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ABSTRACT

A study compared the effectiveness of three classroom methods for teaching semantic mapping to college-level learners of English as a foreign language (EFL). Subjects were 187 freshmen at an Egyptian university, randomly assigned to three treatment groups: teacher-initiated semantic mapping; student-mediated semantic mapping; and teacher-student interactive semantic mapping. Treatment was administered over 5 months in one session per week. Subjects were pre- and posttested in reading comprehension. While the pretest indicated no significant differences in the groups, posttest results revealed students in the teacher-student interactive semantic mapping group scored significantly higher than the other two groups, which had similar results. Contains 61 references. (MSE)

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Effects of three semantic mapping strategies on EFL students' reading comprehension

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Abstract

The purpose of this study was to compare the effects of three semantic mapping strategies on the reading comprehension of learners of English as a Foreign Language. The subjects for the study were 187 freshmen enrolled in the department of French at the Faculty of Arts, Menoufia University, Egypt. These subjects were randomly assigned to three treatment groups. These groups were instructed by the researcher using the same reading materials, but three different semantic mapping strategies: (1) teacher-initiated semantic mapping, (2) student-mediated semantic mapping, and (3) teacher-student interactive semantic mapping. The study lasted a period of five months (one session per week). Prior to, and at the end of the treatments, all subjects were tested in reading comprehension. The obtained data were analyzed using the one-way analysis of variance and the t-test. The results showed no significant differences in the mean scores on the pretest among the three groups of the study. The posttest results revealed that students in the teacher-student interactive semantic mapping group scored significantly higher than the teacher-initiated and student-mediated semantic mapping groups ($t = 9.8, p < 0.05$; $t = 12.4, p < 0.05$, respectively). In addition, the posttest results showed no significant difference in the mean scores between the teacher-initiated semantic mapping group and the student-mediated semantic mapping group ($t = 0.9, p > 0.05$). These results were discussed and recommendations for future research were suggested.

Introduction

The semantic aspect of a text plays an important role in the reading comprehension process. As Frederiksen (1982) points out, "Apparently, understanding a text involves analyzing it into highly structured semantic units that are acquired, stored, retrieved, and in other ways processed as units" (p. 58). In support of this information, research has clearly demonstrated that good readers rely more on semantic cues than on syntactic cues (e. g., De Ford 1981, Meyer et al. 1980, Sprenger-Charolles 1991). Therefore, the need for teaching semantic organization is necessary to enable students to read effectively and with improved comprehension. As Pehrsson and Robinson (1985) explain, "The reader who fails to organize ideas in ways similar to the author's will fail to comprehend the intended meaning" (p. 26).

In light of the above information, semantic mapping has emerged as a teaching technique to increase comprehension. This technique has become popular in the teaching of reading comprehension because of its multiple advantages in this area. The major advantage of this technique is that it integrates new information with prior knowledge. As Prater and Terry (1988) point out:

When we consider the influence of background knowledge upon reading comprehension, we also must consider effective classroom techniques that activate students' prior knowledge. Semantic mapping is one of these techniques. If semantic mapping is used as a strategy to activate, assess and embellish students' prior knowledge of a topic before reading, it seems to have considerable merit. (p.103)

In their book, *Semantic Mapping: Classroom Applications*, Heimlich and Pittelman (1986) add a set of advantages related to the semantic mapping technique. These advantages are:

motivating students of all grade levels, integrating thinking with reading, integrating assessment with teaching, and making judgments concerning the appropriate instruction needed. They state:

Semantic mapping appears to motivate students of all age levels and to involve them actively in the thinking-reading process. . . . The process of semantic mapping also allows teachers to assess and interpret what students know as well as to make judgments concerning the appropriate instruction needed. These judgments can be based upon what students demonstrate they already know about a topic, rather than teachers having to assume what the students know. (pp. 45-46)

Research has also confirmed the effectiveness of using the semantic mapping technique in teaching reading comprehension. In many studies, subjects in the semantic mapping group scored significantly higher than the no-map control group on tests of recall and/or reading comprehension of both expository and narrative text (e.g., Baumann and Bergeron 1993, Melendez 1993, Rewey et al. 1991, Reynolds and Hart 1990, Scevak et al. 1993, Sinatra et al. 1984, Wachter 1993). Therefore, the main issue of this study was not whether semantic mapping should be used but how it can be appropriately and effectively used for teaching reading comprehension.

Purpose of the study

The purpose of this study was to compare the effects of teacher-initiated, student-mediated, and teacher-student interactive semantic mapping strategies on the reading comprehension of EFL students.

