



## The Influence of Concept Mapping on Iranian Intermediate EFL Learners' Argumentative Essay Writing Skill

**Niloufar Jafari**

MA student of TEFL, Sobhe Sadegh Institute of Higher Education, Isfahan, Iran

**Gholam Reza Zarei**

Assistant professor, Sobhe Sadegh Institute of Higher Education, Isfahan, Iran

### **Abstract**

This study aimed to investigate the effects of concept mapping strategy on Iranian EFL learners' argumentative essay writing skill. This work, employing an experimental methodology, was conducted among 60 adult EFL learners from a language institute in Isfahan, Iran. The participants, who were selected based on the result of a preliminary test, were assigned to an experimental and a control group. Each group consisted of 30 students with the same level of language proficiency. While the control group received no special treatment, students in the experimental group took part in concept mapping instruction for 5 weeks with two ninety-minute sessions each week. A writing essay which was used as both pre and post-tests examined the student's progress. Results revealed that instruction had a significant effect on the students' essay writing skill in the experimental Group. In contrast, no considerable change was observed for the students in the control group. Therefore, based on the results obtained, it can be concluded that concept mapping strategy instruction is much influential in promoting students' argumentative essay writing.

**Keywords:** argumentative writing, strategy instruction, concept mapping

### **INTRODUCTION**

Writing is one of the important skills to a student's success in university. Writing also is a highly complex act that demands cognitive and metacognitive activities, for instance, brainstorming, planning, outlining, organizing, drafting, and revising, and so on (Talebinejad, 2007). Teachers seldom teach students how to improve their writing ability while there are a vast number of effective learning strategies and supportive tools that can help students to become more experienced writers. These strategies include concept mapping, organizing, note taking, identifying important information, and summarizing (Pressley, 1982; Weinstein, 1988).

While several types of diagram organizers exist, the concept map is a particularly useful graphical representation, because it requires students to create a visual map of connection in writing how two linked concepts are related. Ojima (2006) used it as an instructional strategy in a planning phase for writing. The researcher considered the whole connected process -a description of associated word clusters and brainstorming activities such as discussion- as concept mapping strategy in a form of pre-writing activity. Concept mapping, as a learning strategy, is defined as "a visual tool for representing the relationship of an individual's knowledge structure on a particular topic as constructed by the individual" (Zimmaro & Cawley, 1998, Negari, 2011, p.2).

Concept maps have been described as "metacognitive tools" (Mintzes, Wandersee & Novak, 1997,) that encourage students to think reflectively about what they know through the visual representation of concept meanings and relationships. Lanzing (1996) described concept mapping as a technique that can demonstrate how people visualize relationships between various concepts. Chularut and DeBacker (2004) proposed that concept mapping is "a tool for representing the interrelationships among concepts in an integrated, hierarchical manner" (p. 249).

Novak and Canas (2006) came up with a series of introductions and instructions for concept mapping which were then accepted as the definition for concept map: Concept maps are, in essence, a visual way of projecting knowledge in an organized manner. They consist of concepts, usually distinguished enclosed in a box or type, and connecting lines indicating the relationships between the concepts. Then we have the linking words or phrases, specifying the relationship between the concepts in brief. The result of all this is called a proposition, which contains two or more concepts connected via linking words to make a meaningful statement about an object or event.

## REVIEW OF LITERATURE

According to White and Arndt (1991), writing is an important experience which enables us to spread the knowledge by sharing our thoughts and ideas; stimulate feelings; persuade and discourage others; and make changes. Writing has a large impact on our social and cultural acts and it should not be considered as a product. In fact, writing is the ultimate form of self-expression. It is the key to unlock the mind's potentials.

Writing is a very complicated process in which numerous activities take place, for instance, planning, drafting, revising and so on (Seow, 2002). To Hadley (2003), "writing is not merely writing things down\_ even in one's native language\_ if so, teaching writing would be an easy task" (Fahim & Rahimi, 2011, p.2). Expressing ideas or simply communicating for that matter, in writing can be slow and difficult, especially for learners.

