World Academy of Science, Engineering and Technology
International Journal of Educational and Pedagogical Sciences
Vol:9, No:05, 2015

The Effect of Paper Based Concept Mapping on Students' Academic Achievement and Attitude in Science Education

Authors : Orhan Akınoğlu, Arif Çömek, Ersin Elmacı, Tuğba Gündoğdu

Abstract : The concept map is known to be a powerful tool to organize the ideas and concepts of an individuals' mind. This tool is a kind of visual map that illustrates the relationships between the concepts of a certain subject. The effect of concept mapping on cognitive and affective qualities is one of the research topics among educational researchers for last decades. We educators want to utilize it both as an instructional tool or an assessment tool in classes. For that reason, this study aimed to determine the effect of concept mapping as a learning strategy in science classes on students' academic achievement and attitude. The research employed a randomized pre-test post-test control group design. Data collected from 60 sixth grade students participated in the study from a randomly selected primary school in Turkey. Sixth-grade classes of the school were analyzed according to students' academic achievement, science attitude, gender, mathematics, science courses grades, and their GPAs before the implementation. Two of the classes found to be equivalent (t=0,983, p>0,05) and one of them was defined as experimental and the other one control group randomly. During a 5-weeks period, the experimental group students (N=30) used the paper-based concept mapping method while the control group students (N=30) were taught with the traditional approach according to the science and technology education curriculum for light and sound subject. Both groups were taught by the same teacher who is experienced using concept mapping in science classes. Before the implementation, the teacher explained the theory of the concept maps and showed how to create paper-based concept mapping individually to the experimental group students for two hours. Then for two following hours she asked them to create some concept maps related to their former science subjects and gave them feedback by reviewing their concept maps to be sure that they can create during the implementation. The data were collected by science achievement test, science attitude scale and personal information form. Science achievement test and science attitude scale were implemented as pre-test and post-test while personal information form was implemented just as once. The reliability coefficient of the achievement test was KR20=0,76 and Cronbach's Alpha of the attitude scale was 0,89. SPSS statistical software was used to analyze the data. According to the results, there was a statistically significant difference between the experimental and control group for academic achievement but not for attitude. The experimental group had significantly greater gains from academic achievement test than the control group (t=0,02, p<0,05). The findings showed that the paper-and-pencil concept mapping can be used as an effective method for students' academic achievement in science classes. The results have implications for further researches.

Keywords : concept mapping, science education, constructivism, academic achievement, science attitude
Conference Title : ICEST 2015 : International Conference on Educational Sciences and Technology
Conference Location : Paris, France
Conference Dates : May 18-19, 2015