

A STUDY OF THE IMPACT OF GEOGEBRA SOFTWARE ON TEACHING CIRCULAR GEOMETRIC THEOREMS IN G.C.E. ORDINARY LEVEL CLASSES IN TYPE 2 SCHOOLS IN THE POLGAHAWELA DIVISION, SRI LANKA

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Geometry accounts for approximately one-quarter of the G.C.E. Ordinary Level (O/L) Mathematics examination in Sri Lanka, yet circular geometry remains challenging, with consistently poor performance in questions on circular theorems. This underachievement has been attributed to weak spatial-visualization skills, limited geometric reasoning, and traditional teacher-centered methods that emphasize memorization over conceptual understanding. GeoGebra, a free dynamic mathematics software, enables interactive exploration and visualization of geometric concepts, potentially enhancing conceptual learning. However, empirical evidence in the Sri Lankan context remains limited. This study investigated the impact of GeoGebra on teaching and learning circular geometric theorems among G.C.E. O/L students in Type 2 schools in the Polgahawela Division using a quasi-experimental mixed-methods design. A total of 62 students from two schools completed a pre-test (control $M = 26.06$, $SD = 13.76$; experimental $M = 25.26$, $SD = 14.13$) and were alternately assigned to the experimental and control groups based on pre-test rankings. Both groups improved, but the experimental group showed a greater mean gain (+16.71) than the control group (+6.55), with a higher post-test mean ($M = 41.97$, $SD = 13.41$) compared with the control group ($M = 32.61$, $SD = 19.06$). An independent-samples t-test confirmed a significant difference in post-test achievement ($p = 0.029$), with Cohen's $d \approx 0.57$ indicating a moderate effect. Post-intervention Likert-scale responses also showed higher engagement, confidence, perceived conceptual understanding, ability to identify angle relationships, and teacher–student connection among students taught using GeoGebra. These findings suggest that GeoGebra-based instruction was associated with greater achievement gains and more positive learning experiences. The study supports piloting GeoGebra through teacher training

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