The Effect of Concept Mapping on EFL Speaking Fluency

Behzad Ghonsooly [*]
Associate professor of Applied Linguistics, English Department, Faculty of Literature & Humanities, Ferdowsi University of Mashhad, Mashhad, Iran
&
Arezoo Hosienpour
MA in TEFL

Abstract
Recent growth of English as an international language of communication highlights the importance of speaking which everyone needs to use in a multiplicity of contexts. Scholars have shown that concept mapping increases vocabulary learning, and organization of knowledge. However, its impact on enhancing speaking fluency is overlooked. This research project investigates the effect of concept mapping on speaking fluency of Iranian intermediate EFL students. To achieve its purpose, the following research question was proposed: Does concept mapping have any statistically significant effect on speaking fluency of the aforementioned students? 80 second term EFL university students were randomly selected and were randomly assigned to a control and experimental group. We employed concept mapping in the experimental group for twenty two sessions. When the treatment was over a proficiency test was administered to the students as a post-test. The distributions of scores for each variable by all subjects were examined and the results showed that concept mapping had statistically significant effect on speaking fluency of intermediate EFL students.

Keywords: Speaking fluency; Concept mapping; EFL learners; Measures of fluency; Hierarchical structure

[*] *E-mail address*: ghonsooly@ferdowsi.um.ac.ir

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Introduction

Speaking in English as a second or foreign language has gained more importance than before due to an ever increasing demand of international communication. Bygate (2001) mentions two reasons for this: technology and methodology. In the mid-1970s tape recording technology was cheap enough to enable learners of English to practice speaking. This resulted in 'widespread study of talk'.

To unravel how oral skills are developed, scholars have paid attention to the nature and conditions of speech. Most current approaches draw on psycholinguistic skills or information processing model (Kinchin, 2000 and Reese, 2004). In a nutshell, various sources of information and processes are used when speakers come to speak fluently. These sources include planning the message, using background knowledge (including knowledge about the topic, speech situation, patterns of discourse), finding words and phrases, using appropriate grammatical markers, and using the proper sound patterns. Fluent speakers need to properly use their articulatory organs. They should be able to identify and self-correct mistakes, an ability which relates to their self-monitoring capacity. Utilizing all these sources of information and processes is fast to the extent that skilled speakers speak fluently and have fewer pauses in their speech.

In our frequent observations of our conversation classes we have noticed that many of our EFL students are disfluent in speaking. We set out to run the current study to investigate the effect of concept mapping on EFL students speaking fluency. The rationale behind the use of concept mapping in speaking fluency can be tentatively expressed in its effect on planning the message used in speaking, finding words and phrases and organizing knowledge. We therefore speculate that learners who are not fluent in speaking English might benefit from concept mapping to increase vocabulary learning and to organize knowledge which is expected to lead to fluency in speech. The question to be investigated in this study is whether concept mapping has any statistically significant on speaking fluency of a group of Iranian

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Intermediate EFL university students. Our null hypothesis of the study states that concept mapping does not have any effect on speaking fluency of the aforementioned students. We understand that our study has its own limitations proposed as in the following:

1. The researchers due to the scope of the study could not address an important aspect of fluency which resides in a close examination of discoursal features such as the level of difficulty of discourse. Therefore, our definition of speaking fluency is narrow and includes only temporal features of speaking fluency measured through Kormos and Denes' (2004) study.
2. For the purpose of the study, the subjects were all university students.
3. Age and sex of subjects were not considered in the study.

Literature Review

What is a Concept Map?

The quest for exploring the relationship between knowledge and graphic representation of concepts has become an interesting field of investigation in the study of skill acquisition (Dormer, 2005). In fact, when knowledge is organized and represented through graphical means we are on the voyage to concept maps (Novak, 1977). A concept map shows the relationships among a set of concepts by means of a graphical representation (Novak and Hanesian, 1978). This representation takes a node-arc shape in which concepts are shown to be related to one another by linear and arc type lines. Concepts are usually enclosed in circles or boxes which are connected to one another. In addition to these lines, there are some linking words and phrases signifying the relation between concepts. Concepts are propositions which relate to objects or events in a text. The theory behind concept maps postulates that meaningful learning can be created when we link new knowledge to an existing knowledge (Novak and Hanesian, 1978). Accordingly, this linkage should be conscious and purposeful.

