



Evaluating the Effectiveness of School-Based Climate Change Curricula in Urban Youth Knowledge Transfer: An Evaluation Framework in South Africa

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Abstract

Urban youth in South Africa are increasingly exposed to climate change impacts such as extreme weather events and rising temperatures. However, their understanding of these issues remains limited. A mixed-methods approach combining quantitative survey data from 500 students with qualitative interviews from 30 teachers. The study employs a structural equation modelling (SEM) to assess the impact of curricula on knowledge acquisition. The SEM analysis revealed that while curricula significantly improved general climate change awareness ($p < 0.05$), specific topic areas such as ocean acidification and biodiversity loss saw only moderate gains (direction: positive, proportion: 30%). While the curricula have shown promise in broadening knowledge, targeted interventions are necessary to address identified gaps. Future research should focus on developing more specific teaching materials for challenging topics and implementing formative assessment strategies to enhance learning outcomes. climate change education, urban youth, school-based curriculum, structural equation modelling Model estimation used $\hat{\theta} = \operatorname{argmin} \{ \theta \} \operatorname{sum} \operatorname{ell} (y_i, f \theta (\xi)) + \lambda \operatorname{Vert} \theta \operatorname{rVert} 2^2$, with performance evaluated using out-of-sample error.

Keywords: *African Geography, Quantitative Research, Qualitative Research, Surveys, Focus Groups, Intervention Studies, Evaluation Frameworks*

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