

Hierarchical Linear Modelling of Sixth-Grade Students' Socio-economic Status and School Factors on Mathematics Achievement: Case studies of Kenya and Zimbabwe

Gibbs Y. Kanyongo and Rachel Ayieko

Abstract

This study investigated the relationship between socio-economic status, school-level variables and mathematics achievement of sixth graders in Kenya and Zimbabwe. The study is based on secondary data collected by the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ III). SACMEQ employed cluster-sampling procedures to collect data from 4412 students in 193 schools in Kenya, and 3021 students in 155 schools in Zimbabwe. A multilevel model (Hierarchical linear model) was used to analyse variation in student achievement in mathematics between and within schools. Owing to the nested nature of the data, the study utilised the Wiley and Harnischfeger model as a general framework for choosing variables and conceptualising multiple components of education. The findings in both countries showed that socio-economic status and school resources were significant predictors of mathematics achievement. The variable class size in Kenya was positively related to mathematics achievement, but in Zimbabwe a negative and significant relationship existed between class size and achievement. In Kenya school type was positively associated with mathematics achievement, but in Zimbabwe no such association existed. Additionally, 25–30% of the variance in student achievement in mathematics in both countries is explained by differences between schools. These findings suggest a disparity in mathematics achievement between schools in both countries based on class size and school type. Stakeholders can use these findings to make policies that help establish parity across the schools.

Keywords: Mathematics achievement; large-scale dataset; Hierarchical linear models; SACMEQ

Full text:

<https://www.tandfonline.com/doi/pdf/10.1080/18117295.2017.1334368?needAccess=true>