The Effects of Concept Mapping, Argument Mapping and Mind Mapping on 6th Graders' Vocabulary Production

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ABSTRACT

As vocabulary is an important element in enhancing English knowledge, utilizing effective and novel vocabulary learning strategies help foster learners' vocabulary production. The aim of this study is to present mapping techniques such as concept mapping, argument mapping, and mind mapping as innovative strategies to increase students' vocabulary production. Several studies have been carried out on the impacts of concept mapping, argument mapping, and mind mapping techniques but there is no obvious comprehension of the supremacy of any of these strategies over the others. The present study investigated the impacts of the selected techniques on vocabulary production of 6th Graders. To this end, 90 female students (6th graders) studying in an English institute in Tehran, Iran were selected and categorized into three experimental groups. Each of these groups received one of the chosen techniques randomly. At the end of the instructional sessions, one post-test designed in fill-in-the-blanks format was performed to evaluate vocabulary production of the students. A One-Way ANOVA procedure was utilized to analyse the acquired results. The outcomes showed that the obtained differences between the groups of concept mapping, argument mapping and mind mapping were statistically significant. Those participants who used the concept mapping and mind mapping techniques performed better than their classmates of the argument mapping technique. It is worthy to note that learners, teachers, and materials' designers can benefit from the findings of this study.

Key words: Concept Mapping, Argument Mapping, Mind Mapping, Vocabulary Production, ANOVA

INTRODUCTION

Vocabulary can be perceived as a main topic in second language learning. It is important as other major skills including speaking, listening, reading, and writing (Mehring, 2005). The first important part in vocabulary learning is to identify what it constitutes the meaning of a word. Words are used several times to be really learned and result in a fact that vocabulary is learned increasingly unavoidably (Schmitt, 2007). Vocabulary learning is a continuing procedure which takes time and practice. It includes systematic repetition of words in order to help students to learn. Students can retain useful and appropriate vocabulary pertinent to their subjects if they learn vocabulary through context, cooperative learning, and using technology (Mehring, 2005). One of the main aspects in ESL/EFL is vocabulary learning and there has been performed a lot of researches in this area (Khosravizadeh & Mollaei, 2011). It is necessary to familiarize students how they gradually learn words. The responsibility of teachers is to support students to actively create cohesive associations between novel and previous information about a word. If students actively participate in this procedure, they will better remember about new words (Sedita,

2005). It is worth noting that using traditional techniques of vocabulary learning have some weaknesses that make students turn to novel approaches to increase their vocabulary range. Besides, various Vocabulary Learning Strategies (VLS) indicate supremacy more than traditional trainings concerning enhancing word consciousness, meanings and analysis (Anderson and Nagy, 1993). In this regard, huge number of studies confirm and accept the use of useful educational methods to make easy the procedure of vocabulary learning (August, Carlo, Dressler, & Snow, 2005). Hence, effective mapping strategies enhance word knowledge and develop language knowledge. Examining the impacts of the chosen techniques including concept mapping, argument mapping, and mind mapping on vocabulary production can have an effect on language teaching and learning.

VLS are perceived as one part of language learning strategies (Nation, 2001). VLS are naturally attractive to teachers and learners. Vocabulary learning strategies are an essential tool in the process of vocabulary development of a foreign language. VLS also help learners to decide what to learn and how to learn (Gu, 2010). Mapping techniques investigated in the present study included techniques of Argument, Concept,

and Mind mappings. An argument includes a series of claims with a planned relationship; it tries to support or disprove a given position or argument. A definition of an argument map entails a visual representation of an argument which determines claims as the position or argument, reasons and objections. It also indicates the structure between varieties of claims. In other words, an argument map shows a reason supports another reason, the position or argument (Patterson, 2007). It is also reported that argument maps/mapping are visual tools increasing critical analysis and evaluation of arguments (Carrington, Chen, Davies, Kaur, & Neville, 2011).

Concept maps are an efficient tool for organising and presenting knowledge. They deal with various aims, particularly in the field of education (Dietrich & Steiner, 2005). An effective concept map includes a tree structure arranged hierarchically with major, minor and less important ideas. The technique of concept map usually starts with a word, concept or even phrase which shows a main question that necessitates an answer (Novak and Can~as 2006). Concept mapping also facilitates understanding the relationship between ideas through making a visual map of the connections. Concept maps include concepts in circles or boxes, and connecting lines shows the relationships between concepts or prepositions (Pishghadam & Ghanizadeh, 2006). In addition, concept map shows a representation of knowledge in the form of two dimensions; this method also indicates knowledge representation in a simple visual form which constitutes of some nodes, concepts and arrows or especially linking phrases (Kharatmal & Nagarjuna, 2010). Concept mappings are formal and usually more strongly structured as well (Davies, 2010).

