The Effect of The System Dynamics Approach on Understanding Causal Relationship Skills in Science Education

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Learning is a dynamic process. Concept learning by oneself is not sufficient to achieve a meaningful learning in cognitive level. Learning concepts in the context of their causal relationships improves the level of learning process. System dynamics provides to be an effective learning and teaching tool for students and teachers. Students model concepts and cause-effect relationships among concepts with a dynamic concept map owing to system dynamics approach. The aim of this research is to investigate the effect of system dynamics approach, in understanding of cause-effect relationship. The experimental design with pre-post test with control group is applied in this research. In order to assess the sub problems of the study, a valid and reliable “Cause-Effect Relationship Scale” had been developed by the researcher. Collected data were analyzed with the help of descriptive statistics, paired and independent t-tests. The scale for “understanding cause and effect relationship” has two sections. In the first section (causality 1), the interest and attitude of the students towards cause and effect relationships are evaluated. In the second section (causality 2) the cause and effect relationship commenting skills of the students in some sample cases are evaluated. In the first section the initial mean values of experimental and control groups are different whereas, their mean scores are equal in the end of the empirical study. As per second section, in the end of the empirical study, it is obvious that cause and effect relationship skills of the students have been increased after system dynamics application. Statistically there is not a significant difference in cause and effect relationship oriented of interest and attitude (causality 1) of the students in the end of empirical study (t = 0.00; p>.05). In the classes where system dynamics approach is performed, it is obvious that ideas of the students about cause and effect relationship did not change. The results gained from causality 2 scale shows that there is an increase in previous and post empirical study in both groups. Cause and effect relationship is understood better by the students in experimental group, according to mean scores. It can be said that the system dynamic provides benefit of understanding and commenting of cause and effect relationship.