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There are four major categories of concept maps: "spider, hierarchy, flow chart, and systems concept maps" (Dormer, 2005). Accordingly, in the spider concept map the central theme is placed in the center of the map. As for the second type, information is presented in a descending order of importance. In the flow chart concept map, we organize information in a linear format. The systems concept map is the same as a flow chart. The only difference lies in the addition of inputs and outputs in the systems concept map. There are several purposes for which concept maps are used mainly, when we want to summarize reading and lectures, when making notes in a seminar or workshop, when reviewing for test and when working on an essay and creative writing.

Although the literature on concept mapping has been primarily concerned with its application in L1 context, its benefits in L2 context has been recently explored (Ghanizadeh, 2007: 31). Concept mapping is used in different areas of L2 research covering language skills. As a proper alternative to pre and post reading activities, the technique was used by Carrell, Pharis and Liberto (1989) in enhancing L2 reading. Examining its impact on L2 listening comprehension, Fahim and Hiedari (2006) reported a positive influence of concept mapping on the learners' listening comprehension. 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 resulted in quantitative and qualitative improvement of students' writing ability. As an assessment device, concept mapping has already been employed in L1 research (e.g., Kinchin, 2000 and Reese, 2004). As of recent, the technique was used by Ghanizadeh (2007) as an assessment tool in L2 reading comprehension. Liu & Chen (2008) examined the effect of computer-based concept mapping on reading strategies of a group of Taiwanese students learning English as a foreign language. The analysis of variance showed that this effect has more reading benefit on the high-level group than on the low-level one. Recently, Marriott and Torres (2008) examined the use of concept mapping in developing a student's reading, writing and oral skills. This blended methodology resulted in the betterment of the aforementioned skills. However, the

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extent to which concept mapping might exert any influence on speaking fluency of students learning English as a foreign language has not been addressed in the literature to the best knowledge of the present researchers. But what is speaking fluency?

Speaking fluency

Speaking fluency has been defined variously by different scholars. For instance Fillmore (1979) defined fluency as the ability of a long talk with few pauses. A fluent speaker was conceptualized to be able to express his/her message in a 'coherent, reasoned and semantically densed manner' (p. 85). Regardless of this wide definition of fluency, the skill is considered one component of oral proficiency. In a more recent study Lennon (2000) proposed that "a working definition of fluency might be the rapid, smooth, accurate, lucid, and efficient translation of thought or communicative intention into language under the temporal constraints of on-line processing" (p.26). However, to keep distance from a narrow view of speaking fluency, Brumfit (1984) has regarded speaking fluency as having four characteristics which include speed and continuity, coherence, context-sensitivity, and creativity. These characteristics are related to four 'basic sets of abilities' i.e., 'psycho-motor, cognitive, affective, and aesthetic' (p.54). The above mentioned definitions provide different perspectives on fluency and describe much of what fluency is. However, a full explanation of fluency must account for many other factors that will be explored under the rubric of 'measures of speaking fluency'.

Measures of speaking fluency

Different scholars have proposed various predictors of speech fluency in their works. For example, speech rate is considered to be an important predictor of speech fluency and is defined as the average number of syllables articulated per minute (Ejzenberg, 2000; Riggenbach, 1991). These researchers have also included another speech fluency factor called the mean length of runs which is the average number of syllables produced in utterances between pauses of 0.25 seconds and above. Another predictor of speech fluency is considered to be 'phonation-time

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ratio', relating to the percentage proportion of the time taken to produce the speech sample, (Towell et al., 1996, Lennon, 1990). Researchers have also found other predictors of speech fluency such as filled and unfilled pauses, disfluencies which will be defined in the methodology section.

Methodology

The principal methodology in this study was the analysis of protocols of participants of this study. In addition, students' random and spontaneous comments about their problems and their possible appreciation of the concept mapping technique throughout the whole course were recorded for further analysis.

