

The Effect of Graphic Organizer and Marginal L2 Glossing Training on the Reading Comprehension of ESP Students

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Abstract: There have been a plethora of seminal studies regarding teaching reading strategies to ESL and EFL learners, but teaching reading strategies to ESP students has been given scant attention in language teaching. The guiding theme of this research was prompted by awareness of marketing university students' problems understanding business texts in English. In other words, this study was undertaken to examine the efficacy of using two reading strategies (i.e. graphic organizer and marginal L2 glossing) in ESP students' reading comprehension. The Students who participated in this study were randomly assigned to "graphic organizer" treatment, "marginal L2 glossing" treatment, and a control group. The result of this quasi-experimental study revealed that both treatment groups outperformed the control group in the reading comprehension posttest. Furthermore, there was a significant difference between the means for the graphic organizer and marginal glossing groups in favor of the graphic organizer group. In other words, the result of this study indicated that the graphic organizer group performed significantly better than the other two groups in reading comprehension of business texts. The Students in the graphic organizer group were provided by a "structured picture" of the concepts of the texts.

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Introduction

Language practitioners and linguists assert that teaching reading strategies to advanced students can be valuable for reading comprehension (Anderson, 2003; Barnett, 1988; Devine, 1984). Carrell, Gajdusek, and Wise (1998) stated that these strategies make a seed bed for interaction between reader and written text. Moreover, current EFL teaching/learning has emphasized understanding both main ideas and supporting sentences in a text (Sola, 1996). Anderson (2001) pointed out that L2 teachers need to keep two perspectives regarding the evaluation of reading in mind: the big picture and minor details. Spatial and visual learning strategies seem to provide readers with a stepwise process for extracting, remembering, and retrieving information from academic texts books (Holley & Dansereau, 1984). It has been claimed that graphic organizers lend themselves to such a spatial learning. Ausubel (1968) postulated that the use of graphic organizer provides ideational scaffolding for reading comprehension. Barron & Earle (1970) proposed the idea that the visual-spatial representation of graphic organizers would support existing cognitive structure. Generally speaking, the ultimate goal of graphic organizer is to emphasize key information within the texts instead of providing extensive coverage of all the textual information. Marginal glossing in teaching share some common grounds with graphic organizer in that both of these strategies serve the role of idea extraction while squeezing reading

materials. They both highlight the main idea of the text in some short phrases. They also represent knowledge structures and key ideas in an organized geometric shape or simple outline. ESL and EFL students are a particular population who needs special attention in reading development, especially those who wish to pursue academic work in their second language. Learning how to read informational texts to obtain content-area knowledge becomes critical for their success. A body of research was conducted regarding different reading strategies such as graphic organizer and glosses in EFL and ESL contexts, but a few researchers investigated the efficacy of such reading strategies in ESP context. Almost all of these studies have been carried out with EFL and ESL readers. As ESP students stumble across more complex and dense reading materials, they need to arm themselves with such scaffolding devices to facilitate their reading comprehension. The present study addresses the following research questions:

1. What is the effect of creating graphic organizer on the reading comprehension of university marketing students?
2. What is the effect of marginal L2 glossing on the reading comprehension of university marketing students?
3. Is one strategy – graphic organizer or marginal glossing- more facilitative and effective than the other?

