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Advancing research on growth measures, models, and policies for improved practice

Growth Models for Students with Significant Cognitive Disabilities*

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ABSTRACT
Alternate assessments based on alternate achievement standards (AA-AAS) are designed to measure the academic achievement of students with the most significant cognitive disabilities (SWSCDs). AA-AAS present unique measurement challenges because of the inherent need for individualization in item presentation and response, combined with expectations for rigorous levels of standardization. Additional measurement challenges are presented as states move toward implementation of growth models for accountability. This brief addresses some decisions that states face as growth models with AA-AAS are implemented.

Background

AA-AAS are designed to measure the academic achievement of students with the "most significant cognitive disabilities" exclusively as part of the U.S. Department of Education's effort to ensure that "schools are held accountable for the educational progress of students with the most significant cognitive disabilities"[1]. Students with intellectual disabilities, autism, or multiple disabilities make up the majority of the SWSCD population.[2] SWSCDs can be difficult to assess in a standardized manner.[3] Measurement challenges for growth models include trend analysis discrepancies, distribution assumptions, compounded standard errors, and multiple scales.[4] Additionally, significant data-related concerns for growth models include data system integrity, missing data, student mobility, student attrition, and scaling difficulties.[5] These challenges are confounded with even more factors for AA-AAS, including: (a) eligibility concerns, (b) lack of a comparison group for certain grade levels, (c) retention (and/or lack of grade level consistency), (d) within-group variability, and (e) reporting levels. The measurement difficulties inherent within AA-AAS may also lead to different decisions made across tests when AA-AAS results are used in statewide accountability growth models and adequate yearly progress (AYP) determinations.

Transition Matrix Approach

In the Transition Matrix (TM) approach, student growth can be depicted as changes in percentages and/or frequencies of students at various performance standard levels (e.g., *Does Not Yet Meet, Nearly Meets, Meets, Exceeds in Oregon*). TMs also can award points to students in multiple ways.
In order to successfully represent growth of SWSCDs within existing accountability systems, we present a model with points given for students who perform at a higher level from one year to the next, and points subtracted for students who performed at a lower level from one year to the next. No points are awarded for students who maintain performance levels from one year to the next (with the exception of the Exceeds level).

AA-AAS is typically developed on scales that preclude comparisons across different state assessments. The TM approach is ideal for AA-AAS applications, as it allows for scores from tests on different scales to be aggregated on a common scale of change. An important assumption in documenting this type of change, however, is that appropriate and articulated procedures have been adopted and followed in setting standards and proficiency cut scores.

Sample and Measure

This longitudinal, grade-level comparison study used data from the Oregon Extended Assessment (ORExt) in reading for SWSCDs in Grades 3-8 from 2008-2009. Of the 6,722 students in the 2008/09 dataset, 2,933 students with test data for both years were used in the TM analyses.

Results

We constructed cross tabulation tables comparing the frequencies of each of four performance categories in order to generate transition matrices for the 2008/09 transition years. These are longitudinal analyses, comparing the same students from one year's summative assessment to the next year's summative assessment. The four performance categories were: *Does Not Yet Meet* (DNYM), *Nearly Meets* (NM), *Meets* (M), and *Exceeds* (E). Students earned a point for moving up one performance level and lost a point for moving down one performance level. For example, a student who moved up one performance level from DNYM to NM generated a +1. A student who fell a performance level from E to M generated a -1. A student earned zero points for remaining at the same performance level, except those who remained at E, who earned one point. Results across Grades 3-8 for all students in the 2008/09 transition years are presented in Figure 1. It appears that most students are maintaining current levels of performance from one year to the next with the four-category analyses.

