

Efficacy of GeoGebra as a Didactic Strategy for the Understanding of Solids of Revolution In Integral Calculus

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Main Line: State, Society and Development. **Associated Line:** Comprehensive Training for Educational Development. **Thematic Axis:** Pedagogy.

How to cite this article: Luis Beltrán López Agamez, " Efficacy of GeoGebra as a didactic strategy for the understanding of solids of revolution in integral calculus" (2026), (1,16).

Received: 16/02/2026 Revised: 22/02/2026 Accepted: 26/02/2026

ABSTRACT

The inherent difficulty in spatial visualization and the modeling of abstract concepts, such as solids of revolution in Integral Calculus, represents a constant didactic obstacle in university education. The scientific concern of this research lies in the persistent difficulty in spatial visualization and the modeling of abstract concepts, such as solids of revolution in Integral Calculus. The general purpose was to evaluate the effectiveness of the GeoGebra software as a strategy to strengthen the comprehension of this topic in university students. The study was based on the theories of Constructivism and Technology-Assisted Learning (TAL), which postulate the improvement of knowledge through active interaction with dynamic tools. The methodology employed was quantitative, under a quasi-experimental design with Non-Equivalent Control Groups (Pretest-Posttest), cross-sectional, with a sample of 58 Integral Calculus students. The results obtained after statistical analysis indicated that the Experimental Group, intervened with GeoGebra, achieved a significant improvement in conceptual, visual, and procedural comprehension. The discussion of the findings confirms that the integration of dynamic software facilitates the transition between algebraic and graphical representations, overcoming the limitations of traditional instruction. The main conclusion is that GeoGebra constitutes a highly effective didactic strategy, validating its application to optimize the teaching and learning of solids of revolution.

Keywords: GeoGebra, Solids of revolution, Integral calculus, Mathematical modeling, Technology Assisted Teaching, Didactic strategy.

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