Review of Related Literature

Marginal Glossing in Reading Comprehension

Marginal glossing is an avenue to help learners comprehend reading texts. By providing additional information beyond the text in the margin of the same page or another page, glosses guide the learner and assist as a mediator between text and learner. Glosses have different functions in helping to decode the text by providing additional knowledge in specific content, skills, strategies, and definitions of difficult words. The two most significant justifications for gloss employment are to facilitate reading comprehension and assist vocabulary learning. First, glosses can help readers demystify meaning of new words by providing correct guesses. Deriving meaning from context can be difficult and risky because of readers' lack of language or reading strategies (e.g., Bensoussan and Laufèr, 1984; Hulstijn, 1992; Kruse, 1979; Nation, 2001; Stein, 1993). Second, glossing can facilitate flow of reading process without any interruption. Third, glosses may help readers to bridge the gap between prior knowledge or experience and new information in the text. In other words, interactions among gloss, reader, and text may promote comprehension and retention of the content of the text. Furthermore, glosses in key words can help readers recall their background knowledge and connect it to the text (Stewart and Cross, 1993). Some studies have shown that students prefer to have glosses in their L2 language reading materials (e.g., Jacobs, Dufon and Frog, 1994). Holley and King (1971) compared different types of glosses. Jacobs et. al. (1994) investigated the effects of L1, L2, and no gloss on foreign language reading comprehension and vocabulary learning. The findings showed that there was no significant difference among the different conditions, and participants expressed their preference for L2 glosses.

In contrast, Davis (1989) and Jacobs (1994) indicated that glossing resulted in positive effect of L2 reading comprehension. Davis (1989) tested whether marginal glosses would improve comprehension of the passages. The results of the study revealed that those students who read a text with glossing performed significantly better than those without glossing. Overall, a majority of studies in this regard showed that there is a positive interaction between marginal glossing and reading comprehension.

Graphic Organizer in Reading Comprehension

A cursory glance over the recent literature of reading indicated the sweeping claim that students should have a number of reading strategies at their disposal. A majority of researchers claimed that reading strategies are facilitative aids which contribute to reading abilities. More specially, awareness of text organization is a key factor in overall reading

comprehension abilities (Pearson & Fielding, 1991; Trabasso & Bouchard, 2002). One of the most important ways to recognize discourse structuring in texts is through the use of graphic organizer (GOs) – visual representation of information in the text. One reason for such a claim is that digging deeply text structures may result to full understanding of the texts. Prior to 1969, advance organizers had been introduced as prose passages. Baron (1969) changed them into tree diagrams for vocabulary acquisition. He termed this diagram as “the structured overview”. A structured overview is a “diagrammatic representation of the basic vocabulary of a unit so as to show relationships among the concepts represented by those words” (Earle, 1969, p.4). Jones & Pierce eloquently stated that “a good graphic organizer can show the key parts of a whole and their relations, thereby allowing a holistic understanding that words alone cannot convey (p.21).” In some studies, “ graphic organizers taken the forms of anything from hierarchical listings of vocabulary terms to elaborate visual-spatial displays with accompanying descriptors and phrases” (Griffin & Tulbert, 1995, p.86). Bean & Simmons et al. (1986) defined graphic organizer as spatial arrangements and wording that organize key conceptual relationships graphically. These GOs represent information as a semantic web or as an outline of main ideas in a text. These semantic webs highlight discourse structure of the texts. In other words, sketching a semantic map or graphic organizer is exactly the same as getting an x-ray in that it shows the deeper skeletal parts vividly. There are different types of graphic organizers such as fishbone diagram, cause and effect, pie chart, semantic feature analysis, cloud, continuum scale, comparison and contrast matrix, and the list goes on. For instance, a star diagram is a basic way for brainstorming about a topic or simply listing all the major traits related to a theme. It can also be served as a story star, a star diagram that used to describe the key points of a story, noting the five W's: who, when, where, what, and why. To minimize the amount of information within each cell of the graphic organizer, words are restricted to single words, phrases, or codes. It is stated that the number of cells in each graphic organizer should not exceed more than ten cells (Englemen & Carnine, 1982). It should be born in mind that types of graphic organizers are determined by the types of text structure.

Cognitive Theories behind Graphic Organizer

A number of theories lend support to the use of graphic organizers in helping students process and retain information. Schema theory, dual coding theory, and cognitive load theory provide the foundation stones in this regard.