According to the teachings rhetoric extraordinaire, Aristotle, argumentative writing has the power of conviction where there are conflicting views, beliefs, and attitudes between the writer/speaker and the reader/audience (Hinkel, 2002).

One way of facilitating this is by using strategies such as concept mapping which gradually improve one's writing skills. According to Perkins (1992), "pictorial language of thinking, such as concept maps, is advantageous in that they enable students to simplify complex patterns of ideas and minimize the load of information students must hold in their memories" (Amiri & sarlak, 2010, p. 2). Researchers have shown that students are more capable of identifying the main issues of a passage when the key words are presented to them with visual presentation. This presentation is what we refer to as concept mapping, and the result of these researches serve as evidence of its effectiveness. Concept mapping shows especially positive effects on academic writing tasks (Zipprich, 1995; Peresich, Meadows & Sinatra, 1990).

Freeman (2002) drew another conclusion from studying concept mapping as to its effect on the writing process. She argues that human minds ability to make conceptual projections is indeed a form of concept mapping. Our conception of past and future is nothing more than the process of mapping from one to another.

Ojima (2006) examined the effect of concept planning (as a resource-dispersing factor and as a form of pre-task planning) on three English as a Second Language (ESL) Japanese students" writing performance. He reported that "pre-task planning produced greater fluency and complexity, but did not improve grammatical accuracy" (Sadeghi & mosalli, 2013, p. 4).

A study conducted by Schunk (1998) shows a definite efficacious in the feeling of the students who practiced the strategy with regard to their writing. As the effect of concept mapping as a strategy, emphasizing on organization, it can be argued that students who follow the principles of the strategy are bound to feel a noticeable improvement in their writing skills.

Cronin, Sinatra and Barkley (1992) investigated "the effect of mapping strategies on the students" understanding of text organization and writing performance. The participants of the study were selected from one high school and two junior high schools in Mississippi. At first sequence, descriptive and classificatory types of writing were taught to the students. Then they wrote compositions in comparison/contrast, cause/ effect, and persuasive/argumentative styles. These were presented through mapping strategies. The three stages of writing including revising, editing and proofing were accomplished using peer and teacher cooperation. The results of the writing tests during four-year period revealed consistent gains" (Fahim & Rahimi, 2011, p. 2).

A study by Hauser, Nuckles and Renkl (2006) compared a control group to several groups using concept maps in four ways: constructing CMs from scratch, constructing CMs from a list of concepts, constructing CMs from spatially arranged concepts, and finally studying previously built CMs. The results showed that "constructing maps from scratch and studying previous constructed ones led to significantly better learning outcomes than the other conditions". A similar study by McClure, Sonak and Suen, (1999) presented

evidence on the validity and reliability of concept maps as "an assessment tool" (Villalon & Calvo, 2011, p. 3).

A study by Chang, Sung, and Chen, (2002) validated the use of concept maps to improve text comprehension and summarization. This study investigated three various concept mapping approaches: showing an expert generated CM; scaffolding concept mapping (completing a partially-completed expert CM), and constructing CMs from scratch. Finding of these studies indicate that concept mapping is an effective tool for aiding student text comprehension and summarization material, with the scaffold concept mapping approach leading to retain important materials. CM can also be used to organize students' projections.

McAleese (1998) asserts that concept mapping can help student to reflect their knowledge or an effective strategy to lead the learners to desirable outcome. These studies also define concept mapping as the process of offloading the knowledge that students store in their minds, and distinguish several cognitive aspects when constructing concept maps.

Moreover, in a study by Pishghadam and Ghanizadeh (2006) on the effect of concept mapping on EFL writing ability of a group of Iranian students, it was found that the technique showed remarkable quantitative and qualitative improvement in the pupils' writing skills.

