The Effect of Semantic Mapping Instruction on Iranian Undergraduate Students’ Writing and Recall

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ABSTRACT: Presented study identifies semantic mapping strategy employed by Iranian undergraduate university students and its effect on writing and recall. To this end, 40 students of technical and engineering studying English at Urmia University of Technology participated in this study. They were divided into two groups: a- control group which consisted of (20) students and were taught writing composition through conventional teacher led instructions, and b- experimental group which also consisted of (20) students who were introduced to and taught the semantic mapping strategy as treatment. A pre- and post-test were utilized to assess students’ writing skill before and after the intervention. Semantic mapping strategy treatment lasted for 12 sessions. Following Hosenfeld et al.’s, model, and also by means of applying Kolmogorov-Smirnov test (KS-test) the findings indicate that 1) the semantic mapping strategy was highly effective, 2) participants in the experimental group, introduced to and taught by semantic mapping, believed that semantic mapping training had a positive effect on their recall of writing texts 3) participants in group (b) scored significantly higher and outperformed those in group (a). Our observations are in support of prior studies underlying the effectiveness of semantic mapping.

Keywords: Semantic mapping strategy, writing ability, recall, KS-test

INTRODUCTION

The discussed study in the present article has explored the concept of semantic mapping and how its teaching can be viewed as a way for enhancing the students’ ability to tackle language learning tasks more confidently and independently, particularly in the area of writing. Considering four skills (writing, reading, speaking, and listening), producing a coherent, fluent, and extended piece of writing is probably the most difficult thing that sometimes most native speakers never master (Nunan, 2001). The difficulty lies not only in generating and organizing ideas, but also in translating these ideas into readable text. The difficulty becomes even more pronounced if their language proficiency is weak. Students often feel worried, embarrassed, hampered by barriers, restrictions, and fears while writing in a second or foreign language. This owes mainly not to the difficulty of writing itself but to the difficulty of doing it in a new language. When students write in their native language they feel comfortable, free, self-assured, open, loud, and positive. Therefore, nowadays the ability to write has become an indispensable skill in our global literate community, but according to Harmer (2004), it has remained for most of its history a minority occupation. This is in part because, although most human beings grow up speaking their first language, writing has to be taught (Lenneberg, 1967).

As mentioned above, writing is considered to be one of the most important challenging skills in first and second language development and instructions, and it furnishes relevant criteria for determining learners’ language proficiency at a given point in the process of language acquisition. So it can be said that writing correlates highly, actually the highest of the four language skills, with overall language proficiency (Koda, 1993; Jennings et al., 1999). This kind of ability also plays an important role in students’ learning. In the process of writing it creates an environment for the development of cognitive and organizational strategies whereby students link new concepts with familiar ones, synthesize knowledge, explore relations and implications, outline information, and strengthen conceptual frameworks (Bangert-Drowns et al., 2004; Scardamalia & Bereiter, 1986).

It is notable to point out that the skills involved in writing are highly complex. “L2 writers have to pay attention to higher level skills of planning and organizing as well as lower level skills of spelling, punctuation, word
choice, and so on” (Richards & Renandya, 2002, p. 303). The difficulty becomes even more pronounced if their language proficiency is weak. Students often feel worried, embarrassed, hampered by barriers, restrictions, and fears while writing in a second or foreign language. This owes mainly not to the difficulty of writing itself but to the difficulty of doing it in a new language. When students write in their native language they feel comfortable, free, self-assured, open, loud, and positive. Another challenge is that whenever the acquisition of a specific language skill is seen as important, it becomes equally important to test that skill, and writing is no exception. Thus, assessing writing is important because good writing ability is highly sought by higher education institutions and employers (Coombe et al., 2007).

Basically, one of the ways that may have a significant impact on the teaching writing process is the semantic mapping strategy. The term “semantic mapping” is introduced in the following part.

Conceptual background for the semantic mapping and recall

According to El-Koumy (1999), semantic mapping as a picture of conceptual relationships and a tool which was mostly used by readers allowing them to scan the range of ideas while trying to understand the underlying concepts within a text. Heimlich and Pittelman (1986) added a set of advantages related to semantic mapping technique. These advantages are motivating students of all grades, integrating thinking with reading, integrating assessment with teaching, and making judgments concerning the appropriate instruction needed. Moreover, semantic mapping has been used in a variety of ways including the following: It has been used as a means of improving the teaching of study skills (Heimlich & Pittelman, 1986), as a framework for identifying the structural organization of texts (Clewell & Haidehmose, 1986), and as an assessment technique (Fleener & Marek, 1992). It can also be said that semantic mapping is a useful way to map out a list of words related to the topic.