Schema Theory

According to schema theory, memory is composed of a network of schemas. A schema is a collection of organized and interrelated concepts in mind. According to Winn and Snider (1996) a schema is an organized structure that exists in memory and combined with other schemas, contains the sum of an individual's knowledge. Schemas are dynamic. As new information is learned, it is assimilated into existing schemas or causes the information of new schemas. According to Dye (2000), "the graphic organizer has its roots in schema theory" (p.72). It is clear that graphic organizer link new information to existing knowledge and help students build appropriate schemas. If prior knowledge is activated, the schema will be able to construct a framework to which new information can be anchored and comprehension will be facilitated.

Dual Coding Theory

Paivio (1986) noted that there are two systems of information processing. One system is focused on visual the other is specialized in verbal language. These two systems are highly connected with each other. The visual system specializes in processing and storing images while verbal system processes linguistic information. According to Saavedra (1999), dual coded information is easier to retrieve and retain because of the availability of two mental representations, verbal and visual, instead of one. The more students use both forms, the better they are able to think about and recall information (Marzano, Pickering, & Pollock, 2001). The theoretical foundations of dual coding theory have definite implications on the value and use of graphic organizers. Marzano, Pickering and Pollock (2001) state that graphic organizers "enhance the development of non-linguistic representations in students and therefore, enhance the development of that content" (p.73). The use of graphic organizers also helps students generate linguistic representations. As a visual tool, graphic organizers help students process and remember content by facilitating the development of images. As a linguistic tool, text based graphic organizers also facilitate the development of logogens thereby dual coding the information.

Cognitive Load Theory

Cognitive load is the amount of mental resources necessary for information processing (Adcock, 2000). According to this theory working memory can work on a limited amount of information otherwise the information is likely to be lost. Cooper (1998) stated that capacity of this memory is between four to ten elements. Visual learning tools such as graphic organizer can reduce the cognitive load which result to a condition that working memory is able to attend to more learning material (Adcock, 2000). As a result,

graphic organizer can be served as facilitative tools in learning material.

Finally, a body of empirical studies has provided the facilitative and debilitative effects of graphic organizers. Armbruster, Anderson and Meyer (1991), for example, found positive effects of GOs on reading texts of social studies with the fifth graders, but not with the fourth graders. Bean, Singer, Sorter and Frazee (1986) found GO training no more effective than instruction in outlining if not combined with previous summarization training. Griffin, Malone, and Kameenui (1995) found GO transfer effects with fifth graders but no training effect as measured by the immediate and delayed recall of the training materials. Simmons, Griffin, and Kameenui (1988), on the other hand, failed to demonstrate any advantages of GOs over traditional instruction with the sixth graders in science classes.

In contrast to the research mentioned above, Boothby and Alvermann (1984) examined the effectiveness of GOs on fourth-grade L1 students in helping them remember the main ideas within social studies texts. The results showed that the GO group scored significantly higher than the control group on both immediate and 48-hour-delayed recall tests. Another study undertaken by Berkowitz (1986) indicated that sixth-graders who constructed their own GOs had better comprehension than those who studied ones constructed by the teacher. Guri-Rosenblit (1989) investigated whether a tree diagram assisted Israeli L1 college students' comprehension of main ideas in a 3,500-word social science expository text and to what extent a verbal explanation would assist the processing of a diagram. The tree diagram used in the study represented the main ideas of the text in a hierarchical organization and depicted the text structure of comparison-contrast. Four versions of the text were used: the original text, added diagram version, explained diagram version, and elaborated text version without diagram (with marginal notes, different type face, subheadings, and additional explanation of the relations between various elements in the text). The results demonstrated that students who received the tree diagram performed significantly better on comprehension of main ideas and on recall of the relations between various elements in the text than those who received either the original or the elaborated text without a diagram. Students who received the diagram plus an explanation were more able to perceive subtle relations and interrelations than those who received no such explanation. There was no difference in performance between the original text group and the elaborated text group. Ellis (2001) noted that information is more easily learned and comprehended with visual organizers. Once students acquire the basic, yet solid foundation of a concept,

