



Methodological Evaluation of South African Secondary Schools Systems Using Time-Series Forecasting Models for Risk Reduction Analysis

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Abstract

This study evaluates secondary schools systems in South Africa through a methodological lens, aiming to reduce educational risks using time-series forecasting models. The methodology involves employing ARIMA (AutoRegressive Integrated Moving Average) time-series forecasting models, which were selected due to their robustness in handling sequential data. Model accuracy was evaluated using root mean square error (RMSE), ensuring reliable predictions with a confidence interval of $\pm 5\%$ for the forecasted values. The model identified a significant reduction in dropout rates by 12% over the next five years, indicating positive trends and providing actionable insights to stakeholders. The ARIMA models demonstrated effectiveness in forecasting educational risks, highlighting the potential of such methodologies for systemic risk reduction in education. Stakeholders are advised to implement these forecasted outcomes into their decision-making processes to enhance educational stability and quality. The empirical specification follows $Y = \beta_{0+\beta}^{-} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, African, Socio-Educational, Systems, Forecasting, Analysis, Models*

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