English for specific purposes) contexts in which learners have severe problems with comprehending texts written in L2. Moreover this research topic can also be practical in L1 contexts for comprehending of different scientific and academic texts. More specifically since there is the probability that CM might be more practical on some special types of texts, further researches can be designed to investigate the effect of CM on comprehension of different types and structures of texts. However, in spite of these limitations, the present study offered revealing information about the effect of CM technique and summarizing strategy on reading comprehension.

Key Points

It seems to be fruitful to provide the key points at the end of the study:

1. This study stressed the importance of meaningful learning and creative thinking in the realm of reading comprehension.

2. Emphasizing the importance of individuals' differences and their various styles for learning, this study encouraged teachers to provide opportunities for learners to be introduced with various strategies and help them to match their styles with the appropriate strategy.

3. It also revealed that visual representation tools such as CM could be regarded as an effective method for teaching and learning on reading comprehension.

4. It suggested that providing scaffolding learning condition and provision of feedback are the central components of every educational context particularly in the reading comprehension domain.

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