then future content can be addressed at higher cognitive levels leading students to become more strategic learners. Researchers unanimously accepted that graphic organizers are scaffolding tools for reading comprehension. When students intend to create a graphic organizer, they arrange the pertinent aspects of a concept into a geometric shape. Undertaking this procedure help learners comprehend the concept inside out. There are a series of reasons for the facilitative impact of graphic organizers in reading comprehension. First, graphic organizers match the mind. As researcher David P. Ausubel (2001) has shown, the mind arranges and stores information in an orderly fashion. New information about a concept is filed into an existing framework of categories called a schema. Graphic organizers arrange information in a visual pattern that complements this framework, making information easier to understand and learn. Second, graphic organizers aid the memory as opposed to recalling key points from an extended text. Third, graphic organizers help retain information readily when higher thought processes are involved. Finally, graphic organizers engage the learner with a combination of the spoken word with printed text and diagrams. Graphic organizers may be utilized as advance organizers, before the learning task, or as post organizers, after encountering the learning material. A review of the research from 1980-1991 (Hudson, Lignugaris-Kraft, & Miller, 1993) concludes that visual displays can be successfully implemented at several phases of the instructional cycle. Indeed, positive outcomes have been reported when graphic organizers are used as both advance (Boyle & Weishaar, 1997; Gallego et al., 1989) and post organizers (Alvermann & Boothby, 1986; Boyle & Weishaar, 1997; Gardill & Jitendra, 1999; Idol & Croll, 1987; Newby et al., 1989; Sinatra et al., 1984; Willerman & Mac Harg, 1991). Moor and Readence (1984) report that post organizers as follow-up activities are more effective than advance organizers. In a meta-analysis study, for example, a large effect size (.57) was found when graphic organizers were used after reading text, but a much smaller effect size was reported when graphic organizers were presented before the task. Similarly, an effect size of .68 was reported when the dependent measure was vocabulary in contrast, when the test measured comprehension, the effect size was .29.

Method

Participants and Setting of the study

This study was conducted during summer term 2011 at Tonekabon Open University in Iran. Sixty-two marketing junior university students both male and female participated in this study. They were randomly assigned to graphic organizer treatment (n= 19), marginal glossing treatment (n= 23), and control group

(n= 20). All the students of three groups have passed four or five semesters. They also passed their general English last term before taking their marketing ESP reading course. This course was a requirement for students' graduation which met once a week for almost 80 minutes.

Instruments

At the outset of the study, a week before the treatment, the researcher administered a standard reading pretest to ensure that all students were at the same stepping point in reading comprehension. The reading pretest included 30 multiple-choice items. The test consisted three parts of open-ended, multiple-choice, and fill in the blanks items. Since the pretest was taken from a standard TOEFL test, the reliability and validity of the test were taken for granted. A series of reading passages for marketing student was downloaded from the internet. The topics of these passages were as follows: marketing mix strategies, psychology of selling, creative product pricing, selling/buying process, social marketing, advertising creativity, and marketing financial services. A vocabulary textbook called "Business vocabulary in use" by Bill Mascull was also taught as a complementary material. The instructor covered six units of this book at the beginning or at the end of sessions as warm-up or fillers. At the end of study, a reading posttest was administered to gauge the efficacy of graphic organizer, marginal glossing, and traditional reading instruction. By the same token, the test battery included three ESP reading passages followed by open-ended, multiple-choice and fill in the blanks questions. Item analysis showed that average discrimination index for the question was 0.43. The average facility index of the text was 0.62 which shows that most of the distracters functioned well. Reliability of this test was 0.88 which is quite acceptable.