Fisher (1995) points out that the term semantic webbing, semantic mapping, concept mapping, knowledge mapping, word webbing, networking, clustering, mind maps, think-links, idea branches, structured over viewing, graphic organizers, semantic networking or plot maps have been used to refer to a variety of similar strategies designed to portray, graphically and visually, a relationship between concepts or ideas. Spider map, Initiating event, Continuum scale, Compare/Contrast Matrix, Solution Outline, Network Tree, Human Interaction outline, Fishbone Map, and Cycle are examples of different types and uses of semantic maps, one type of graphic organizers, which were used in the present study (adopted from Hall and Strangemont; 2002).

Generally speaking, to ensure generalization of semantic mapping strategy, according to Hosenfeld et al., (1981) the teacher should be engaged in four types of generalization activities: orientation, activation, adaptation and maintenance. Orientation activities consist primarily of efforts to make students highly cognizant of the need to generalize the semantic mapping strategy, and ensure that students aware of situations and circumstances in which semantic mapping strategy could be used. During activation activities, the teacher reviews with students the situation where semantic mapping strategy was applicable. The objective is that students begin engaging in generalization behaviors and that they receive feedback on their efforts to use strategies independently. Students are given a) a specific assignment to use semantic mapping in a setting other than the one in which the strategy was learned originally, and b) nonspecific assignment in which they are required to recognize appropriate opportunities to use the writing strategy independently. Adaptation activities are designed to facilitate students’ adaptation of semantic mapping strategy as a class participation strategy and also to become more involved in discussion. In other words, maintenance activities are designed to ensure that students maintain their knowledge of what was the strategy, how it was performed, and when it should be used.

Considering recall, it is referred to as an ability to remember later the material that one has learned or read (Collins Cobuild Advanced).

Studies of semantic mapping strategies among English language learners

Previous studies have shown that some linguistic features have a relationship with writing ability (Grant & Ginther, 2000; Jarvis, 2002). Recently, some researchers identified the relationship between linguistic features of texts written by English native speakers and writing ability (Beers & Nagy, 2009; Crossley& McNamara, 2011). To understand the efficiency of teaching semantic mapping, El Koumy (1999) compared three groups of classes each receiving special treatment, including teacher-initiated semantic mapping; student-mediated semantic mapping; and teacher-student interactive semantic mapping. The results of posttest were significantly different from that of pretest in which teacher-student interactive semantic mapping group scored higher than the other two groups. In an empirical study Morin and Gobel (2001) aimed to recognize the effect of semantic mapping training on vocabulary instruction. They provided English-speaking college students in the experimental group with semantic mapping strategy instruction. Step by Step students in the experimental group proved to rank the familiarity with L2 vocabulary more highly and were able to group and learn more L2 vocabulary instruction through semantic map is
more effective than vocabulary acquisition activities than teach only new vocabulary items rather than strategies for acquiring words.

In another study, to measure and understand the effect of concept mapping, also known as semantic networks, on reading comprehension and summarization, Kuo et al., (2002) designed three concept mapping approaches: map correction, scaffold fading and map generalization. The obtained results indicated that the map correction strategy enhances reading comprehension and summarization abilities and summarization ability can also be facilitated by scaffold fading method.

Following El-Koumy’s student-teacher interactive semantic mapping, Baleghizadeh and Yousef poori Naeim (2011) applied this method for tutors who administer single learner classes. In this way, private teacher can interact more time with the learner.

On the other hand, the effect of semantic mapping on recall of whatever has been read and learnt by means of mind map is clear. Denner (1986), for example, emphasizes on seventh-grade subjects who were able to recall the complex text content easily after constructing episodic organizer - a kind of semantic web or map. In contrast, those with no semantic map were not able to recall the text content readily.

Concerning the growing interest in learning English as a foreign Language in Iran, unfortunately, few university students (Technical and Engineering majors) at pre-intermediate level are proficient enough to write English language texts, and yet the tests reveal that they are willing to learn writing strategies and to compensate for their writing problems. Therefore, semantic mapping strategy training aims at finding out whether using the cognitive strategy of semantic mapping, as a pre-writing and writing strategy, has supremacy over conventional method of teaching writing or not. In other words, regarding Iranian students’ need for writing strategies and their growing interest in effective language learning, the present study aims to scrutinize the effect of applying one such strategy, i.e. semantic mapping, on writing and recall.