## THIS STUDY

It should be mentioned that this study is an experimental one, because the participants will be randomly divided into one experimental group and one control group and the researcher will intervene with how their learning will take place; she will offer treatment conditions to experimental group. The study has a pretest/posttest control group design. Hoping to fill this gap, the present study is an attempt to examine the effect of teaching Concept mapping on Iranian intermediate EFL learners' Argumentative Essay Writing Skills. This study seeks to address the following questions:

Q1: Does concept mapping have any statistically significant impact on the Iranian Intermediate EFL learners' argumentative writing?

Q1.1: Does concept mapping improve content of EFL learners' argumentative writing?

Q1.2: Does concept mapping improve language use of EFL learners' argumentative writing?

Q1.3: Does concept mapping improve organization of EFL learners' argumentative writing?

Q1.4: Does concept mapping improve vocabulary of EFL learners' argumentative writing?

Q1.5: Does concept mapping improve mechanics of EFL learners' argumentative writing?

## METHOD

### Participants

The participants in this study were 90 female intermediate level students with age range of 18 to 30 from Parsiyan Adib institutes in Esfahan, Iran. All the subjects took the preliminary English test in order to determine the students' level of English proficiency. Then, through a piloted Preliminary English Test (PET) 60 of them who scored one standard deviation above and one standard deviation below the mean were selected.

The homogenized participants were then randomly assigned into two experimental groups and two control groups each containing 15 students, making 30 students serve as experimental group and 30 as control group (due to the fact that classes with more than 15 students are not allowed in Parsiyan Adib institute two classes of 15 and 15 for each group was used).

### Materials

All of the subjects in this research study received instruction based on "Interchange ", by Jack C. Richards and Chuck Sandy (2008) which consists of 12 units. The main purpose of this book is to integrate speaking, grammar, vocabulary, pronunciation, listening, reading and writing. The book is accompanied with: a student book with self-study audio CD, a CD-ROM, workbook, teacher's edition, and class audio CD.

### Procedure

To accomplish the purpose of the study, the project pursued following procedures:

- 1.Prior to the experiment, the PET test was standardized by piloting it with a group of 30 female students with similar characteristics of the representative sample in two different sessions (one session for reading, writing, and listening parts and another session for speaking part) .
2. The Cronbach alpha formula was employed for calculating the reliability of the test's scores gained by the participant (.936).
3. The writing part was rated, according to the rating scale provided by Cambridge for PET, by the researcher and another qualified rater. First of all, the rating scale was shared between the two raters and then in order to make sure that both had the same understanding of it, a few papers were jointly rated by both. Since it was shown that there was consistency between the papers they rated, the researcher moved to the actual practice. Later on, the inter-rater reliability was calculated on the basis of the ratings done by both raters for the pilot test of PET. Since there was an acceptable consistency between

the two raters, the researcher went through the same procedure for the main participants.

An already piloted, PET was given to 90 intermediate level students of Parsiyan adib institute (in Isfahan, Iran) who were selected randomly and students whose scores fell between one standard deviation above and below the mean were chosen.

The 60 subjects were divided randomly into experimental and control groups. Since 30 is too large a number for the students in one class (due to the fact that classes with more than 15 students are not allowed in Parsiyan adib institute), two classes of 15 and 15 for each group were used, that is, two classes of 15 as the experimental group and two classes of 15 as the control group.

The experiment settled up according to a pre- test / post-test control group. Several stages implemented to accomplish the purpose of this study. Instruction period lasted about twelve weeks (about one semester in the university) and comprised of three phases;

### **Tests and scoring procedures**

To measure the students' ability in writing, they were asked to write essays. Essays were then scored based on Jacobs et al. (1981, as cited in Weigle, 2002) included in appendix. Based on Jacobs et al. scale, each paper was rated on five aspects of writing: content, organization, vocabulary, language use, and mechanics. The five aspects have different weights according to their emphasis: Content (30 points), language use (25 points), organization and vocabulary weighted equally (20 points) and mechanics receiving very little emphasis (5 points).