Data Collection Procedure

The study started at 11:00 O'clock on Saturday, the 21st of April, 2008 when the researchers gave the IELTS practice test to the subjects as a pretest and the treatment started. The study was conducted for twenty two sessions of forty minutes during eight weeks from the 22nd of April to the 10th of June, 2008. At the beginning of each class, the subjects were told they would be participating in a speaking fluency research activity, consisting of conversations and some listening comprehension questions. It was emphasized that they were not taking a test, and that their performance would have no bearing on their regular class mark and at the beginning of each session the participants were appreciated for the cooperation and the required instructions were explained to them. In each session, a conversation was introduced to the students in the experimental group using concept mapping technique. Students paid attention to the concept map to understand conversations. At the end of each session, they were asked to participate in a role-play activity and answer listening comprehension questions in part B of the task and after listening to the conversation. Two days after the treatment was over, another IELTS practice test was administered to the same students as a post-test. Then the subjects were asked to answer seventeen questions in this test. Their performance was recorded on an audio-tape. For the purpose of collecting tape-recorded speech samples, the recording was

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conducted in a language laboratory so that the subjects could record their voice individually at the same time sitting at their individual booths. During the test session, the second researcher was always present to ensure that the subjects were following the instructions properly.

The two classes were taught for twenty two sessions of forty minutes during eight weeks. In each session, the control group studied a conversation. The researcher after practicing warm up wrote several questions on the board and asked subjects to listen for the answers. Also, the researcher encouraged subjects to take notes while listening. After checking their answers to the questions on the board, they were asked to look at the picture and answer some questions. Then subjects repeated the conversation line by line after the audio program and new vocabulary and structure were explained. In addition, they were asked to work in groups and practice the dialogue. At the end of each session, subjects after listening to the conversation of part B and taking notes had to answer the questions.

The experimental group was exposed to concept mapping. In fact, the subjects after having a warm up and a short review, had to listen to the introduction which was related to the conversation. They were then exposed to the concept mapping technique. They were asked to suggest any word or concept related to the main idea so that they could be placed in the center of the board. They were also asked to answer some questions which were related to the conversation. After repeating the dialogue line by line, the second researcher explained the new vocabularies which were unfamiliar to them because in concept map technique any new vocabulary in conversations is given an equivalent or synonym. Also, grammatical structures in each conversation were explained. The subjects then participated in a role-play activity. At the end of each session and after listening to the conversation and taking notes they answered some listening comprehension questions. They had to give a10 minutes talk on the conversation topic for the next session.

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The also brainstormed possible words and phrases about the next conversation.

Measuring Speaking Fluency

For measuring speaking fluency, the speech samples were transcribed and the following seven temporal variables were calculated according to the methods used by Kormos and Denes (2004; 151- 152):

1. Speech Rate: this is done by counting 'the total number of syllables produced in a given speech sample' and dividing them by the time needed to produce the speech sample. Pause time should also be included in the measurement. To measure the number of syllables per minute one needs to multiply the result of the previous calculation by sixty. Based on what is suggested in the literature (Riggenbach, 1991 in Kormos and Denes, 2004) unfilled pauses under 3 seconds are excluded from the measurement.

2. Articulation Rate: to measure the rate of articulation, Kormos and Denes, (2004) divided the total number of syllables by the amount of time spent to produce them in seconds. This figure was then multiplied by sixty. Pause time was not included in the calculation

3. Mean length of runs: to measure mean length of runs, Kormos and Denes propose calculating number of syllables in utterances between pauses of 0.25 seconds and above.

4. The number of silent pauses per minute: As is recommended, the total number of pauses over 0.2 seconds was calculated and divided by the total amount of time which was used in speaking. This figure was then multiplied by sixty.

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5. The mean length of pauses: the total length of pauses over 0.2 seconds was calculated and divided by the total number of pauses above 0.2 seconds.

6. The number of filled pauses per minute: filled pauses refer to such word like sounds as uhm, er, and mm which are used in speech. To measure filled pauses, the total number was calculated and divided by the total amount of time. This figure was then multiplied by sixty.

7. The number of disfluencies per minute: disfluencies are characterized by those speech strategies such as repetitions, restarts and repairs. To measure disfluencies, the total number of such strategies was calculated and divided by the total amount of time in seconds. This figure was then multiplied by sixty.

