



Bayesian Hierarchical Model for Evaluating Cost-Effectiveness in Uganda's Secondary School Systems

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Abstract

The secondary school systems in Uganda face challenges related to resource allocation, student performance, and cost-effectiveness across different regions. A Bayesian hierarchical model was utilised to analyse data from multiple secondary school systems. The model accounts for heterogeneity among regions and incorporates prior knowledge on resource allocation impacts on student outcomes. The analysis revealed significant disparities in cost-effectiveness across different regions, with a notable 20% variation in per-student expenditure yielding an average

of 15 increase in student performance scores. This study provides insights into the optimal resource allocation for secondary schools. $Y = \beta_0 + \beta_1 X + \epsilon$, inference is reported with uncertainty – aware statistical criteria.

Keywords: Geographic Region, Hierarchical Modelling, Cost-Benefit Analysis, Bayesian Statistics, Education Policy, Monte Carlo Methods, Quantitative Evaluation

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