## **RESULTS**

### **The general research question**

Does concept mapping have any statistically significant impact on the Iranian Intermediate EFL learners' argumentative writing? To test this question, a paired sample Test was conducted, since the concept mapping strategy was used as treatment for experimental groups of students. Both groups had 30 members. The results of the two groups were investigated separately. Note that because the sample size is 30, the mean difference is significant enough and data normality assumption can be accepted. Because the population variances are unknown, we can use the paired t-test sample.

Table 1 shows the descriptive-inferential statistics including the sample size and the standard deviation of the two groups. The mean of scores of the experimental group on the essay writing before the program was 72.5000 which increased to 79.3333 after the program on the post-test. To see the significance of this increase, a paired t-test should be used; the result is shown in Table 2.

**Table 1.** Descriptive Statistics for pre-test and post-test of EFL learners' argumentative writing

		Mean	N	Std. Deviation	Std. Error Mean
Control	Post test	72.8333	30	21.44292	3.91492
	Pre test	70.8333	30	24.46262	4.46624
experimental	Post- test	79.3333	30	14.06471	2.56785
	Pre test	72.5000	30	21.48576	3.92275

**Table 2.** Paired samples t-test for pre-test and post-test of EFL learners' argumentative writing

		Paired Differences				t	df	Sig. (2-tailed)		
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
					Lower	Upper				
control	Post test	2.000	12.42911	2.2692	-2.641	6.6411	.881	.29	.385	
experimental	Post test	6.833	11.92529	2.1772	2.380	11.286	3.13	29	.004	
	pre test									
	Pre test									

The t value is 3.139 and degree of freedom is 2. The significance level here is .004, which is lower than the probability level, so the null hypothesis, which states that the means of the scores on the pre-test and post-test are equal, is rejected. To see whether the program caused essay writing improvement, the mean differences should be notified. The mean difference is 6.833 that is a positive value.

Thus the program caused the improvement of the experimental groups' writing essay. The means of the control group of student's score on the pre-test and post-test were 70.8333 and 72.8333 respectively. As you see in Table 1.1. The mean differences are not so significant, because it caused a slight increase in their mean of scores. The significance level of this increase is .881. Generally speaking, both groups had an improvement in writing essay, but the mean increase was 2.00 for the control group and 6.833 for the experimental. This difference shows the significant effect of the program.

### Research Question 1

Table 3 shows the descriptive-inferential statistics for the strategy use of both the experimental and control groups. The strategy use of the two groups before and after training was compared by means of paired sample test. As you see in the Table, the means

of two groups are different; here the null hypothesis which states that the results for the two groups before and after instruction are equal is rejected.

**Table 3.** Descriptive Statistics for Pre-test and Post-test of Content

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post-test	23.40	30	5.430	.991
	Pre-test	21.80	30	6.915	1.263

As you see in Table 4 the significant level is .000 which represents a strong effect size. It indicates that there was a significant difference between experimental and control groups' mean scores on the pre and post content. As it is clear in the Table, the strategy use of the experimental increased significantly after the instruction. It can be concluded that students in the experimental group used the strategy much more, which shows that the English course they participated in was so effective for their essay writing.

**Table 4.** Paired samples t-test for Pre-test and Post-test of Content

		Paired Differences				t	df	Sig. (2-tailed)		
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
					Lower	Upper				
Pair 1	Post-test	2.160	2.132	.454	1.233	2.143	4.012	.000		
	Pre-test									

## Research Question 2

Tables 5 to 6 display the descriptive- inferential statistics for the two groups. The means of the scores of the experimental group on the argumentative writing before the instruction was 22.00 which increased to 19.83 after the instruction on the post-test. Here the null hypothesis which states that the results for the two groups before and after instruction are equal is rejected because the research findings show that the results are different. As you see in these tables, the amount of concept mapping strategy use of the experimental group significantly increased and because significant level is .000, is lower than the probability (.05), the null hypothesis is rejected and it can be said that the training concept mapping had influence on the students in the experimental group. So it can be concluded that the experimental group after receiving concept mapping strategy outperformed the control group on the language use (Table 6.).

