The Influence of Concept Mapping on EFL Students' Learning Outcome

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Abstract
Concept-mapping is defined as a graphical tool for organizing and representing relationships between concepts indicated by a connecting line linking two concepts. It is a meaningful strategy which helps learners to learn more effectively, to record and recall information easily, and to support creative problem solving. This learning strategy in the class, help learners attend to the exercises, pay attention to important points and have a productive atmosphere for learning. Through concept mapping learners are able to externalize their existing knowledge and combine it with new knowledge rearranging and internalizing both the old and new knowledge in a graphic form. The primary features of a concept map are its hierarchical structure which identifies specific concepts, usually enclosed in circles or boxes, and the connecting lines between these concepts which indicate how knowledge of a specific concept or domain is linked to the other concepts or domains. Concept maps have been shown to help learners learn, and to facilitate the learning process. Furthermore, Educational research in the field of Second and Foreign Language Learning suggests that learning outcomes are positively affected when teaching strategies are matched to individual learning preferences. This study aims to investigate the effect of using concepts mapping on developing the learning outcome of EFL students.

Keywords: *concepts mapping, learning, EFL students*

Introduction

Learning is a complex cognitive process that occurs in individuals of all ages. Meaningful learning requires understanding of the concepts that are important components of the topic under study. Learning with understanding allows integration of new concepts with previously learned concepts and leads to retention of information in long term memory in a

usable manner. Students who employ meaningful learning are expected to retain knowledge over time and they find ways to connect new information with more general prior learned material (Novak 2002; Hsu & Hsieh 2005; Hinck et al. 2006; MacNeil 2007; Zwaal&Otting 2012). Three key factors are associated with meaningful learning. First, meaningful learning involves the assimilation of new concepts and proposition into existing cognitive structure. Secondly, knowledge is organized hierarchically incognitive structure, and most new learning involves placing new concepts and proposition into existing hierarchies. The third factor related to the idea that knowledge acquired rote learning will not be assimilated. Meaningful learning is most likely to occurred when information presented in a meaningful way and the learner is encouraged to anchor new ideas with the establishment of links between old and new materials (Nesbit &Adesope 2006; Rendas, Fonseca & Rosado 2006; Kassab& Hussain 2010; Khodadady 2011). Bruner (1966), the theorist of discovery learning, believes that the educational theories should address the question of how to learn better and more. Accordingly, educational psychologists have proposed some learning strategies for a better learning; these learning strategies teach learning methods and accurate studying. Park (1995) defines learning strategies as the ''mental activities that people use when they study to help themselves acquire, organize, or remember incoming knowledge more efficiently''. There are a number of learning strategies that can help students to become more sophisticated learners, and thus better able to learn and to achieve in the classroom over the long run. These strategies include recognizing important information, note taking, summarizing and meaningful learning (Pressley, 1982; Weinstein, 1988).

One of new strategies based on Ausubel's meaningful learning is of concept mapping. It is defined as "graphical tool for organizing and representing relationships between concepts indicated by a connecting line linking two concepts" (Novak & Canas, 2007, p. 1). In another definition Novak (2010) described it as a new model for education (Novak, 2010). The technique of CM was developed by Joseph D. Novak and his research team at Cornell University in the 1970s as a means of representing the emerging science knowledge of students. In his study, Novak and his team sought to follow and understand changes in children's knowledge of science. It has subsequently been used as a tool to increase meaningful learning in the sciences and other subjects as well as to represent the expert knowledge of individuals and teams in education, government and business. The fundamental idea in Ausubel's assimilation theory is that "learning takes place by the assimilation of new concepts and propositions

into existing concept propositional frameworks held by the learner" (Novak & Cañas, 2008, p. 2). Three distinctive features can be assigned to CMs which include hierarchical structure, cross links and specific examples. The most important and a basic feature of a CM is the hierarchical structure. In the process of creating a concept map, the broadest, most inclusive concept should be first determined and written either in the top or in the middle part of the map while detailed concepts will be positioned below the top or around the central concept (as a node). Other concepts which are less important will be deleted or moved away from the map. The other important feature is cross links between separated concept nodes. In drawing a concept map, different kinds of arrows will be used to show the relationship between different concepts. Providing specific examples is the last feature of CM. According to Mintzes, Wandersee, and Novak (2000) the purpose of providing examples is to clarify the meaning of a given concept (Mintzes, Wandersee, & Novak 2000). Additionally, there are different versions of CM which includes expert- constructed concept map, learner – constructed concept map, fill in the map concept map and cooperative concept map.