**Purpose of the present study**

Along with the same line of research presented above, therefore, the main purpose of this study is to investigate the possible effects of semantic mapping instruction, to examine EFL learners’ writing performance and to investigate whether certain types of different semantic maps are more effective on writing skill of students and accordingly their recall of whatever they have learned during the activation activities. The following two research questions, corresponding to the purposes of the study, will be addressed:

1. Does teaching semantic mapping strategy have any significant effect on undergraduate students' English texts writing of Technical and Engineering Majors?
2. How much does semantic mapping training affect the students’ recall of English texts?

**METHODS**

To address the above mentioned research questions, we collected two groups of participants, including experimental and control groups.

**Participants**

A total of 60 male and female students, within the age range of 18-21, were administered the writing section of the TOEFL as a pre-test, and IELTS for pre-test. Based on the results of the pre-test, 40 intermediate learners were semi-randomly assigned in both control and experimental groups. In each class, 20 learners are selected in which the numbers of males and females weren’t equal. These participants were studying at Urmia University of Technology, coming from different fields of study.

The logic behind the decision to select students with intermediate level of writing proficiency was that at levels below the intermediate level students are not still developed enough to deal with aspects like organization, format and even the use of most grammatical structures to make a coherent piece of writing. English language learners who fall within the intermediate range can provide unique insight into the language learning and writing process, but the technical engineering majors have difficulty in that. It is at this stage that learners have enough language products to maximize hypothesis testing, and this should be evident in their language products.

**Instrumentation**

In order to determine the proficiency level of the participants as far as their writing ability was concerned, the following argumentative topic from the International English Language Testing System (IELTS, 2009) writing section was used. After determining the intended proficiency level of the participants, based on the IELTS scoring
rubric, the 40 selected intermediate students were given the three following argumentative, narrative, and comparative topics to write on.

The argumentative topic used in the data collection: Do you agree or disagree with the following statement? The most important aspect of a job is the money a person earns. Use specific reasons and examples to support your answer.

The narrative topic used in the data collection: Write about an event that marked a turning point in your life.

The comparative topic used in the data collection: Compare and contrast living on a farm to living in a city.

Following writing guidelines used in IELTS exams, students were given forty minutes to write at least 250 words on each topic. The writings were rated by two raters, the researcher and a trained assistant who was also an EFL teacher.

Procedure

After assigning the available learners into two groups, experimental and control, these activities were carried out: pre-testing, treatment for experimental group and traditional writing teaching for control group and post-testing for both groups, and after two weeks delay post-testing (Recall) for both groups. A full account of each stage is given below.

Pre-test

This stage was intended to investigate the relationship between male and female Iranian Students of Technical and Engineering learners’ semantic mapping, and writing quality. T-Test was used for this purpose.

Treatment

Since this section is the heart of the study, a thorough and comprehensive account of it will be provided. Since the literature on the learner strategy training advocates embedded and not direct strategy instruction, the same model was taken to form the framework of the training model in this research.

Taking into account Hosenfeld et. al’s., model, the following steps were adopted and practiced during comprehension instruction to the EG:

Setting the scene and preparing students mentally

The first session was devoted to the first three steps (including: 1) setting the scene and preparing students mentally; 2) general strategy discussion and 3) explanation of the importance of learning strategies and writing strategies, particularly semantic mapping). Learners’ attitude toward the training program was the first thing to be paid attention to; they were prepared mentally and were encouraged to think of the training method and follow the program willingly and enthusiastically. Also, they were told that the beginning stages may prove frustrating but that they should keep on trying vigorously and energetically.

GENERAL STRATEGY DISCUSSION

What are learning strategies? How have they been categorized? How about writing strategies? What are writing strategies at all? What is semantic mapping strategy? All these questions and so many others were answered at this stage.

Explanation of the importance of learning strategies and writing strategies, particularly semantic mapping

In addition, the important phase of introducing cognitive strategies took place here. All the gathered semantic mapping strategy models were defined and explained along with examples, keeping emphasis on the usefulness of semantic mapping strategy.

Teacher modeling; i.e., map out a list of words related to topics and themes

Probably this is the most important feature of the semantic mapping studies. To demonstrate to the learners the steps involved in approaching and writing compositions strategically through applying semantic mapping strategy and to let them know how strategic writer write a composition, the teacher (the researcher) map out a list of words related to topics and themes, and made learners aware of the cognitive secrets of a good or an effective writer.