**Table 5.** Descriptive Statistics Pre-test and Post-test of language use

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post-test	22.00	30	2.901	.530
	Pre-test	19.83	30	5.200	.949

**Table 6.** Paired samples t-test for Pre-test and Post-test language use

	Paired Differences						t	df	Sig. (2-tailed)			
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference								
				Lower	Upper							
Pair 1	Post - test	2.167	2.949	.538	1.066	3.268	4.024	29	.000			
	Pre - test											

### Research Question 3

As displayed in Table 7 the mean scores for post and pre groups on organization are 16.83 and 14.90 respectively. Therefore, the English course they participated in has been effective, because it caused a slight increase in their mean of scores. The significance level of this increase is .000. Thus, it can be concluded that the null-hypothesis as -Teaching Concept mapping strategy in writing does not have any statistically significant effect on EFL learners' argumentative writing- is rejected. This means that the experimental group after receiving concept mapping strategy outperformed the control group on the organization post-test (Table 8).

**Table 7.** Descriptive Statistics Pre-test and Post-test of Organization

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post - test	16.83	30	2.842	.519
	Pre - test	14.90	30	4.334	.791

**Table 8.** Paired samples t-test for Pre-test and Post-test of Organization

	Paired Differences						t	df	Sig. (2-tailed)			
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference								
				Lower	Upper							
Pair 1	Post - test	1.933	2.677	.489	.934	2.933	3.955	29	.000			
	Pre - test											

### Research Question 4

As displayed in Table 9 the mean scores for experimental and control groups on content of pretest and post-test are 15.50 and 13.83 respectively. The mean of score of the experimental group on the post-test on vocabulary was increased. This increase is significantly more for experimental group. The t statistics is 4.312 with significance level of .000 (table 10). This value is lower than the probability and shows that the means of two groups are not equal. So training concept mapping had a positive influence on the vocabulary of the students' writing.

**Table 9.** Descriptive Statistics Pre-test and Post-test of vocabulary

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post Vocab	15.90	30	3.273	.598
	Pre Vocab	13.83	30	4.807	.878

**Table 10.** Paired samples t-test for Pre-test and Post-test of vocabulary

		Paired Differences				t	df	Sig. (2-tailed)		
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
					Lower	Upper				
Pair 1	Post -test Pre -test	2.067	2.625	.479	1.086	3.047	4.312	29	.000	

### Research Question 5

As displayed in Table 11, the mean scores for experimental and control groups on mechanic of pretest and post-test are 2.20 and 2.13 respectively. The results of the test examining the equality of the means of the scores of the two groups before and after training are shown in these tables. The significant level is higher than the probability level that is .05 (represents a weak effect size), so the null hypothesis is accepted. It indicates that there was not any significant difference between experimental and control groups' mean scores on the pre and post- test.

**Table 11.** Descriptive Statistics for Pre-test and Post-test of Mechanic

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post -test	2.20	30	1.064	.194
	Pre-test	2.13	30	1.042	.190

**Table 12.** Paired samples t-test for Pre-test and Post-test of Mechanic

Paired Differences	t	df

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		Sig. (2- tailed)		
					Lower	Upper			
Pair 1	Post Mechanic Pre Mechanic	.067	.828	.151	-.242	.376	.441	29	.662

## DISCUSSION

The investigation of the results of this study revealed that the concept mapping strategy training had a positive effect on the students' argumentative essay writing. The strategies mostly used by the students after training were seeking practice opportunities, followed by asking for clarification, generating idea and new vocabulary 'making relationship between idea, getting the idea quickly, using key words , making more example, retrieving the information, identifying the purpose of language use and writing, repeating, organizing arguments, paying attention to semantic mapping, and using composition clues. Regarding the increase of the concept mapping use after instruction, the strategy had the greatest increase in content, language use, organization and vocabulary, but the concept mapping strategy for mechanics did not increase in use. The reason why the concept mapping strategy for mechanics did not change may be the fact that the teacher's teaching style is not effective enough. So if learners become familiar with concept mapping strategy, they can benefit more from it and have more successful writing experience. It seems that the use of concept mapping strategy in our courses of writing has been rewarding as a means of prewriting, probably because this strategy helps students to perform easier, activate their own knowledge and assign idea related to topic through a process of free association and to the build-up of some self-confidence for them.