Procedure

A week before the beginning of the treatment, all three classes took the reading pretest. Then, the researcher assigned the classes into three groups randomly. Two experimental groups (graphic organizer and marginal glossing) and one control group (traditional reading group). In experimental organizer group, students participated in seven 80-minute graphic organizer sessions, one session per week. In the first session, the researcher explained to students the facilitative impact of graphic organizer in reading comprehension. Then each student was given a handout about following a series of procedures to create graphic organizer. The steps are as follows: 1. Read the passages carefully and extract the main idea and supporting sentences. 2. Circle the skeletal concepts of the passage. 3. Make a list of these concepts

hierarchically. 4. Draw a line between related concepts. 5. According to the relationship of the passage, appropriate graphic organizers should be drawn. 6. Review the graphic organizer to assure it is as accurate as possible (adapted from Pauk, 1989). Next each student was given a text to read. Since students did not have the foggiest idea about generating graphic organizer, they were paired up to come up with well-rounded organizers. While they were creating organizers, the instructor (the researcher) walked around the classroom to monitor students' progress. Finally, the final sketch of organizer was provided by the instructor on the board. To check students' comprehension, they were asked to discuss the topic. The same procedure was followed in the other six sessions. In the marginal glossing treatment group, students were supposed to participate in an 80-minute reading class once a week. In the first session, the researcher talked about the importance of providing L2 notes at the margin of the book. Then they were given a handout how to extract the skeletal concepts out of the passages. In a similar vein, students' cooperative reading and writing marginal notes were followed by a group discussion led by the researcher. Students in the

control group read the passages on their own. Then, the researcher elaborated on unknown words and difficult structures, if any. They did all the comprehension questions followed by the passages individually. Finally, the researcher asked them to summarize the text and main idea. A couple of days after the treatment, all students of all three groups were post tested. Students were given the test passages and were allowed 60 minutes to finish the test.

Results

Quantitative analysis of the study was conducted using the SPSS PC+ Version 10.0 software package (Norusis, 1990). The alpha level for the whole study was set at 0.05. The total possible score on the reading comprehension test was 30 points. First, the homogeneity of all three groups investigated through the administration of a TOEFL reading pretest. As it is displayed in table 1, the mean scores of all three groups are close to each other, thus, the groups were homogenous in terms of their reading proficiency. Table 2 indicated the ANOVA results. It showed that there is no subject differences among the three groups ($F = .716$, $p = .493 > 0.05$).

Table 1: Descriptive Statistics: Results of the reading pre-test among three groups.

Groups	Number	Mean	SD
Marginal Glossing	23	17.22	2.449
Graphic Organizer	19	16.84	2.713
Control	20	17.90	3.259

Table 2: One-way ANOVA: Results of the reading pre-test scores among three groups.

Groups	Sum of squares	Df	Mean Square	F	Sig.
Between Groups	11.309	2	5.655	.716	.493
Within Groups	466.239	59	7.902		
Total	477.548	61			

Comparison of reading posttest: The means for the groups' posttest are also shown in table 3. It can be concluded that the mean score of graphic organizer is higher than the other two groups. Thus, with respect to the first research question, the results suggested that graphic organizer had a facilitative impact on students' reading comprehension of marketing.

Table 3: Descriptive statistics: Results of reading post-test among three groups.

Groups	Number	Mean	SD
Graphic Organizer	19	26.11	2.307
Marginal Glossing	23	22.26	2.281
Control	20	17.45	4.084
Total	62	21.89	4.549

To measure the significance of these differences, a one-way ANOVA was run. The results are tabulated in table 4.

Table 4: One-way ANOVA: Results of the reading post-test scores among three groups.

Groups	Sum of Squares	df	Mean Squares	F	Sig.
Between Groups	735.035	2	367.518	41.132	.000
Within Groups	527.174	59	8.935		
Total	1262.210	61			

It can be concluded from the above table that there is a significant difference among the groups concerning the visual reading strategies in the reading posttest, $F(41.132)$, $p = .00 < .05$. Finally, to locate the exact place of differences among test scores, a Scheffe post test had to be run.

Table 5: Scheffe test of differences across the groups on the reading post-test.

(I) grouping	(J) grouping	Mean Differences (I-J)	Std. Error	Sig.
Graphic organizer	Marginal Glossing	3.844*	.927	.001
	Control	8.655*	.958	.000
Marginal Glossing	Graphic Organizer	-3.844*	.927	.001
	Control	4.811*	.914	.000
Control	Graphic Organizer	-8.655*	.958	.000
	Marginal Glossing	-4.811*	.914	.000

As can be seen, the one-way ANOVA revealed that there is a significant difference among all groups. Regarding the second research question, the role of marginal glossing in reading comprehension, results showed that marginal glossing also had positive effect on reading comprehension, but this effectiveness is in the second place in comparison to graphic organizer group. As for the third research question, the result showed that the graphic organizer group outperformed the marginal glossing.

