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# Effects Of GIS-Supported Inquiry on Student Academic Achievement and Spatial Thinking in Social Studies Education: A Mixed Method Study

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## Abstract

The use of Geographic Information Systems (GIS) for supporting student learning and achievement has gained increasing interest in recent years. However, only a few empirical studies have thus far explored the potential for using GIS-supported inquiry in middle school social studies classrooms. To narrow this gap in the literature, this study developed a series of GIS-supported inquiry lessons for middle school social studies classes and examined their effects upon student academic achievement and spatial thinking. The study employed a mixed-method approach, using pre- and post-test assessment to measure both academic achievement and spatial thinking, plus semi-structured interviews to further explore student experiences and perspectives regarding GIS-supported inquiry. Participants included 232 Grade 8 students divided between Experimental and Control Groups. The experimental groups engaged with GIS to perform inquiry, while the control groups covered the same material via traditional inquiry-based methods. Results revealed that the GIS-supported inquiry approach significantly improved student academic achievement and spatial thinking levels in comparison to traditional inquiry-based methods. Moreover, the experimental groups expressed positive opinions regarding GIS-supported inquiry lessons. These findings provide a significant contribution to the social studies field by examining how using GIS within an inquiry-based framework can support positive learning outcomes.

**Keywords**: GIS, spatial thinking, student achievement, inquiry, mixed methods