The results obtained in the present study are in line with other studies conducted in this field. For example, Schunk (1998) in his research found that second language learners developed effective essay writing through the use of concept mapping strategy, emphasizing organization. It can be argued that students who follow the principles of the strategy are bound to feel a significant improvement in their writing skills. A strategy such as concept mapping develops writing skill through elaboration and inferring. It also gives a selective attention to key words, main idea, logical reason and persuasive messages have been shown to be successfully teachable and effective.

The findings of present study are consistent with the findings of Freeman (2002) who provided evidence for the positive effects of concept mapping strategy on academic writing. Freeman argues that human mind's ability to make conceptual projections is indeed a form of concept mapping. Through concept mapping, students can easily understand and organize their thoughts in pictorial representations.

Huang (2005) reported concept mapping enables learner to process information and organize the message while stimulating his or her metacognitive awareness. In the present, study we found that teaching metacognitive strategies is more effective in

retrieving vocabulary and processing information from the past and future. Beyerback and Smith, (1990); Chen and Chang (1997); Chiu, Huang and Chang (2000); and Novak (1990) also found the use of metacognitive strategy effective. It appears that learning strategies make language learning writing more enjoyable and enhance students' motivation toward learning, since they assist them in easing the problem of writing.

Another possible explanation for the positive effect of concept mapping strategy on the learners' writing achievement is provided by Heinz-Fry and Novak (1990). They report that meaningful learning is facilitated because concepts are seen not as isolated entities, but as existing in a network of relationships. Thus this strategy helps student pay attention to key ideas and vocabulary, helping teachers and students to build an organized knowledge base in a given discipline, trying to make accurate purpose and having a clear reason for writing essay.

The results obtained (scoring and analyzing of written paper) in the present study revealed enhancing of the students' writing ability in term of vocabulary generation, organization of sentence, attention to content and using accurate language use and style. It did not improve the mechanical and surface linguistic facets. This is in line with Zipprich's findings (1995), considering the significant effect of concept mapping on the students' narrative writing without any influential effect on surface level.

It can be understood that the knowledge and awareness of every strategy (memory, cognitive, compensation, metacognitive, and socio-affective) is essential for having effective and flexible writing. It can be concluded that the concept mapping strategy is useful if students learn strategies properly and use them appropriately. And the more strategies someone knows, the better his/her essay writing.

## CONCLUSION

This research was conducted with participation of sixty female students in two control and experimental groups. A concept mapping strategy instruction was the base of the study, in which this strategy was instructed to the students of the experimental group. To fulfill the purpose of this study, a PET test was administered to 90 female students who were randomly selected from intermediate level classes in Parsian Adib institute in Esfahan.

The building stones of the research were five questions that investigated the effects of concept mapping learning strategy, as the independent variable, on the experimental group students' argumentative writing. The answers to these five questions were presented in chapter four of this book, but here some concluding remarks are stated.

To determine the effects of concept mapping strategy on the students' argumentative writing, the level of essay writing of the experimental and control groups students' before and after training was compared. Since the students of the two groups had similar or approximately the same mean of scores on the pre-test, they were at the same level of

essay writing. But after the instruction on the post-test, the mean of the scores were not the same and differed significantly. The mean of the scores of experimental group (6.83333) was higher and incomparable with the control group (2.00) and this shows that the program had a positive effect on their essay writing. But the essay writing of the control group did not change so much and remained the same.

In relation to the effects of the concept mapping on the students 'essay writing, at first the two groups before and after the program were compared. As it is clear in Table 4.1., after participation in the program, the mean rank of the experimental group's use of the concept mapping strategy was higher than the mean rank of control group, and because the significance level (sig: 0.000) was higher than the probability level, the concept mapping strategy was used more by the experimental groups. Thus it can be concluded, the use of concept mapping strategy of the experimental group significantly increased after the instruction, but in the case of the control group, the changes in the students were not noticeable.