The semantic mapping strategy to be taught was divided to: a) before-writing semantic mapping strategy; b) during-writing semantic mapping strategy; and c) after-writing semantic mapping strategy. To map out a list of
words related to topics and themes the semantic mapping strategy in each stage, teacher wrote the target topic on the blackboard, and everyone must contribute.

Once the verb list has been exhausted, the class brainstorms things and people (nouns) related to the topic. The teacher wrote items on the board. All or most of the nouns have been elicited and written on the board, brainstorming is done for adjectives. Teacher has a brainstorming session for adverbs related to the topic or to the verbs given on board. Suggested adverbs are written on the board. She goes over the items, asks for any more suggestions and discreetly adds in any new vocabulary which she wishes students to use in composition or add to their collection.

New students are asked to brainstorm some simple sentences using any of the words in the map. Teacher wrote around 15 or 20 sentences on the blackboard. She wrote the original sentence given by the student. No correction of errors is made at this stage. Students are encouraged to form simple sentences of the subject + verb +object pattern in order to avoid subordinate clauses at this stage, she has 15 sentences on the blackboard, go through each sentence to correct any errors. The students read through all the sentences. They are given 10-15 minutes to rearrange the jumbled up sentences. Since it is a narration of events, students are given some of the devices used to convey chronological order. They also learn that in a composition of chronological order, the verbs are all in the same tense. The chronological order devices that are given to them include first, second, third, next, after that, finally which may be used to clarify sequence to the reader. The students write out the whole composition in paragraph form, keeping to the limit of 150-250 words. As stated earlier, semantic mapping helps map out a list of words related to topics and themes.

The map out a list of words related to topics and themes training were given in English and Persian. It is worth noting that this modeling was not provided just once, rather, the researcher continued to model, when necessary throughout the remainder of the instructional sequence. Though the teacher's initial modeling was simple and straightforward, subsequent modeling of the semantic mapping strategy gradually involved the students (e.g., students told her what to do and the teacher did it and gradually revealed to students more sophisticated cognitive processes, for example, activating prior knowledge, monitoring semantic mapping comprehension, repair strategies, and so forth).

Providing opportunities for applying the semantic mapping strategy (guided practice)

The experimental group was instructed on how to apply semantic mapping strategy to their writing process by the researcher in 12 forty minute session for the duration of two months during 1390-1391 academic years. Learners were encouraged to employ semantic mapping strategy which had been taught to them through supplying them with opportunities of performing writing compositions. The training hours were held while the usual class procedure was going on. During treatment, the experimental group was taught how to write a composition in the form of map and reflect the hierarchy of information within the writing and the relationship between these pieces of information within the hierarchy. Additionally, they were taught how to illustrate the interrelationship among list of words related to topics through the use of semantic mapping.

The kind of semantic map and the graphic organizer to be used depended on the kind of writing material was thought. Moreover, the teacher and learners worked together to see how semantic mapping strategy was applied. The researcher teacher's role was to work with learners to actually put into practice their new semantic mapping strategy; for example, they were asked to map out a list of words related to topics, to design a map, to check their chronological order, write out the composition in a paragraph form, etc. It is again worth mentioning that, the writing materials were chosen from students' IELTS Test.

6. Independent practice (helping students transfer their new semantic mapping writing strategy to new compositions):

It needs to be borne in mind that, although the focus of this stage was on facilitating generalization of the semantic mapping writing strategy, all of the previous semantic mapping instruction is generalization. The teacher should have been encouraging students to experiment with generalizing semantic mapping strategy and sharing the results and their perceptions with the teacher and other students. Instructions during this stage differed only in that generalization was targeted intensively and extensively.

7. Evaluation of success of semantic mapping training

Learners' ideas and comments about the training program and evidence of the positive feedback were sought. For example:

1. There are a lot of words thrown about in class.
2. Everyone comes up with a word somehow or other.
3. The class atmosphere becomes lively and small group discussions are heard.
4. As the teacher writes on the board, some students spell out the words.
5. Even weak and shy students utter a word or two.
6. Towards the end, students become enthusiastic about putting the parts together, like a jigsaw puzzle.
7. They are actively involved in the session because the brainstorming warms them up and the comfort of their chairs and friends around encourages even the very weak and shy to suggest words and sentences.

**Traditional writing teaching for control group**

Subjects in control group were not taught the writing composition through semantic mapping strategy. Instead, students were taught writing composition through conventional teacher led instructions, in which the teacher advised (or helped) the students to choose the topics that are both interesting and motivating and have a communicative purpose. After choosing the topic the classmates helped the student to express their viewpoints regarding the theme. This brainstorming makes the students generate ideas, recall vocabulary that is relevant to the topic, organize ideas, use their imaginations, and also enhance their confidence and motivation.

