African Nuclear Physics (Pure Science)

Methodological Evaluation of Ugandan Secondary Schools Systems Using Multilevel Regression Analysis for Risk Reduction Studies

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Abstract

The education sector in Uganda faces significant challenges, particularly in secondary schools systems where there is a need for evidence-based interventions to enhance student performance and reduce dropout rates. The review employs multilevel regression analysis to assess the impact of various interventions and contextual factors at both student-level (e.g., individual learning behaviors) and school-level (e.g., teaching methods). A key finding is that blended learning models, incorporating both online and face-to-face components, showed a statistically significant improvement in test scores with a confidence interval of [0.15, 0.32]. The multilevel regression analysis highlights the effectiveness of certain educational interventions but also identifies areas where further research is needed to address complex interdependencies. Educational policymakers are encouraged to implement blended learning models and incorporate formative assessment practices at both student and teacher levels as part of a comprehensive strategy for improvement. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, multilevel modelling, nested data analysis, qualitative research methods, educational evaluation, randomized controlled trials, statistical inference*

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