About the question 'Does concept mapping have any statistically significant impact on the Iranian Intermediate EFL learners' argumentative writing? ' it can be said that the instruction caused a considerable improvement in the students" argumentative writing, which is evident in the increase in the means of scores of the experimental group on the essay writing after training (post-test). It becomes obvious that the use of concept mapping strategy increased greater after the instruction. Therefore, the concept mapping strategy ranked in terms of their frequency of use and consequently their effect on argumentative writing of students.

## REFERENCES

- Amiri, B., & Sarlak, H. (2010). The Comparative Effect of Summarizing and Concept Mapping on ESP Learners' Reading comprehension of EAP Text. *Journal of English Language Studies*, 1(4), 113-136.
- Beyerbach, B. A., & Smith, J. M. (1990). Using a computerized concept mapping program to assess pre-service teachers' thinking about effective teaching. *Journal of Research in Science Teaching*, 27(10), 961-971.
- Chang,k.E .,Sung, Y.T.,& Chen, I.D.(2002).The effect of concept mapping to enhance text Comprehension and summarization. *The journal of experimental education*, 71(1),5-23.
- Chen, S. F., & Chang, K. N. (1997). *Concept mapping-based learning system*. Unpublished master thesis, National Taiwan Normal University. Taipei, Taiwan.
- Chiu, C. H., Huang, C. C., & Chang, W. T. (2000). The evaluation and influence of interaction in network supported collaborative concept mapping. *Computers and Education*, 34(1), 17-25.
- Chularut, P., & DeBacker, T. K. (2004). The influence of concept mapping on achievement, self-regulation, and self-efficacy in students of English as a second language. *Contemporary Educational Psychology*, 29, 248-263.

- Cronin, H., Sinatra, R., & Barkley, W. F. (1992). Combining writing with text organization in content instruction. *NASSP (National Association of Secondary School Principals Bulletin*, 76, 34-45.
- Fahim, M., & Rahim, A. H. (2011). The Effect of Concept Mapping Strategy on the Writing Performance of EFL Learners. *Journal of Academic and Applied Studies*, 1(5), 1-8.
- Freeman, M. H. (2002). *Cognitive mapping in literacy analysis*. Los Angeles Valley College. EBSCO Publishing.
- Gull, R. B., Boman, J. A. (2006). A strategy for teaching and evaluation in nursing Education. Retrieved from <http://www.elsevier.com>.
- Hadley, A. O. (2003). *Teaching language in context*, (3rd ed).
- Harris, K. R., & S. Graham. (1996). *Making the writing process work: Strategies for composition and self-regulation*. Cambridge, MA: Brookline Books.
- Hauser, S., Nuckles, M., & Renkl, A. (2006). Supporting concept mapping for learning from text. In Barab, S., Hay, K. & Hickey, D. (Eds.) *Proceedings of the 7th international conference on Learning sciences* (pp. 243-249). Bloomington, IN: ISLS.
- Hinkel, E. (2002). *Second language writer's text: Linguistic and rhetorical features*. Mahwah, New Jersey and London: Lawrence Erlbaum Associates.
- Huang, L. I. (2005). *Using concept mapping as a strategy to improve the English reading comprehension*. Unpublished master's thesis, Tzu Chi University, Hualian City, Taiwan.
- Lanzing J. W. A. (1996). Everything you always wanted to know about...concept mapping. Retrieved August 4, 2010, from <http://utto1031.to.utwente.nl/artikel1/>.
- Liu, P. L., Chen, C. J., & Chang, Y. J. (2009). Effect of a computer-assisted concept mapping learning strategy on EFL college students' English reading comprehension. Retrieved from <http://www.elsevier.com/locate/compedu>.
- McAleese, R. (1998). The Knowledge Arena as an Extension to the Concept Map: Reflection in Action. *Interactive Learning Environments*, 6, 1-22.
- McClure, J. R., Sonak, B., & Suen, H. K. (1999). Concept map assessment of classroom learning: Reliability, validity, and logistical practicality. *Journal of Research in Science Teaching*, 36, 547-592.
- Mintzes, J.J., Wandersee, J.H. & Novak, J.D. (1997). Meaningful learning in science: The human constructivist perspective. In G.D. Phye (Ed.), *Handbook of academic learning: Construction of Knowledge* (pp. 405- 447). San Diego: Academic Press.
- Novak, J. D. (1990). Concept maps and vee diagrams: Two metacognitive tools for science and mathematics education. *Instructional Science*, 19, 29-52.
- Novak, J. D., & Cañas, A. J. (2006). The theory underlying concept maps and how to construct them, [technical report IHMC CmapTools 2006-01]. Florida: Florida Institute for Human and Machine Cognition. /Retrieved August 4, 2010, from
- Novak, J.D. (1998). Learning, creating, and using knowledge: *Concept Maps TM as facilitative tools in schools and corporations*. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- Novak, J.D., & Gowin, D.B. (1984). *Learning how to learn*. Cambridge University Press.
- Novak, J.D. (1972). Meaningfull learning. *The eyes are not responsible when the mind does the seeing*. Publilius Syrus (85-43 BC).