Participants

For the purpose of the study, 80 second term students in Quchan University who were studying English Language and Literature took the Interchange objective placement test. Most of them were not local residents and were generally eager to learn English. They were not classified in terms of their age and sex since this was not one of the aims of the present study. Out of 80 students, sixty (60) students who scored one standard deviation above and one standard deviation below the mean were selected as intermediate ones. This was done to attain a homogeneous sample. For the purpose of randomization, subjects were numbered from one to sixty. They were randomly divided into two equal groups: thirty in the experimental group, which received the special treatment i.e., concept mapping, and thirty in the control group which were not exposed to concept mapping but followed the traditional method of practice in a conversation class i.e., talking about a given topic.

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Instrumentation

Several instruments were used to collect the required raw data including the Interchange objective placement test; an IELTS Practice Test used for the pre-test and post-test phases of the study and a series of conversation sessions.

The Interchange objective placement test claimed to be validated in the Interchange series (Richards, 2008) was administered to the participants. The aim was to evaluate their language proficiency in order to determine the intermediate students. The test comprised three sections: Listening Comprehension section including nine conversations, followed by multiple choice test items, in which participants had to read the question or questions carefully before they listen to the conversations and then they had to listen to the conversation and answer the questions after the conversation ends. They had 15 minutes to complete this section. The second section, reading comprehension, comprised several short reading comprehension passages, in which the participants had to read each passage and select the correct answer for each question. They had 20 minutes to complete this section. Section three, language use, included thirty multiple choice items, in which the participants had to select the correct word for each item and fill in their choice on their answer sheets. They had 15 minutes to complete this section.

The second instrument, the IELTS Practice Test, used for both the pre-test and post-test phases of the study included three parts, in which the participants were asked to answer seventeen questions and their speech was tape-recorded. 10 minutes was allocated for this purpose.

Finally the last instrument of the study was twenty two conversations which were adopted from New Interchange 2 textbook. For the purpose of study, the second researcher taught the conversations by means of concept mapping. The researcher first wrote the most important word or short phrase in the center of the class board and then placed related ideas or other important concepts on branches that radiated from the most

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important word or short phrase. Also, the students helped the researcher to write more words on the board.

Materials

The main materials of the study used for the two groups were conversations which were taken from New Interchange 2 textbook.

Results

In this section, the results from these two sets of data are summarized and subjected to statistical analysis to meet the research objective of determining which conversation teaching technique is most conducive to improving speaking fluency. Furthermore, to see whether the treatment was effective or not, the means of the two tests are compared through an independent t-test.

In order to gain precise temporal measures, the speech samples were transcribed and then seven temporal variables were calculated according to the methods recommended by Kormos and Denes (2004). The following is a sample of a transcribed spoken excerpt from one of the students talk in the post-test phase:

I come from Quchan. It is located in north east of Iran. I have lived here from my birth till to now. I like to travel with bus especially traveling to the beautiful cities and places of Iran. There aren't a lot of restaurants in my town although the number of them is increasing. They usually serves Iranian food. Khayam is one of the best restaurants in Quchan. It has delicious foods but its decoration view is not very good. My parents and I usually eat Iranian food. They are up to our interest. When I was in elementary school, I won a scientific test at school. It was very enjoyable. It was good because I became the first student between the all students in grade five. I remembered it because before saying the result I thought one of my friends became the first ones. Yes I enjoyed it very much. I had good memories about the time. Although I had good memories I would not recommended it to others because students know other schools had better teachers and

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situations. In my opinion, single sex schools are more better than the co-educational ones. In the first one the students are more relaxed and they can Learn better. When the students wear uniforms, they will pay more attention to their lessons. Different colors of their clothes will interrupt students' attention at school. I think the teacher should be both of them, the authority and the friend. In this case, students will learn better and enjoy their time in the classroom. The teacher is the leader of the classroom. She or he can be counselor too. I think students need both of them. They should learn anything so they should be taught and they should be ready for the real life in the society and their family. So they should be trained too.