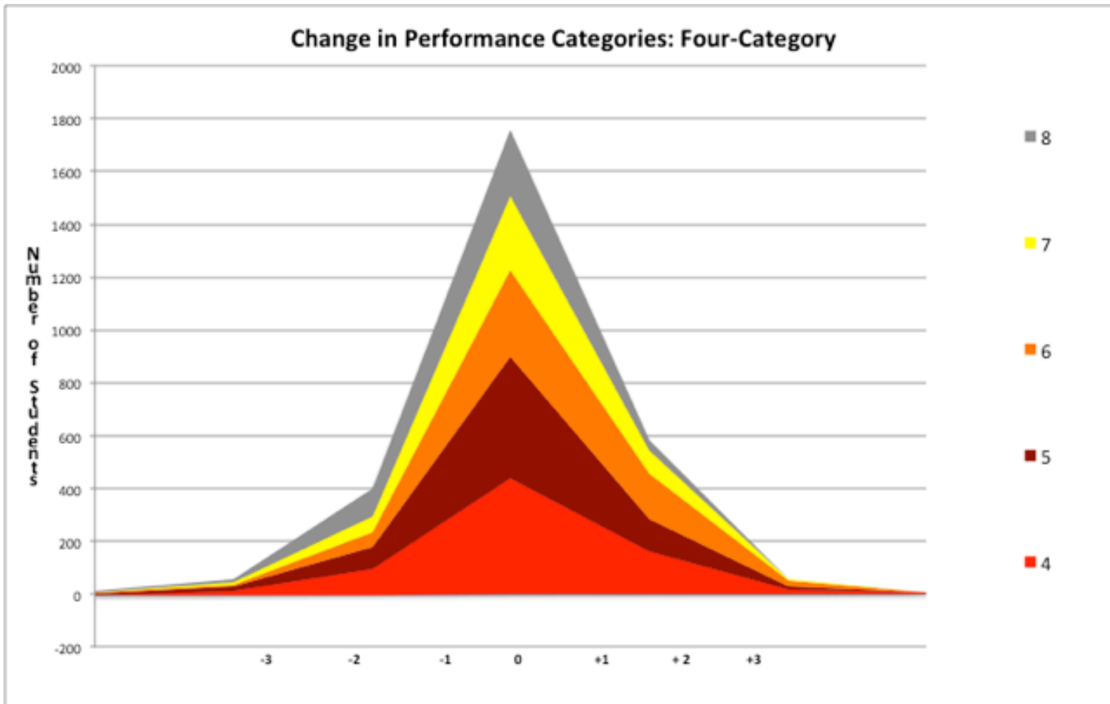

Figure 1. Clustering of student growth near '0', demonstrating no growth from one year to the next in reading for most students.

The majority of students maintained their performance level (1756/2874 = 61%). A total of 475 students dropped one or more performance levels (475/2874 = 16.5%), while 643 students advanced one or more performance levels (643/2874 = 22%). The overall trend is upward, meaning that more students gained a performance level (643) than lost a performance level (475).

A more discrete analysis was also conducted using RIT-scaled scores for this data set. We were interested in looking at how shifting the number of performance categories might affect outcomes. An arbitrary RIT-score range of 30 points for each category was selected, resulting in seven categories. Results of this analysis are presented below.

The seven-category longitudinal model shows that the majority of students are indeed growing and not merely maintaining previous levels of performance, as found with the four-category longitudinal model. With the four-category model, we would be led to believe that 61% of our students are not growing. With the seven-category model, we see that approximately 55.5% of our students grew in a discrete manner, but likely not enough to put them over the bar to earn the next performance level. Overall, the trend also remains positive, with more students increasing (1,588) compared to decreasing (1,146).

Grade level differences are also apparent between the two models. In fact, 6th grade went from the highest performing grade level in the four-category approach (10.9% of students performing one or more performance levels lower from 2008 to 2009, while 33% of students advanced one or more performance levels) to the lowest performing grade level in the seven-category approach (63.2% of students performed one or more performance levels lower from 2008 to 2009, while 30.6% of students advanced one ore more performance levels) simply due to the number of performance levels included in the calculations and the shapes of the respective distributions.