Background to the study

The teacher-initiated and student-mediated semantic mapping strategies have been developed to enable the learner to comprehend more effectively. However, from a theoretical standpoint, it seems that both strategies have their strengths and weaknesses. Initiated by the teacher, semantic maps save students' time and add information to what the students already know (Clarke 1990). However, such maps may inhibit students' creativity and fail to create independent readers. Mediated by the student, semantic maps force students to think about what they read and help them recognize what they already know in light of new information as a platform for learning more. However, the student-mediated strategy may be time-consuming, first in training students to use the semantic mapping procedures and second in putting these procedures to use (Holly and Dansereau 1984). Another disadvantage associated with this strategy is that students with limited prior knowledge may fail to implement it properly or to apply it to what they read (McKeachie 1984).

Noting that both teacher-initiated and student-mediated semantic mapping strategies have their strengths and weaknesses, some reading specialists call for teacher-student interaction for map construction. In this strategy, the teacher functions as a participant. This role, according to Jones et al. (1987), encourages students to share in their own learning. Johnson et al. (1986) also claim that the involvement of the teacher and students in map construction helps not only in-depth processing but motivation as well. Furthermore, the teacher-student interactive semantic mapping strategy can provide the teacher with an opportunity to correct misinformation, introduce new ideas, or change interpretations (Clarke 1990).

In sum, it appears that the teacher-student interactive semantic mapping strategy capitalizes on the strengths of both teacher-initiated and student-mediated strategies and thereby shares the weaknesses of neither.

Review of related research

Research on the effect of semantic mapping strategies on reading comprehension and/or recall of textual materials is broad. A group of researchers obtained positive results with the teacher-initiated semantic mapping strategy. (e. g., Alvermann 1981, Dyer 1985, Idol 1987, Landis 1985, Moore and Readance 1984, Reutzel 1985, Slater et al. 1985). The usefulness of having students construct their maps was also asserted by a second group of researchers (e. g., Berkowitz 1986, Boyle 1993, Hudson 1991, Johnson 1987, McCagg and Dansereau 1991, Ruddell and Boyle 1989). A third group of researchers reported that the teacher-student interactive semantic mapping strategy was effective in improving reading comprehension (e.g., Englert and Mariage 1991, Johnson et al. 1984). In sum, the three semantic mapping strategies have been continually valued by researchers as useful instructional strategies for developing reading comprehension. However, no direct comparison among the three strategies has been made.

Method

Subjects

The sample for the study comprised the entire population (N = 237) of the 1st year students enrolled in the department of French at the Faculty of Arts, Menoufia University, Egypt. This sample was randomly divided into three treatment groups with seventy-nine students per group. The researcher eliminated from the data analysis any student who missed two or more sessions of instruction. Of the entire population originally targeted for the study, 187 subjects ultimately completed both treatment and testing phases (65 in the teacher-initiated group, 60 in the student-mediated group, and 62 in the teacher-student interactive group). All subjects participated in the study using one hour a week from their regular English curriculum.

Materials

Twenty reading passages constituted the instructional materials for the experiment. These passages were drawn from Alan Cilchrist, *Modern English Readings* (London: Longman Group Ltd., 1972). These passages were expository, averaged 800 words in length and covered various topics. All had not been read by the subjects prior to the onset of the study. All were used without any accompanying exercises to make them appropriate for each of the three treatment conditions.

Research hypotheses

On the basis of the literature reviewed previously, the hypotheses of the study were stated as follows:

1. There would be no significant differences in the mean scores among the three groups of the study on the pretest.
2. The teacher-student interactive semantic mapping group would score significantly higher than the teacher-initiated and student-mediated semantic mapping groups on the posttest.
3. There would be no significant difference in the mean scores between the teacher-initiated semantic mapping group and the student-mediated semantic mapping group on the posttest.

Research variables

The independent variables for the study consisted of three experimental conditions: (1) teacher-initiated semantic mapping, (2) student-mediated semantic mapping, and (3) teacher-student interactive semantic mapping.

In the teacher-initiated semantic mapping condition, the teacher drew a semantic map based on the title of the assigned passage on the chalkboard. Each student was then asked to make a copy of this map from the chalkboard and to study it on her/his own. After that, the teacher gave each student a copy of the assigned passage and asked her/him to read it silently and independently. Finally, each student added the new information s/he gained from the passage to the map.

In the student-mediated semantic mapping condition, students received training in the use of semantic mapping a week before the experiment began. During the experiment, each student performed the following procedures on her/his own: (1) generating a prereading semantic map based on the title of the assigned passage, (2) reading the assigned passage, and (3) adding new information gained from the passage to the map and removing misinformation from it.

In the teacher-student interactive semantic mapping condition, the teacher elicited students' background knowledge about the title of the assigned passage by asking students to respond to questions pertaining to it. This background knowledge was then organized onto a semantic map on the board. After that, each student was asked to read the passage silently and ask the teacher if there was anything s/he did not understand. Eventually, through teacher-student interaction, the new information gained from the passage was added to the map.

The dependent variable was EFL students' reading comprehension as measured by a TOEFL reading comprehension test.