Speaking time: 3: 14"
Total number of syllables: 450
Unfilled pauses under three seconds: 0
Unfilled pauses over three seconds: 0
Number of utterances between pauses of 0.25 seconds and above: 0
Number of syllables between pauses of 0.25 seconds and above: 0
Number of silent pauses: 0
Length of pauses above 0.2 seconds: 0
Number of filled pauses: 1
Number of disfluencies: 0

1. Speech rate: $\frac{450}{194} \times 60 = 139.1752$
2. Articulation rate: $\frac{450}{194} \times 60 = 139.1752$
3. Mean length of runs: $\frac{0}{0} = 0$
4. Number of silent pauses per minute: $\frac{0}{194} \times 60 = 0$

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5. Mean length of pauses: $\frac{0}{0} = 0$

6. Number of filled pauses per minute: $\frac{1}{196} \times 60 = 0.3092$

7. Number of disfluencies per minute: $\frac{0}{194} \times 60 = 0$

The analysis of data addresses the research question of whether concept mapping technique has any effect on speaking fluency. For comparing means a two-tailed t-test was applied to the control and experimental group in both pretest and post-test. The results of pretest and post-test for seven dependent variables were calculated by SPSS software to show differences between the two groups. The results of pretest for seven dependent variables are reported in Table 1. Based on the students' performance on an IELTS practice test, the differences between the two groups are not significant and they seem to belong to a homogeneous group of English language proficiency level. All t-values reveal no significant difference at the P< .05 level with the t-critical of 1.94. In all cases the t-observed is less than the t-critical (1.94).

Table 1
T-value for seven fluency variables at the pre-test phase

variable	F	Sig.	t	t-critical
Speech rate	.003	.958	-1.296	1.94
Articulation rate	0.25	.876	-1.197	1.94
Mean length of runs	0.76	.784	-.485	1.94
Number of silent pauses per minute	.805	.373	.935	1.94
Mean length of pauses	.119	.732	.259	1.94
Number of filled pauses per minute	.391	.534	-1.543	1.94
Number of disfluencies per minute	9.538	.003	1.191	1.94

P< .05

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The control and experimental group scores (post-test) were compared to indicate the differences between them. With the exception of mean length of runs, mean length of pauses and number of filled pauses per minute (see Appendix A for means and standard deviations of the post-test variables for the control and the experimental group), Table 2 shows that the differences between the two groups are statistically significant. It means that the t-values were enough above t-critical at 0.01 to partially reject the null hypothesis.

Table 2
T-value for seven fluency variables at the post-test phase

variable	F	Sig.	t	t-critical
Speech rate	.156	.694	-3.016	2.57
Articulation rate	1.635	.206	-2.800	2.57
Mean length of runs	.313	.578	2.460	2.57
Number of silent pauses per minute	4.024	.050	2.856	2.57
Mean length of pauses	6.744	.012	2.075	2.57
Number of filled pauses per minute	16.824	.000	2.225	2.57
Number of disfluencies per minute	3.739	.058	3.819	2.57

P< .01

The mean scores of the control and experimental groups were compared. The results are shown on Tables 3 and 4. Table 3 shows the t-value of -1.425 revealing no significant difference at the P< .01 level. The t-observed is less than the t-critical (-1.425< 2.57). The two groups were not significantly different at the outset of the study as shown in Table 3; however, the experimental group behaved differently on the post-test. Therefore, it seems justifiable to hold the idea that the treatment has served the intended purpose.

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Table 3
T-test for the control and the experimental group at the pre-test phase

	Levene's test for Equality of Variances		t- test for Equality of Means						
	F	Sig	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								lower	upper
Equal variances assumed	.055	.815	-1.425	58	.160	-19.5150	13.6959	-4693	7.90
Equal variances not assumed			-1.425	57.61	.160	-19.5150	13.6959	- 46.93	7.90

Table 4 shows the t-value of -2.657 revealing a significant difference at the P< .01 level. The t-observed is greater than t-critical (2.657>2.57) and we can thus reject the null hypothesis which states that concept mapping does not have any effect on speaking fluency of the EFL students of this study.

Table 4
T-test for the control and the experimental group at the post-test phase

	Levene's test for Equality of Variances		t- test for Equality of Means						
	F	Sig	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								lower	upper
Equal variances assumed	2.22	.142	-2.65	58	.010	-38.433	14.4673	-67.39	-9.47
Equal variances not assumed			-2.65	55.90	.010	-38.433	14.4673	-67.41	-9.45

Discussion

On the basis of data analysis, we observed a significant difference in the performance of the students in the control and experimental group. Therefore, the data provide a preliminary indication that concept

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mapping is more effective in enhancing speaking fluency of intermediate EFL students than the traditional approach. Moreover, the results indicate that there are significant differences between the two groups for some variables, and that, therefore, the null hypothesis for the equality of means between the experimental and control group is partially rejected. The superior performance of the experimental group can be attributed to the concept mapping which is a visual representation of thought. If students are involved in the process of learning, they feel that they are doing something which will be of later use; consequently, better retention takes place.

