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Methodological Evaluation of Secondary Schools Systems in Kenya Using Bayesian Hierarchical Models for Adoption Rate Measurement

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Abstract

Secondary schools in Kenya are a significant part of the education system, with varying degrees of adoption of modern educational practices. The review synthesizes existing studies on secondary schools adoption rates, employing Bayesian hierarchical models as a novel approach to measure these rates with improved precision and robustness. A key finding is the significant variation (32-45%) in reported adoption rates across different regions and educational initiatives, highlighting the need for more localized data collection methods. The proposed Bayesian hierarchical model offers a methodological advancement by accounting for both within-school and school variability, enhancing the accuracy of adoption rate measurements. Educational policymakers should consider implementing this novel model to improve the reliability and comparability of assessment results across different contexts in Kenya's secondary school systems. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, Bayesian hierarchical models, educational adoption rates, secondary schools, statistical methods, systematic review, geographic clustering*