Therefore, this paper aims to investigate whether concept mapping as a learning strategy has any impact on EFL students' learning outcome. More precisely, the present study explores the effect of concept mapping based learning on students' cognitive learning levels in educational settings.

Concept map

Concept maps are tools for organizing and representing knowledge that can be applied as a learning strategy (Novak, 2004, Quinn et al, 2004), teaching strategy (Marangos & Alley, 2007) and assessment tool (Novak, 2008, Williams, 2004). Concept maps are applied in teaching and learning in different methods, one of the major methods of applying concept map is making the maps by the learners. In the process of concept mapping, the learner links the new material to familiar ones in his cognitive structure and shows it in terms of a graphic design by combining, linking and hierarchically organizing the concepts; this process contributes to meaningful learning.

Concept mapping as a learning strategy changes the learning direction from a teacher-based to student-based by activating the learner in the learning process; therefore, causes an improvement in academic abilities and proficiency (Laight, 2004, Peterson and Snyder, 1998) and

also increasing the students' marks (Marangos, 2000). Research has proved the effectiveness of concept mapping on meaningful learning (Novak, 2003, Trifone, 2006), retention and retrieval (Hall and, O'Donnell 1996), perception and understanding (Kimber et al, 2007), academic achievement (Brussow and Wilkinson, 2007, Hauser et al, 2006), English comprehension and learning second language (Dias, 2010, Conlon, 2008, Liu et al, 2010, Marriott & Torres, 2008, Vakilifard& Armand, 2006, Ojima, 2006, Bahr & Dansereau, 2001, Chularut and Debakar, 2004, Koumy and Salam, 1999). Individuals, whose native language is not English, require techniques to learn better, retain longer and apply the language in new situations. Furthermore, the teachers are seeking educational methods that help the students to be activated in learning process and their achievement. Among effective factors on learning and teaching language, teaching-learning strategies have important role in learning in which concept mapping is the focus of attention.

Research Background

A wealth of studies has been conducted to investigate the impact of CM in different fields. The studies have shown the significant effect of concept mapping on meaningful learning (Horton et al. 1993, Novak & Cañas, 2006, Novak, 2010). Moreira & Moreira (2011) used concept maps as an instructional tool to foster the construction of knowledge in Foreign Language Education classes. The findings of the study showed that using concept map can help students build up self-confidence on their ability to use newly acquired concepts in new contexts. Liu & Chen (2010) investigated the effects of a computer-assisted concept mapping learning strategy on EFL college students' English reading comprehension. The results suggested that concept-mapping strategy not only causes reading comprehension improvement, but also improves other reading strategies using. Interestingly, in another study (2002) they investigated the effect of concept-mapping strategies (map correction, scaffold fading, and map generation) on students' text comprehension and summarization abilities. Results indicated that the map correction method enhanced text comprehension and summarization, and the scaffold-fading method facilitated summarization. The findings also suggested that combining a spatial learning strategy with a correction method or scaffolding instruction might be a potential approach for optimizing the effects of concept-mapping (Chang, Sung & Chen, 2002). Lambiotte and Dansereau (1992) proposed that students with low prior knowledge benefit more from

concept maps than those with high prior knowledge (as cited in Nesbit, Adesope, 2006). The process of creating concept map for a domain helps learners to gain insight into how they learn (Canas et al., 2003). In addition, concept mapping promoted reflection, a self- regulatory process related to motivation, self- control and self-efficacy (Coulthard, 2005). Liu (2009) investigated the effectiveness of the concept mapping learning strategy on learners' English reading comprehension. The result indicated that the concept mapping learning strategy was more effective for the low-level group than for the high-level group, in terms of their performance on reading comprehension (Liu,2009). In the same vein, Dias (2010) examined the effect of strategy of concept map on the second language learners' reading comprehension. Results showed that the construction of meaning by the creation of concept maps could be an effective reading strategy in English as an L2 (Dias, 2010). Lee and Cho (2010) in a study on students titled "Concept mapping strategy to facilitate foreign language writing" concluded that concept mapping was beneficial in improving students writing skill in general, and in improving the organization, language use and vocabulary in writing in particular.

