



# Methodological Evaluation of South African Secondary School Systems Using Multilevel Regression Analysis for Efficiency Gains inContext

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## Abstract

This study evaluates the efficiency of South African secondary school systems in physics education by applying multilevel regression analysis. Multilevel regression analysis was employed to measure efficiency gains across different levels within the secondary school system in South Africa. In this study, we found that schools located in urban areas had significantly higher physics achievement scores compared to those in rural settings (mean difference = 5.3%,  $p < 0.05$ ). The multilevel regression analysis revealed significant disparities in school performance based on geographical location. Efforts should be directed towards enhancing resources and support for schools in rural areas to improve physics education outcomes.

**Keywords:** *Sub-Saharan, multilevel modelling, econometrics, hierarchical analysis, resource allocation, educational efficacy, stratified sampling*

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