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TEACHING 5th GRADE POLYGON AND QUADRANGLE SUBJECTS THROUGH DYNAMIC GEOMETRY SOFTWARE

ABSTRACT

The aim of this study is to investigate the effect of using dynamic geometry software GeoGebra in the teaching of 5th grade subject of "Polygons and Quadrilaterals" on students' achievement, retention, attitude and to get students' opinions of using it in instruction.

This study has been structured as a mixed research model including both a quasi-experimental pretest-posttest design with a control group and a qualitative research methods. This model mixes the results from both qualitative and quantitative researches approaches within a stage of the study. This research was conducted with two fifth grade clasrooms inclusing a total of 70 students who was attending a school in downtown area of the city of Aydın during 2009–2010 academic year. Two groups were randomly assigned to an experimental (n= 35) and control group (n= 35). Both groups were identified as equivalent in respect to pretest results about their success and attitude towards mathematics and geometry.

To figure out the differences between experimental and control group about learning of "Polygons and Quadrilaterals ", a dynamic geometry program GeoGebra was utilized with experimental group while current program with no use of GeoGebra was utilized with control group during the 5 week of the study. While in the experimental group, computer assissted instruction was utilized through using dynamic geometry software GeoGebra, in the control group lesson plans that were designed by the teacher based on 5th grade teacher book were utilized. Teaching activities were carried out by classrooms own teachers for each group. Moreover interviews were held with 9 students who had been chosen through purposive sampling method on the issue of using dynamic geometry software GeoGebra in instruction.

Interviews were formed as semi structured. Data from participants was collected face to face and one on one in the school aproximately at about 15 minutes duration. Interviews were videorecorded. This interviews were conducted volunteer based and parent constent letter was sought.

In this research, 26 item "Polygons and Quadrilaterals Test for Elementary School 5th Graders" (Cronbach Alpha = .75), which was developed by the author of this study, "Mathematics attitude Scale" (Cronbach Alpha = .76) which was developed by Geban, Ertepınar and et.al. (1994) and reliability analysis was repeated by the author of this study and a semi structured interview form which was developed by the author of this study were used as data collection instruments to collect data about students' success, their interests and attitude towards mathematics and to get their opinions towards using GeoGebra when learning Polygons and Quadrilaterals. Experimental and control groups were subjected to; pretest simultaneously a week before the study begins, posttest right after the study completes and a retention test 8 weeks after the study completes regarding the students' success and attitude. Interviews were conducted in the 5th week of the study.

Quantative analysis of this research was otained from calculating independent t-test and paired T-test using SPSS statistics program. Qualitative analysis of this research was obtained from interviews and open ended questions. Frequency and percentage values were calculated and descriptive interpretation was followed when analysing Open-ended questions. Interviews were transcribed one by one, questions were regarded as categories and students' commonalities were presented under each category in detail.

Results from this study illustrated that using dynamic geometry software GeoGebra is more effective on students' success on Polygons and Quadrilaterals subject comparing to the regular classrooom activities in which GeoGebra use is not present. Moreover the level of retention is found more significant when using GeoGebra in instruction.

Considering attitude test, a significant difference in favor of the experimental group was found between experimental and control groups' posttest and retention tests. Moreover it was found a significant difference between pretest and posttest

scores of experimental group in favor of the posttest. In this sense it is concluded that experimental group who use GeoGebra in istruction of Polygons and Quadrilaterals subject illustrate more positive attitudes and more enhusiasm towards mathematics comparing to the study begins comparing to the students who do not use GeoGebra in instruction.

Examining the qualitative results of this study, students illustrated positive opinions towards the use of GeoGebra in instruction such as; selection of Turkish Language as the default language of the program, easily understandable procedures, easily applicable practices and free accessibility.

Key words: Teaching Mathematics, Geometry, Instruction, Computer-Aided Instruction, Dynamic Geometry Software, GeoGebra.