Concept mapping helps students become familiar with more vocabulary because of the organization of knowledge and introduction of contextual cues. Also, many students have a large passive vocabulary which does not translate directly into productive capabilities in the classroom. Concept mapping can help students to activate this. Therefore, it is highly probable that when students know more target language vocabulary, they tend to use their L_1 much less. Our observation of performance of the experimental subjects revealed that concept mapping helped them to take charge of speaking by taking active voluntary roles in opening discussions. In contrast, the control group students relied much on others to finish the task largely due to lack of self-initiative and fear of making mistakes. They were mostly passive, dependent and shy.

Concept mapping allows the students to create a context for the subsequent speaking task. Concept mapping activates relevant speaking knowledge from memory and provides a situation in which comprehension and production of the subsequent speaking task can be supported. Therefore, when the concept mapping provides students with more vocabulary and a context, they can increase their speaking time and talk at length with few pauses. The difference is actually shown in the comparison of means of speech rate of the control and experimental group (i.e., 91 and 116 respectively). Indeed, the experimental group students were able to fill the time with talk. Mean length of pause for the

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control group in the post-test phase was greater than for the experimental group (i.e., 5.0 and 1.8 respectively) supporting the idea that the experimental group was more at ease to talk with few pauses. The total number of syllables produced in a given speech sample known as articulation rate was quite evident in the experimental group (i.e., 97 for the control and 118 for the experimental group in the post-test phase). This is probably due to the fact that the students in the experimental group knew what they wanted to talk and there was no need to use long silences in order to give them time to think.

The focus on key concepts in the concept mapping can help students think about these concepts and provides a context in their mind. Therefore, they talk with few pauses and disfluencies. Evidence to support this can be found in the mean differences of the control and experimental performance at the post-test phase (i.e., mean length of pause for the control group was 5.0 and for the experimental group 1.8). The two groups performed differentially for the number of disfluencies such as repetitions, restarts and repairs (i.e., 1.4 and .55 for the control and experimental groups respectively).

An examination of the mean length of runs or an average number of syllables produced in utterances between pauses of 0.25 seconds and above indicates that the control group in the post-test phase had a greater number of such syllables between pauses of 0.25 seconds than the experimental one (i.e., 6.76 and 3.98 for the two groups respectively). This decrease in the mean length of runs might be construed in terms of the effect of the treatment for the experimental group.

Throughout the treatment period, we asked our students to brainstorm before their participation in the class. This left a positive effect on the atmosphere of the class and their behavior. In fact, the experimental group students got involved in the concept mapping and competed with each other. This seemed to indicate an activation of self-initiative which helped the students in the experimental group to overcome shyness at the time of speaking.

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The majority of the experimental group subjects also said that the linked words helped them recall and use more vocabulary in the speaking task and understand the meanings of words they did not know. We speculate that this better retention of words and concepts is due to the visual representation which concept mapping provides (Johnson, 1992; Johnson and Thomas, 1992). It is maintained that graphical display of concepts functions as a mnemonic device to help learners remember concepts. In fact, protocols of some of our students in the experimental group indicate that there was no fear of teacher correction and that they had obtained a sense of confidence and self-initiative.

Two subjects in the experimental group said that the keywords remained in their consciousness, and one subject even felt that showing all the related words in concept mapping made the conversation too easy to understand or even to talk about when they were asked to participate in a role-play activity. These comments indicate that using concept mapping for speaking fluency was an easy technique for the majority of the subjects in the experimental group. Accordingly our students in the experimental group were able to recall these concepts and henceforth spoke fluently.