Discussions

The main purpose of this study was to examine the effectiveness of two visual reading strategies. The results of the study showed that students of graphic organizer group scored higher than the other two groups in reading posttest. It can be concluded that graphic organizer group performed better than the marginal glossing and control groups. The results of this study confirmed with Tang (1992) who pointed out that dual coding function of graphic organizers provide learners with both visual and verbal information. The visual information contains the knowledge of the content while the verbal information promoted language acquisition (p.178). The result of this study is also congruent with Hawk (1986) who examined the effectiveness of graphic organizer as an advance organizer on science students' achievement. The result showed a statistically significant main effect ($p < .001$) in favor of the students who received instruction using

graphic organizers. The conclusion drawn from this study was that the graphic organizer is an effective and practical teaching strategy. Finally, the results of the study are also in tune with Ellis (2001) who noted that information is more easily learned and comprehended with visual organizers. The result of this study is dissimilar to Carnes, Lindbeck, & Griffin (1987). Alvermann and Boothby (1986) also failed to demonstrate an improvement in comprehension. The results of this study are also at odds with Bean, Singer, Sorter and Frazee (1986) who found GO training no more effective than instruction in outlining if not combined with previous summarization training. Griffin, Malone, and Kameenui (1995) found GO transfer effects with fifth graders but no training effect as measured by the immediate and delayed recall of the training materials. Finally, Simmons, Griffin, and Kameenui (1988) failed to demonstrate any advantages of GOs over traditional instruction with the sixth graders in science classes. Generally speaking, a number of empirical researches proved that visual-spatial reading strategies such as GOs deepen students' understanding in reading comprehension. There are a host of reasons for such a claim. First, it has been stated that active involvement of readers in constructing a graphic organizer provides them an opportunity for deeper processing of the material. Second, when vocabulary and structures are removed, readers focus their full attention on the content of reading material and connection among different

concepts. Third, graphic organizers have multiple uses. They can be used to structure writing projects, summarize reading texts, organize and store vocabulary, and help in problem solving, decision making, studying, planning research and brainstorming. Organizers are easy to edit, revise, and add to. They also serve the role of “visual notes” for reviewing. Ellis (2001) identifies three benefits of using graphic organizers. First, graphic organizers make content easier to understand and learn. Graphic organizers also help students separate important information from what might be interesting but not essential information. Second graphic organizers decrease the necessary semantic information processing skills required to learn the material. By making the organization of content information easier to understand, graphic organizers allow material to be addressed at more sophisticated levels. Finally, students who use graphic organizers may become more strategic learners. In a nutshell, it is a visual frame of a textual photo. The pedagogical implication of this study is that language teachers especially ESP practitioners should not neglect the advantages of using visual-spatial reading strategies. They should also take the matter of teaching reading strategy to ESP students into consideration. Furthermore, ESP text book designers and writers can make a room in reading passages to illustrate different types of organizers for readers. Further investigation can build on the results of this study. For instance, other researchers can investigate the effectiveness of different glosses (L1 & L2) in both ESP and EFL contexts. They can also examine the efficacy of advance organizer and post organizer i.e. as pre-task or follow-up activity. Furthermore, a replication of the study could be conducted with other groups checking teacher-generated and student-generated organizers. This study focused on the relationship between visual strategies and reading comprehension, other studies can be done on the relationship between visual strategies and vocabulary recall, retention, and other language skills or components. Finally, it is hoped that the findings of this study will help improve reading comprehension in ESP classes and help language practitioners to promote their knowledge and find different ways of teaching reading strategies. It is other researchers’ duty to conduct more rigorous study in this area.

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