

Tracking Student Growth Over Time

Sample Analysis: Using Longitudinal Data to Examine Math Achievement Growth

Prepared by: Joel Artifex, PhD

Prepared for: Smart City Department of Education

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I- Executive Summary

This analysis uses longitudinal data tracking 1,721 students' math achievement from kindergarten through grade 4. It compares growth between students who repeated a grade (retained) and those who did not and examines how math achievement changes over time more broadly.

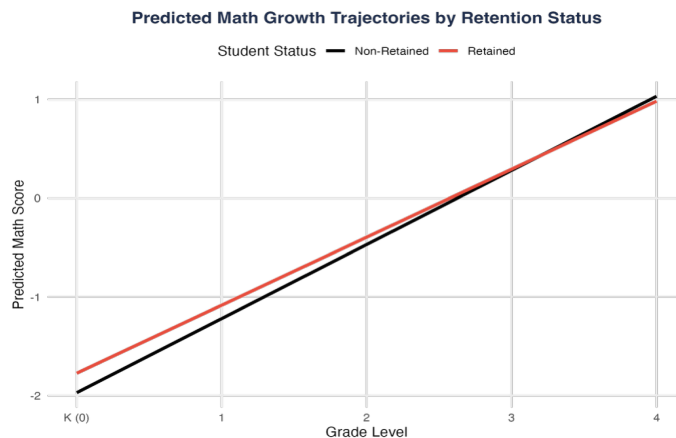
At the start of the study, retained students demonstrated slightly higher initial math scores than their peers. However, the two groups followed similar growth trajectories that intersected around Grade 4, where non-retained students caught up to and slightly surpassed their retained classmates.

II- Methodology

Three growth curve models were evaluated: a baseline model with no time trend, a random-intercept model, and a random-intercept-and-slope model. Model comparisons using likelihood ratio tests (ANOVA) identified the random-intercept-and-slope model as the best fit.

III- Result and Interpretation

About 36% of the overall variation in math scores reflected stable, systematic differences between individual students, and students also differed meaningfully in their own individual paces of growth. While math achievement grew steadily across the grades observed, the model-predicted trajectories show that retained students held an initial advantage, but non-retained students caught up to and slightly overtook them by grade 4.



IV- Recommendation

Track students' growth over time rather than relying on single-year scores, since students who start ahead can still fall behind. Targeted intervention strategies to support retained students can help them maintain their initial performance advantage before it completely disappears by Grade 4.