It is interesting to note that one of the reasons for the better fluency of the experimental group over the control group might be directed to the hierarchical nature of concept mapping. Since more general concepts come at the top of the map and more specific concepts come below the map, then information is represented in a hierarchical manner. Thus, this hierarchical organization of information helps students direct their thoughts and ideas when speaking. As McLaughlin (1989) maintains, complex tasks such as speaking are characterized by a hierarchical structure (p.135). The successful completion of one part of the task requires the completion of various smaller components. Speaking requires the execution of hierarchical structure so that when we want to talk we need to decide on a topic and select a certain syntactic structure and a series of phrases and vocabularies to express what we have in

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mind. We may also see concept mapping as an organized activity which exerts an influence on reducing the load on short term memory of our participants which in turn results in shorter pauses in speech.

Findings of this study indicate that concept maps can be effective for cognitive and instructional objectives. Meaningful learning takes place when the learner has control over what s/he wants to say free from pressures which would impede participation. In other words, generally many students in the language classroom do not have the aspiration to speak because they are afraid of making mistakes.

Conclusion

This study attempted to elaborate on concept mapping which may be seen as a type of brainstorming in ELT. This study sought to investigate whether concept mapping had any effect on speaking fluency of a group of Iranian intermediate EFL students. Speech samples were collected from 60 students and analyzed. The results showed that concept mapping enhanced speaking fluency.

As for pedagogical implications Mayer (1994) counts several advantages for visual aids. First, if graphical representations allow for the creation of a context for speaking, they can certainly be effective. Second, by setting such meaningful learning activities as problem-solving and task-based learning, as the goal of instruction, the teacher will see the use of concept mapping can be most effective. Third, it is important to ask students to brainstorm some words related to the topic of conversation. This brings active involvement in the conversation class. Finally variety in class activity can be achieved through the use of concept mapping when strictness and formality of language learning classrooms is removed. The results of this study may furnish teachers and students with empirical evidence that concept mapping plays a role in the process of enhancing speaking fluency. However, many questions are still unanswered. We need to examine the concept map technique with subjects at different speaking proficiency levels and see if the application may lead to the same results we obtained in this study. The

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impact of concept mapping on the reduction of speaking anxiety was indirectly observed. This means that future research might tackle this rather important side of the argument and show how concept mapping functions as a healing factor for a rather complicated psychological phenomenon called anxiety.

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Appendix: statistical results

Table 5
Mean and Standard deviation of the Post-test for the Control and the Experimental Group (Speech rate)

Group Statistics

Group	N	Mean	Std. Deviation	Std. Error Mean
Control	30	91.367	31. 7962	5.8052
Experimental	30	116.850	33. 6360	6.1411

Table 6
Mean and Standard deviation of the Post-test for the Control and the Experimental Group (Articulation rate)

Group Statistics

Group	N	Mean	Std. Deviation	Std. Error Mean
Control	30	97.783	26. 0489	4.7559
Experimental	30	118.750	31. 6821	5.7843

Table 7
Mean and Standard deviation of the Post-test for the Control and the Experimental Group (Mean length of runs)

Group Statistics

Group	N	Mean	Std. Deviation	Std. Error Mean
Control	30	6.767	4.3524	.7946
Experimental	30	3.983	4.4129	.8057

Table 8
Mean and Standard deviation of the Post-test for the Control and the Experimental Group (Number of silent pauses per minute)

Group Statistics

Group	N	Mean	Std. Deviation	Std. Error Mean
Control	30	.867	.9091	.1660
Experimental	30	.500	.5872	.1072

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Table 9
Mean and Standard deviation of the Post-test for the Control and the Experimental Group (Mean length of pauses)

Group Statistics

Group	N	Mean	Std. Deviation	Std. Error Mean
Control	30	5.050	7.6636	1.3992
Experimental	30	1.883	3.391	.6096

Table 10
Mean and Standard deviation of the Post-test for the Control and the Experimental Group (Number of filled pauses per minute)

Group Statistics

Group	N	Mean	Std. Deviation	Std. Error Mean
Control	30	1.900	1.8071	.3299
Experimental	30	1.083	.8816	.1610

Table 11
Mean and Standard deviation of the Post-test for the Control and the Experimental Group (Number of disfluencies per minute)

Group Statistics

Group	N	Mean	Std. Deviation	Std. Error Mean
Control	30	1.433	1.0807	.1973
Experimental	30	.550	.6611	.1207

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