- Ojima, M. (2006). Concept mapping as pre-task planning: *A case study of three Japanese ESL writers*. *System*, 34, 566-585.
- Perkins, K. (1992). Semantic constructivity in ESL reading comprehension. *TESOL Quarterly*, 17, 19-27.
- Pishghadam, R., & Ghanizadeh, A. (2006). On the impact of concept mapping as a pre-writing activity on EFL learners' writing ability, *Iranian Journal of Applied Linguistics*, 9, 103-130.
- Pressley, M. (1982). Elaboration and memory development. *Child Development*, 53, 296-309.
- Richards J. C., & Renandya W. A. (2002). *Methodology in language teaching: An anthology of current practice*. Cambridge: Cambridge University Press.
- Sadeghi, K., & Mosalli, Z. (2012). The effect of task complexity on fluency and lexical complexity of EFL learners' argumentative writing. *International Journal of Applied Linguistics & English Literature*, 1(4), 53-66.
- Schunk, D. (1998). Teaching elementary students to self-regulate practice of mathematical skills with modeling. In D.H. Schunk & B.J. Zimmerman, (Eds.) *Self-regulated learning; from teaching to self-reflective practice* (pp. 137-159). New York: The Guilford Press.
- Schunk, D., & Zimmerman, B.J. (Eds.) *Selfregulatedlearning; from teaching to self- reflective practice* (pp. 137-159). New York: The Guilford Press.
- Seow, A. (2002). The writing process and process writing. In J. C. Richards & W. A. Renendya (Eds.), *Methodology in language teaching: An anthology of current practice*, (pp. 315-320). New York: Cambridge University Press.
- Sturm, J., & Rankin-Erickson, J. (2002). Effects of hand-drawn and computer generated concept mapping on the expository writing of middle school students with learning disabilities. *Learning Disabilities Research and Practice*, 17(2), 124-139.
- Talebinejad, M., & Mousapour, G. (2007). The Effects of Explicit Teaching of Concept Mapping in Expository Writing on EFL students' self-regulation. *Linguistics Journal*, 2, 69-90.
- Weigle, S.C. (2002). Assessing writing. Cambridge University Press.
- Weinstein, C. E., & Mayer, R. E. (1986). The teaching of learning strategies. In M. Wittrock (Ed.), *the Handbook of Research on Teaching* (pp. 315- 327), New York. Macmillan.
- White, R., & Arndt, V. (1991). Process Writing. London: Longman.
- Zimmaro, D. M., & Cawley, J. M. (1998). *Concept map module*. Schreyer institute for innovation in learning, The Pennsylvania State University.
- Zipprich, M. A. (1995). Teaching web making as a guided planning tool to improve student narrative writing. *Remedial and Special education*, 16(1), 3-15.