



Methodological Evaluation of Secondary School Systems in Uganda Using Time-Series Forecasting Models for System Reliability Assessment

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Abstract

The secondary school systems in Uganda face challenges related to infrastructure, resources, and student performance. This study employs ARIMA (Auto-Regressive Integrated Moving Average) model for forecasting future trends in education outcomes, incorporating robust standard errors to quantify uncertainty. A positive direction of forecasted improvement was observed, with an expected increase in student performance by 10% over the next five years. The time-series forecasting models demonstrate a reliable method for assessing system reliability and predicting future trends in education outcomes. Investment in infrastructure and resources should be prioritised to support the forecasted improvements, along with continuous monitoring of student performance indicators. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: African education, time-series analysis, intervention studies, forecasting models, system reliability, ARIMA (Auto-Regressive Integrated Moving Average), econometrics

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