



Multilevel Regression Analysis to Assess System Reliability in Ghanaian Secondary Schools Systems

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Abstract

The secondary school system in Ghana faces challenges related to infrastructure, funding, teacher quality, and student performance. A multilevel logistic regression model was employed to analyse data collected from Ghanaian secondary schools. The model accounts for both fixed effects (e.g., funding levels) and random effects (e.g., differences between schools). The analysis revealed that school funding had a significant positive impact on student performance, with an odds ratio of 1.05 per unit increase in funding. Multilevel regression analysis provided insights into the reliability and effectiveness of secondary school systems in Ghana, highlighting the importance of adequate funding. Investment strategies should focus on increasing educational resources to improve student outcomes. multilevel regression, system reliability, secondary schools, Ghana The empirical specification follows $Y = \beta_{0+\beta} X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, logistic, multilevel, regression, education, evaluation, reliability*

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