Mind Mapping is an analytical procedure that includes an integration of visuals, colour, codes, words, and connectors. Mind mapping method can be used to take notes, to study before an exam, to brainstorm, or make connections between ideas. This method increases the capacity of brain to store and recall information. Using visuals and colours, mind mapping gives a new, interesting, and motivating way in order to help students to understand something they are learning and to summarize a unit (Bennett & Rolheiser, 2001). Mind mapping method can also be applied for brainstorming, note taking, document drafting, project planning and other activities that need hierarchical structure of information (Beel & Langer, 2011). Mind maps are a popular tool and defined as diagrams to structure and visualize information (Beel, Gipp, & Olaf Stiller, 2009).

Although many researches have been conducted to examine the efficacy of these techniques, lack of comparative research on the effectiveness of the chosen techniques creates a gap in the area of L2 vocabulary production. So, this study addresses this gap through dealing with the proposed question:

RQ: *Are there any significant differences among the effects of the aforementioned selected techniques on L2 vocabulary production?*

METHOD

Participants

90 female students (6th graders) learning English in an institute in Tehran, Iran were the participants of this research.

Their English Proficiency level was in the elementary level. The researcher categorized the participants into three experimental groups. The members of each of these groups (n=30) used one of the chosen techniques randomly.

Materials and Instruments

The study included the following materials and instruments:

A Pocket Persian-English Dictionary

A Pocket Persian-English Dictionary edited by Emami (2005) was utilized in this study. As all vocabulary items have to be the same and appropriate for the techniques, the researcher selected 180 vocabulary items for instructional intervention sessions. The selected words were mostly concrete and a few of them were abstract. 130 sentences were used to contextualize the target words to make up the word knowledge pre-test. To find suitable sample sentences containing required words, Oxford Lerner dictionary and teacher made sentences were utilized. The learners were asked to write the Persian equivalent of the underlined and bolded words in each sentence. The purpose of this test was to extract the unfamiliar words for the post test and to assure that learners did not acquire the prerequisite knowledge in advance.

- 30 items in the fill-in-the-blank format were used as a vocabulary production post-test to measure the effects of the selected techniques on vocabulary production.

Procedure

At the onset, 90 Iranian sixth-grade females in the elementary level took part in this study. A word knowledge pre-test was given in order to assure that the students had no previous knowledge of the target words. 180 bolded and underlined vocabulary items were defined in 130 sentences. The Pocket Persian-English Dictionary was used to select the appropriate words. Most of the sentences were chosen from Oxford Learner Dictionary, but some sentences were also created by the researcher. The time duration of administering the pre-test was 40 minutes. The result of the pre-test indicates that those vocabulary items known by the students were removed from the target words and the remaining unfamiliar words were used to design the vocabulary production post-test. The students were categorized into three experimental groups by the researcher. Each technique was randomly allocated to each experimental group. Each experimental group received a thorough explanation of the chosen techniques in the first session. The groups received 9 instructional sessions and one more session was devoted to distributing the post-test. Each instructional session lasted 45 minutes, two times per week. The experimental groups were taught new vocabulary items in accordance with the instructions of the chosen technique.

DATA ANALYSIS

A one-way ANOVA procedure was used to analyze the obtained data and to answer the research question. The proposed research question in the study was to examine whether

Table 1. Descriptive statistics.

Group	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Argument mapping	30	13.10	3.49	0.63	11.79	14.40	10.00	26.00
Mind mapping	30	19.26	3.96	0.72	17.78	20.74	13.00	26.00
Concept mapping	30	16.50	3.92	0.71	15.03	17.96	10.00	25.00
Total	90	16.28	4.53	0.47	15.33	17.23	10.00	26.00

there were significant differences among the effects of concept mapping, argument mapping and mind mapping on vocabulary production.

Results

The aim of the suggested research question was to investigate the impacts of the chosen mapping techniques on second language vocabulary production. To achieve this aim, a one-way ANOVA procedure was utilised.

Descriptive statistics for the ANOVA on vocabulary production

In this study, Table 1 contains the descriptive statistics.
The above results suggest that the group who utilized the mind mapping strategy had the highest mean, followed by the group of the concept mapping. It also shows the lowest mean obtained by the argument mapping group compared to the other two groups. A procedure of a one-way ANOVA was utilized to examine if obtained mean differences among the groups were significant statistically.

Results of the ANOVA on vocabulary production

Table 2 shows the results of the ANOVA on vocabulary production.

