

Feasibility of Using Geogebra in the Teaching and Learning of Geometry Concepts in Secondary Schools in Kajiado County, Kenya

Mwingirwa Irene Mukiri

Abstract

GeoGebra is a free computer application software that provides an algebra view, geometry view, spreadsheet view and an input bar. This study looked at if and how this resource can be used to enhance the teaching of Geometry in secondary schools in Kajiado County in Kenya. The objectives of this study were to assess the applicability of GeoGebra in the teaching of mathematics in secondary schools in Kenya. The relationship in performance of students taught with the help of this innovation and those students not using it was established. The study also compared the change in girls' performance with that of boys after being introduced to Geometry using GeoGebra. The study further assessed how teachers responded to training on use of GeoGebra in teaching. The design adopted for this study was a mixed methods design of qualitative and quantitative approaches. The quantitative approach entailed the use of a quasiexperimental method whereby the independent variable in this study was the uptake of technology in this case GeoGebra in the teaching of Mathematics, while dependent variable is the achievement of students in Geometry. The target population was the secondary school mathematics teachers and students. The study sampled two boys' secondary schools, two girls' secondary schools and two mixed secondary schools in Kajiado County. Another mixed school was used for piloting of the instruments. Cronbach alpha of 0.79 was obtained for the teachers' questionnaires while the reliability of the mathematics test was calculated using split half reliability index of 0.84. The data obtained was analyzed with the help of split plot ANOVA and descriptive statistics for the uptake of technology. The study found out that uptake of technology was slow (at the early adopter's stage of adoption) among mathematics teachers. Further, there was a clear indication that GeoGebra would help improve the students' understanding of concepts in mathematics and hence improve performance. The gender differences were not seen to affect performance of students in mathematics after learning in a GeoGebra environment. Although mathematics teachers in the county were mostly male, the female students were able to compete fairly well with the male students. The study concludes that GeoGebra is useful in improving performance of secondary school students in Geometry if teachers are well trained using the guides indicated in this study. It also concludes that GeoGebra benefits both girls and boys and therefore it is useful in bridging the gap between the genders in the learning of mathematics. It also developed a prototype GeoGebra manual for Kenyan mathematics teachers using GeoGebra. The study recommends that GeoGebra be used in teaching geometry in Kenyan secondary schools. The findings of this study will be useful to scholars of Mathematics Education, Quality Assurance and Standard Officers, Mathematics teachers, students and the schools administration. The study will add to the current knowledge in the teaching of mathematics in the Kenyan curriculum and hence improve performance.

Full text: <https://ir-library.ku.ac.ke/handle/123456789/15094>