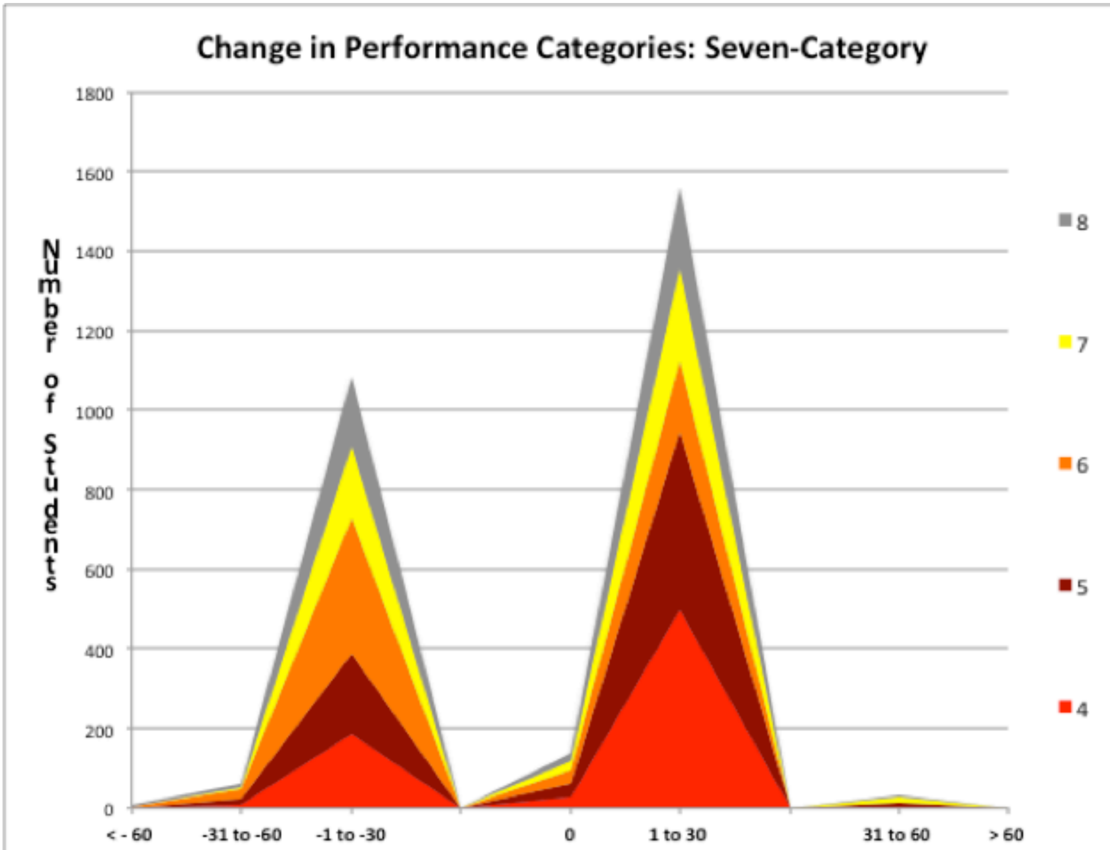

Figure 2. Students who are growing slightly from one year to the next in reading.

Future directions

The TM approach is flexible and feasible to implement with existing status-based performance structures. While this model is efficient and appears to hold some promise, it is shared not as a standard for the AA-AAS field to adopt, but to illustrate some of the policy and measurement challenges the field faces in implementing growth models in a robust manner for SWSCDs.

With AA-AAS, only a limited range of possibilities can be investigated. In the end, the field needs to define at the school, district, and state levels how much growth is enough. Ideally, future federal and state policies will address the needs surrounding growth models to support their implementation, as the move from status-based models toward growth models progresses. It appears unlikely that states will be in a position to implement valid growth models, even TMs, for SWSCDs until they have addressed at least eligibility concerns, participation, retention, within-group variability, and reporting level. Additional measurement concerns that are common across assessments, such as data system integrity, missing data, student mobility, student attrition, trend analysis discrepancies, distribution assumptions, compounded standard errors, and scaling difficulties will need to be addressed as well.

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