The efficacy of "provision of concept-maps preparation through pre-planned individual and cooperative methods" as an instructional strategy

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Abstract

Constructivism approach is one of the most important theoretical frameworks in the formation and development of the new instructional revisions and activities. The main focus of constructivism is the fact that individuals construct knowledge actively. Concept map is one of the modern instructional methods in the sense that it is closely related to constructivism. The concept map is the visual representation of meaningful relations between concepts. The main purpose of the present study is to improve the efficacy concept map as a learning-teaching strategy. Likewise the minor purpose has been to make an analogy between the effectiveness of the provision of pre-planned concept maps on one hand and the development

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of concept maps by learners on the other. The comparison of the effectiveness of individual and cooperative methods of preparing concept maps was also taken into account. The participants of the study were 55 primary school teachers who participated in three discrete in-service training classes. The research project was a quasi-experimental design with pre-test and pos-test. The participants were assigned to three experimental groups. The first experimental group was given pre-planned concept maps in the process of classroom education. The second experimental group prepared the concept maps individually. Meanwhile the third experimental group prepared the concept maps cooperatively. Research results revealed that the post-tests averages increased compared to pre-tests averages but the efficacy maximal was observed in the group of individually preparing concept maps. The least efficacy is observed in the provision of pre-planned concept maps.

Key words: constructivism, concept map, educational achievement, meaningful learning

Introduction

Today, we are observing changes in educational philosophy, content, and teaching. In the modern approaches, the transferring of knowledge to the mind through teacher and textbook and repetition and award system has given place to creating knowledge through meaningful learning. This development has taken place by passing from the behaviorism viewpoint to cognitive viewpoint, especially constructivism viewpoint (Brendezford, 2001). Constructivism is shaped, as part of the contemporary (cognitive) movement, due to the dissatisfaction with the traditional education. In constructive psychology, the learner builds knowledge actively and through constant interaction with the environment. Therefore, it is assumed that knowledge is dependent on the learner and that the individuals reach different levels of awareness in equal conditions. In general,

the teaching method based on constructivism is a student-centered method in which active participation in gaining knowledge is emphasized. In education based on the theory of constructivism, it is mostly the learning and thought process that are considered than its products. In the modern educational viewpoints that are derived from the psychological viewpoints of constructive learning, various names have been used within the educational field. Among these, it can be referred to experimental, explorative, student-centered, and learning by action viewpoints (Ahmadi, 2001). One of the modern educational approaches that has tight relation with the philosophy of constructivism, is taking advantage of concept-map in various educational levels, from content and lesson plan design and preparation, to its carry-out and evaluation (Sun 2004 & Marangos, 2000). According to Constructivism theory, individuals personally make their mental schemes or maps. In new learnings these schemes are revised, expanded, or renovated.

Concept maps are signs of our thinking methods and perception, and also an indicator of our attitudes about our awareness and the relationship between them. For the first time, the concept map was used as an educational policy by Novak in early 1980s. Concept map is derived from the concept of advance organizer of theory of meaningful learning by Ausubel, in which there is high emphasis on the comprehensive previous learning on the next meaningful learning. Based on Ausubel's theory, the most important effective element in learning is the previous set of learning. Meaningful learning occurs when the individual, by awareness, relates the new knowledge with the knowledge that he previously has. When meaningful learning occurs, there are changes in the whole cognitive structure which itself results in change in both the concepts as well as their existing relationships.

A concept map is consisted of nodes and links between these nods. A concept, statement or question is connected to others nodes through links. The connecting lines between the nodes represent relationships such as similarity relationship (Similarity of two concepts), clarifying relationship (Clarifying the hierarchies) and

configuration (identifying the sections and the components that make the concept) (Sun, 2004). Concept maps are usually prepared hierarchically, meaning that the more general and comprehensive topics are centrally positioned and as we move further down the map, concepts and topics become more detailed (Martin, 1994).