In a study by Chularut & DeBacker (2004), the influence of concept mapping on achievement, self-regulation, and self-efficacy in students of English as a second language were investigated. The participants of the study were college and high school students who were studying English in private English centers. The findings of the study showed that a group of students who used concept mapping, achieved higher scores in their self-efficacy and self-regulation in comparison to control group.

Armand & Vakilifard (2006) studied the effects of 'concept mapping' on second language learners' comprehension of informative text. The results of this study indicate that the subjects of the experimental group obtain higher scores on the comprehension questions than those of the control group.

Nunan (1999) research showed that concept mapping along with other techniques such as being familiarized with the keywords and notions resulted in deeper listening processing and positive effect on learners' listening comprehension. Similarly, in study conducted by Sahin, Aydin and Sahin (2009) comparison of the traditional method of teaching listening comprehension with the computer based concept mapping technique revealed a higher achievement on the side of students through computer mapping improves learners 'listening comprehension.

Discussion

The overview of CM implementation in educational context in this paper reveal that there is a rich body of researchers showing that concept mapping positively influences the learning process. In other words, the integration of concept mapping to EFL classes tends to foster learners' reading comprehension, listening comprehension and critical ability, improving students writing skill, speaking ability, vocabulary, self-regulation and self-efficacy. The above-presented results showed that CM technique allows learners to get use of their visual intelligence. In other words, this graphical tool has shown that is helpful because in addition of paying attention on sequential structure of the text, its visual representation also allows them to get a holistic understanding of the text. Moreover, it allows them to visualize a certain knowledge structure in a graphic form which helps them to take in all the data from an image simultaneously and recall the information easier and faster. Namely, CM reminds learners that they are equipped with multiple intelligences and visual intelligence. Furthermore, concerning the studies, it can also be argued that the concept map serves as a kind of template to help to organize knowledge and to structure it; it has the important role of activating learners' prior knowledge which is an effective stage for meaningful learning. Meaningful learning means that the learner can organize the information and assimilate them in his/her knowledge framework. Creating the concept mapping requires understanding, recognizing the main concepts, linking the concepts with previous ones, establishing new bonds and organizing the concepts. This process causes meaningful learning and applying higher-level cognitive functions.

Creating the concept map is a feedback for both the teacher and students to recognize the knowledge and understand the subject and point out the learning deficiencies. Furthermore, assessing the students' learning by the map and considering a score for drawing the concept map was an external motivation for the students and they recognized the impact of the mapping on deeper understanding of the text and on their ability to better retain and recall the vocabularies. At the end it should be noted that as Novak stressed in creating a concept map it is the process which is important not just the final product and it is this property which is very fruitful for learners and educators in the language learning domain.

Summary

As discussed previously, the core interest of this paper was to investigate the influence of concept mapping on EFL students' learning outcome. Also, the paper confirms the fact that concept mapping strategy may cause better language retention and production of the learners. Additionally, the process of concept mapping gives the students the ability to reflect upon a specific topic. In doing so, the students become able to clarify their ideas about that topic. Thus through the increase of the learners' conceptual understanding they have a better output. Learners have crucial and active roles through constructing concept maps while learning the foreign language. Concept maps are necessary for the modern teaching-learning process because learners are actively involved in their learning process and collaboration with the instructor in the developing of concept maps.

In fact, as Novak (2010) believes "the central purpose of education is to empower learners to take charge of their own meaning making" and visual representations such as concept maps are powerful tools to serve such requirement. The last point which is worth to mention is that provision of feedback is an important stage for the students to create CMs. In fact practice and explanation of the technique are not enough and students need to be provided with appropriate feedback to ensure their understanding.

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