Controlling of variables

To control extraneous variables, all subjects were informed not to discuss their randomly assigned semantic mapping strategies with each other or with anyone else during the experiment. The instructional time was also held constant for the three groups in the study. Additionally, the three semantic mapping strategies were used as pre- and post-reading activities as indicated above.

Instruments

Two TOEFL reading comprehension tests were used as measures of reading comprehension for the three groups in the study. Model Test One was used as a pretest and Model Test Two was used as a posttest (Sharpe 1996).

Procedure

At the beginning of the experiment, all subjects were pretested. Following pretesting, they were randomly assigned to three treatment groups. All groups were then instructed by the researcher in 20 one-hour sessions for a duration of five months during the 1997-98 academic year. At the end of the treatments, a posttest was administered to the three groups and the data collected were analyzed using the one-way analysis of variance and the t-test. All analyses used the 0.05 level of significance.

Results and discussion

Pretest results

Table 1
The one-way analysis of variance for the three treatment conditions on the pretest

Source	DF	SS	MS	F	Significance
Between Groups	2	15.79	7.10	0.37	p > 0.05
Within Groups	184	3898.30	21.19		
Total	186	3914.10			

As shown in Table 1, a one-way analysis of variance comparing the mean scores on the pretest yielded no significant differences among the three groups of the study ($f = 0.37$; $p > 0.05$). Thus, the first hypothesis was accepted. This suggests that students in the three groups were fairly equivalent in their reading comprehension at the beginning of the study. This result may be attributed to the fact that all subjects studied the same textbooks in the preparatory and secondary schools for the same

amount of time (6 years). The pretest results also revealed that all subjects were poor comprehenders. This may be due to the fact that Egyptian EFL teachers, at both the preparatory and secondary school levels, focus on word-by-word decoding rather than comprehension

Posttest results

Table 2
The one-way analysis of variance for the three treatment conditions on the posttest

Source	DF	SS	MS	F	Significance
Between Groups	2	2417.61	1208.80	80.11	p < 0.05
Within Groups	184	2776.49	15.09		
Total	186	5194.10			

A one-way analysis of variance was used once more to test for differences in scores on the posttest. The results (shown in Table 2) revealed that the F-ratio was significant at the 0.05 level ($f = 80.11$, $p < 0.05$). Therefore, three subsequent t-tests were employed to compare the difference in the mean scores for each two treatment groups.

Table 3
The mean difference for each two treatment groups

Group	N	M	S. D.	t-value
T-S Interactive SM	62	32.44	3.92	9.8
T-Initiated SM	65	25.11	4.47	
T-S Interactive SM	62	32.44	3.92	12.4
S-Mediated SM	60	24.50	3.08	
T-Initiated SM	65	25.11	4.47	0.9
S-Mediated SM	60	24.50	3.08	

As shown in Table 3, results from the t-tests indicated that the teacher-student interactive semantic mapping group scored significantly higher than the teacher-initiated and student-mediated semantic mapping groups ($t = 9.8$, $p < 0.05$; $t = 12.4$, $p < 0.05$, respectively). Therefore, the second hypothesis was accepted. There are several possible explanations for the beneficial effects of the teacher-student interactive semantic mapping strategy in this study. One explanation is that this strategy might have the potential to activate students' prior knowledge more fully than the other two strategies. A second possible explanation is that students might share their own prior knowledge with that of the teacher, which in turn expanded upon their existing knowledge, and further enhanced their reading comprehension. A third explanation is that poor comprehenders might derive maximum benefits from the teacher-student interactive strategy. A fourth explanation is that the teacher-student interactive strategy might allow the teacher to focus students' attention on higher-order thinking skills, which in turn enhanced their reading comprehension. A final explanation is that the interaction between the teacher and students might increase students' motivation.

Results from the t-tests also showed no significant difference in the mean scores between the teacher-initiated semantic mapping group and the student-mediated semantic mapping group ($t = 0.9$, $p > 0.05$). Therefore, the third hypothesis was accepted. This suggests that the teacher-initiated and student-mediated semantic mapping strategies were equally less effective for developing EFL

students' reading comprehension, in comparison with the teacher-student interactive semantic mapping strategy.

Recommendations for future research

During the course of the study, the need for future studies in the following areas became apparent: (1) Analyzing the semantic maps organized by poor and good readers. (2) Exploring the effects of allowing students to generate their own maps individually, in groups, and as a class on their reading comprehension. (3) Exploring the effects of teacher-initiated, student-mediated, and teacher-student interactive semantic mapping strategies on students' attitudes towards reading. (4) Exploring the effects of teacher-initiated, student-mediated, and teacher-student interactive semantic mapping as pre- versus post-reading strategies on reading comprehension. (5) Exploring the effects of top-down vs. bottom-up maps on reading comprehension.

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