Although research witnesses show the superiority of using concept maps compared to the common educational methods, steps have not been taken yet in our education system for utilization of this strategy.

The other subject that we always face when studying the research literature of concept map is to clarify who should make the concept map, the student or the teacher? A group of researchers try to clarify the benefits of methods of providing various concept maps compared to each other. The results of the conducted researches in this field have been contradictory; while Wandersee (1990) states that the most important educational benefits of concept maps goes to its constructor and not the person who receives it, the conclusion reached by Willerman & Mac Harg (1991) is opposite: they believe that the concept map is effective when it is teacher-made, not student-made; and they reason that the teacher makes maps that are much more complete and accurate than the maps made by the student.

Of course they did mention that the effectiveness of the teacher made concept maps on educational advancements could be due to the common goals for learning and guidance toward the test questions, which these teacher made concept maps drive students toward. Also Horton and colleagues (1993) have brought forward witnesses that state that student made concept maps are more effective in their learning compared to those of the teachers.

Another issue that should be considered regarding concept maps is its social constructivism subject. Palincsar, Anderson & David (1993) have mentioned the fact that students' group discussions are suitable opportunities for learning concepts. This is while for the first time, Routh and Rouchoundhurry (1992) stated that the

concept map constructing process as a group activity may be much more important than the individual construction.

The main goal of the research that the findings of which are the basis for this article is to investigate the effectiveness of using concept map as a teaching-learning strategy in Farsi content. There have also been two minor goals along this main goal: 1) Comparison of effectiveness of the offering methods for pre-made concept maps - concept maps prepared by learners; 2) Comparison of effectiveness of individual and group methods of concept map constructing.

Research Methodology

Subjects

The research subjects, consisting of 55 university student-teachers in the primary school grades were selected, who had chosen the course for identifying exceptional children in an on the job training period. These teachers were previously put into three classes.

Research Instruments

The educational content consisted of eight readings which were offered to the learners during the eight classes. These readings were selected from different sections of the lesson textbook for becoming familiar with the characteristics and issues of exceptionalchildren, written by Haj Babayi & Dehghan. During the sessions while the research was conducted, the learners from the three groups used the reading material in an equal way.

Achievement Tests (pre-test and post-test) have been prepared in multiple-choice test formats from the content of the above lessons.

Teacher made concept maps which have been prepared from the educational content for providing to the cases from one of the test groups.

Method

The research design is a quasi-experimental design with pre-test and post-test. In this research, the subjects were participating in the format of three test groups. In experiment "A" the subjects constructed concept maps for the lesson subjects in groups of three. In experiment group "B" the subjects prepared concept maps individually. In experiment group "C" the pre-made concept maps were exposed to the subjects.

Conducting method

The research was conducted in five stages.

The stage for preparing the concept maps for the lesson contents; preparation stage; pre-test stage; the treatment stage; and the post-test.

Results

The research results show that the post-test scores for educational advancement tests has increased in all three test groups compared to the pre-tests (Table No.1 and Figure No.1). However this increased amount is different in the different experiment groups. The most amount of increase in the post-test scores, in comparison with the pre-test scores, is observed in the mean for the experiment group whose members individually made the concept maps (equal to 3.56 scores increase). Also, the lowest mean for increase in post-test scores compared to the pre-test scores was that of the group which had been given the maps (1.41 scores increase). The mean scores for the difference between the post-test and the

pre-test was that of the group that made the concept-maps in groups (two point increase).

The findings of the current research show the effectiveness of the concept maps as an educational strategy. Based on this finding it can be suggested that the curriculum planners and school textbooks authors should consider using concept maps in their work. Also, the teachers of different educational stages and various lessons can use the offering method, the individual concept-map making, or the group concept-map making in various educational and evaluation levels. The point to consider however, is that encouraging the learners to prepare the concept maps in an individual or group format may be more effective than the method of offering pre-made concept maps.

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