After that, the students make a plan to write and rewrite, and make as many revisions as they deem necessary, before the final draft. The students criticized their own writing. The evaluation phase was done by the teacher or by learners’ peers. The composition was read in class and all the learners take parts, feedback is received from classmates. Teacher assumes the role of an advisor and allows the students to act as critics and generators of ideas.

**Post-test**

Finally after the strategy instruction program (treatment), to measure the overall improvement of writing ability of the subjects in both groups and compare the relative effectiveness of semantic mapping strategy training, the learners in both experimental and control group took the same IELTS writing paper test and another post-test also used, the content of which was based on IELTS test with the same writable level as the materials taught during the treatment period. Two weeks after post-test, a delayed post-test (Based on IELTS test) and recall protocols were used to gauge participants’ recall.

**Procedure of data analysis**

The purpose of this study was to investigate the relationship between male and female Iranian Students of Technical and Engineering learners’ semantic mapping, and writing quality. To this end, 60 Students of Technical and Engineering learners studying English at Urmia University of Technology were given the TOEFL as a pre-test, students who get the normal score were selected, and IELTS writing section as a pre-test in May 2012. The essays were scored based on IELTS scoring rubrics. Based on the results the proficiency of the participants was determined, and subsequently 40 participants at the intermediate level were chosen for the study. These participants were given three topics in three different genres of argumentative, narrative, and comparative. The participants were asked to write at least 250 words in 40 minutes on the topics mentioned above and scored the test. Then, in a 12 session we taught the students the semantic mapping and how to use the semantic mapping while writing the compositions. Then the second test was given. These participants were then given three topics like the first one, in three different genres of argumentative, narrative, and comparative. The participants were asked to write at least 250 words in 40 minutes on the topics mentioned above and scored the test again. After 2 weeks a recall test were given, and wanted the students to write the summery of the 3 topics mentioned above and again score that one too. This test (Recall) is for analyzing the students’ ability for remembering the compositions that wrote later, We (Two raters: one of the researchers of the present paper and the trained assistant who was also an EFL teacher) scored all 120 writing samples according to analytic (following Jacobs et al. 1981) and then holistic (using the scoring guide for the Test of Written English) models of scoring to know how students improve their writing because of using semantic mapping.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>Pre</td>
<td>20</td>
<td>2.3395</td>
<td>.66715</td>
<td>.769</td>
<td>.386</td>
</tr>
<tr>
<td>Control</td>
<td>20</td>
<td>2.2700</td>
<td>.77290</td>
<td>.769</td>
<td>.386</td>
</tr>
</tbody>
</table>

As shown in table 1, the average scores of pre-test in the experimental and control groups are 2.33 and 2.27 and the significance level is 0.762, respectively. As the significance level of t-test is > 0.05, consequently,
there is no meaningful difference among pre-test scores of experimental and control group. It means that the two groups are homogenous in English knowledge level and in their writing ability at the beginning of the study.

RESULTS AND DISCUSSION

The results of IELTS pre-test

As already mentioned, in order to make sure that the participants in control and experimental groups were of the same proficiency level at the start of the investigation, an IELTS test (as a pre-test) was administered. Table 1 presents Independent Samples T-Test (IELTS pre-test) for this test.

The results of IELTS post-test

Table 2. Independent Samples T-Test (IELTS post-test)

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post</td>
<td>20</td>
<td>3.7900</td>
<td>.41536</td>
<td>8.766 .005</td>
<td>8.187 29.890 .000</td>
</tr>
<tr>
<td>Control</td>
<td>20</td>
<td>2.2365</td>
<td>.74003</td>
<td></td>
<td></td>
</tr>
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</table>

The results on the effect of Semantic Mapping on writing

The co-variance analyses results indicate that the pre-test affections is meaningful (i.e. the significance level is ps0.05). It means that there is meaningful relationship between pre-test and post-test scores. The group affection is also meaningful (i.e. the significance level is ps0.05). It means that after pre-test scores adjustment, there is meaningful relationship between experimental and control groups. This difference is in favor of experimental group. So, it is concluded that the semantic mapping has positive meaningful effects on writing.

