



Methodological Evaluation of Secondary School Systems in Tanzania: A Randomized Field Trial on System Reliability

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Abstract

The study focuses on evaluating the reliability of secondary school systems in Tanzania through a randomized field trial, with a specific emphasis on Computer Science education. The study employs a mixed-methods approach combining quantitative data from student performance metrics with qualitative insights through interviews and observations. A random sample of schools was selected for intervention, and pre- and post-intervention assessments were conducted using standardised tests in Computer Science. In the field trial, there was a statistically significant improvement ($p < 0.05$) in student performance scores after the intervention period, with an average increase of 12% in problem-solving skills related to coding and algorithmic thinking. The randomized field trial demonstrated that the secondary school system in Tanzania can be reliable for Computer Science education when supported by targeted interventions and standardised assessments. Future research should explore longer-term impacts and scalability of these findings, while policymakers could consider integrating similar evaluation frameworks into ongoing system reforms. Model estimation used $\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \{ \sum_{i=1}^n \ell(y_i, f_{\theta}(\xi_i)) + \lambda \|\theta\|_2^2 \}$, with performance evaluated using out-of-sample error.

Keywords: Tanzania, Sub-Saharan, Randomized Controlled Trial, Validity, Reliability, Data Analytics, Educational Policy Analysis

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