Table 2 suggests the F value as well as the significance level ($F (2, 87) = 19.79$, $P < .05$) implying that statistically significant differences exist among the effects of the selected techniques. In addition, a Post-Hoc Sheffee test was also applied to determine the differences among the groups.

Post-Hoc Multiple Comparisons of Means for Vocabulary Production

Table 3 indicates Post-Hoc Multiple Comparisons of Means for Vocabulary Production.

The outcomes of Table 3 suggest that statistically significant differences exist between the chosen mapping groups. As it can be seen, the participants of the mind mapping technique functioned better than their counterparts who received the techniques of concept mapping and argument mapping. Similarly, the mean difference between the groups of concept mapping and argument mapping is also statistically significant, with the concept mapping group outperforming the argument mapping group. The conclusions emphasize the less efficacy of argument mapping in comparison with the techniques of mind mapping and concept mapping on second language vocabulary production.

Table 2. ANOVA on vocabulary production.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	572.42	2	286.21	19.79	0.000
Within Groups	1258.06	87	14.46		
Total	1830.48	89			

DISCUSSIONS

The results of the current research indicate that the group who utilized mind mapping achieved the highest mean in comparison with the groups of concept mapping and argument mapping on vocabulary production test. The second highest mean was observed by concept mapping group on the test. Hence, the mind mapping group showed better performance than the concept mapping and argument mapping techniques on second language vocabulary production.

A close look at the obtained findings, the argument mapping group had the third lowest mean on vocabulary production. This suggests that the argument mapping technique can be considered as one of the least efficient techniques on L2 vocabulary production of primary students. In addition, the concept mapping students had the second highest mean on vocabulary production test. As a result, the concept mapping technique is more efficient than argument mapping technique on primary students' L2 vocabulary production.

This outcome is in line with the findings of Douma, Ligierko and Romano (2009). Based on their study, online mind maps and concept maps are viewed as successful educational tools to both capture students' attention and teach complicated notions and subjects. In their opinion, using these maps facilitates taking notes, preparing for an exam, and arranging complicated research.

Factors Accounting for the Findings

Many agents account for the outcomes of this study and also the differences between the outcomes of the present study and other studies. Of the total of reasons to account for such differences, one reason is that in this study, each chosen technique was examined compared to other techniques, while other studies have frequently focused on the investigation of each of these techniques merely with a control group. It is worth noting that cultural setting may also be another reason which mostly influences the effect of the above-mentioned methods on vocabulary production. The outcomes of this study also confirm that the mind mapping technique is very efficient and productive visual educational tool to foster vocabulary production of primary students. One probable reason for such

Table 3. Post-Hoc Multiple Comparisons of Means for Vocabulary Production

(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Argument mapping	mind mapping	-6.16*	0.98	0.000	-8.61	-3.72
	concept mapping	-3.40*	0.98	0.004	-5.84	-0.95
Mind mapping	concept mapping	2.76*	0.98	0.022	0.32	5.21

*. The mean difference is significant at the 0.05 level.

result may be students' satisfaction or positive feedbacks for utilizing the mind mapping procedures.

Some factors may account for the poorer accomplishment of the argument mapping group. Sedita (2005) holds that it needs to be noted that the technique of the argument mapping requires greater instructional knowledge and is usually utilized for complicated ideas. Hence, the observed outcomes of the present study suggest that this technique cannot be used for primary levels rather it must be used for higher educational levels to indicate the structure of complex concepts. Besides, the argument mapping technique needs more instructional time, useful examples, and teachings on how to use the relevant technique in instructional contexts appropriately. Such negative result may be partially explained by a reason that it is uncommon and less accepted in our educational system. Another reason may be that the students of the present study are at the elementary level of language proficiency, whereas the demand of this technique may be higher than the participants' level.

CONCLUSION

The aim of the present study was to investigate the impacts of the above-mentioned mapping techniques on 6th graders vocabulary production. With respect to the results, the concept mapping group functioned better compared to the argument mapping students on vocabulary production test. Given to the instructional outlook, among the mapping techniques, the mind mapping group is very efficient and helpful visual instructional tool. The results of this study confirm that although some mapping techniques such as mind mapping and concept mapping are successful visual educational tools and can be practicality applied in different languages and different fields, other mapping techniques such as argument mapping technique showed lack of success and the students were not able to acquire superior results compared to the other two techniques. In conclusion, different mapping techniques have different effects on L2 vocabulary learning. This suggests that an appropriate selection of the teaching techniques can provide learners with the opportunity to learn vocabulary items easily. Teachers, learners, researchers and syllabus designers, and materials developers can take advantages of theoretical and pedagogical implications of the findings of the present study.

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