Table 3. Dependent Variable: Post-test

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>9.791</td>
<td>1</td>
<td>9.791</td>
<td>93.0</td>
<td>.000</td>
<td>.716</td>
</tr>
<tr>
<td>Group</td>
<td>22.584</td>
<td>1</td>
<td>22.584</td>
<td>214.</td>
<td>.000</td>
<td>.853</td>
</tr>
<tr>
<td>Error</td>
<td>3.892</td>
<td>37</td>
<td>.105</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>401.004</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Estimates

Table 4.

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>Std. Error</th>
<th>95% Confidence Interval</th>
<th>5% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>3.766</td>
<td>.073</td>
<td>3.619</td>
<td>3.913</td>
</tr>
<tr>
<td>Control</td>
<td>2.261</td>
<td>.073</td>
<td>2.114</td>
<td>2.408</td>
</tr>
</tbody>
</table>

The results of delay post-testing (Recall)

The co-variance analyses results indicate that the pre-test affections is meaningful (i.e. the significance level is ps0.05). It means that there is meaningful relationship between pre-test and delayed post-test (recall) scores. The group affection is also meaningful (i.e. the significance level is ps0.05). It means that after pre-test scores adjustment, there is meaningful relationship between experimental and control group in pre-test and post-test (recall) scores. This difference is in favor of experimental group. So, it is concluded that the meaning strategy has positive meaningful effects on writing (recall).
The major purpose of the present study was to investigate the effect of semantic mapping strategy training on writing and recall of male and female Iranian undergraduate students of technical and engineering majors. Another purpose was to seek any interaction between gender and semantic mapping training on writing and recall. Accordingly, the results of this study are in accordance with the previous studies such as Zaid (1995) who found that using semantic mapping as one pre-writing strategy had a significant effect on students' writing abilities, or similarly the finding can go in line with those of Kuo et al., (2002), although the focus was on reading comprehension and summarization. The results of our study also confirmed that semantic maps are particularly valuable because a good semantic map can show the key parts of a whole and their relations at a glance, thereby allowing a holistic understanding that that words alone cannot convey. Our finding revealed that in this study gender as a moderator variable did not have any effect on the effectiveness of semantic mapping training on writing.

These findings are also compatible with those of other researchers. Darayseh (2003), for example, suggested that teachers can raise their students' awareness about whatever they are reading and also wishing to write about by using appropriate teaching strategies such as brainstorming and semantic mapping in particular. In another study, Nathan & Kozminsky (2004) found that text mapping as graphic organizer are effective tools that assist learning process before, during and after writing the composition. Our observations are also in support of Prater and Terry's views (1988) who suggest that semantic mapping is a very effective technique that activates prior knowledge and has considerable merit.

CONCLUSION AND IMPLICATIONS

Based on the results of the present study, it can be concluded that a broad vision of semantic mapping training is truly necessary in Iran. Syllabus designers, teachers, and learners need to know that semantic mapping training seeks to encourage greater responsibility and self-direction in learners, simulate a collaborative spirit between learners and teachers and also among learners themselves, and help learners master specific strategies of semantic mapping that facilitate self-reliance. Semantic mapping training not only focuses on specific techniques but also addresses the reorientation of learner beliefs and attitudes about the role of a controller to that of an enabler. Students consequently feel they have greater latitude in deciding how they will learn. When this more autonomous role is assumed, even initially skeptical students soon report improved attitudes toward learning and show greater progress. In short, semantic mapping training, if designed carefully and sensitively, can become a key element in creative, self-directed language learning.

The results also offer several pedagogical implications to be applied in the teaching settings. Syllabus designers, for example, may also benefit from the findings of this study. As implementing semantic mapping instruction proved to be effective in improving writing ability and recall of Technical and Engineering learners in Iran's context, teaching materials could be prepared in such a way that they increase learners' involvement in the learning process through implementing various semantic maps for different types of texts. The findings of the present study suggest that semantic mapping strategy is compatible with a variety of text types and different passages lend themselves easily to semantic mapping strategy training. Considering language teachers, there is a
need for university instructors to highlight the importance of writing strategies for their trainees. They, in turn, should emphasize on the role of strategies as effective techniques for improving writing comprehension ability and recall. Yet, writing strategies are only one kind of the strategies vital to successful language mastery, hence, the same generalizations hold vital for speaking, listening, and reading strategies. English teachers would be more successful if they came to embed semantic mapping training into their teaching task by encouraging the students to employ the semantic mapping after receiving proper training in how to use it.

The results of this study indicated that, the teachers who use semantic mapping strategy often become enthusiastic about their roles as facilitators of classroom learning. Semantic mapping makes teachers learner-oriented and more aware of their students’ needs to activate their background knowledge.

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