Research on the Academic Growth of Students with Disabilities and its Implications for Educational Policies and Practices

George Washington University
Washington, DC
Wednesday, October 22, 2014
Educating One & All 1994-2014: Context for NCAASE Research and Its Implications

Stephen N. Elliott
Arizona State University
The National Academy of Sciences’ Committee on Education Goals 2000 and Services to Student with Disabilities was established “to conduct a comprehensive study of the inclusion of children with disabilities in school reforms assisted under Goals 2000: Educate America Act” (PL103-227, sec. 1015).

EOA report, “There is a scarcity of research evidence directly bearing on the effects of standards-based reforms, much less their impact on students with disabilities. In addition, the research base on instructional practices and achievement contains few studies that include populations of students with and without disabilities, making systematic comparisons difficult.” (Executive Summary, 1997, p. 2)
EOA Recommendations

The EOA Committee offered 12 recommendations, of which several are highly relevant to the work of NCAASE. Recommendation #12 called for:

- “a long-term research agenda to address the substantial gaps in knowledge about the schooling of students with disabilities and the impact of standards-based reforms. Areas needing particular attention include research on the school experiences of students with disabilities, the potential of computer-based technologies, how local decisions are made about students’ curricular opportunities, alternative student credentials, and the relationship between testing accommodations and validity.” (p. 209)

There was virtually no discussion in the EOA Report about measuring students’ achievement growth.
Since the EOA Report

- Over the past 12 years, there has been a shift in accountability models in special education from one that emphasized compliance with policies and procedures set forth in the IDEA, to one that focuses on measuring student outcomes to gauge the quality of academic programming provided to students with disabilities.

- Yet, students with disabilities (SWDs) continue to lag significantly behind their peers without disabilities. For example, many states report that over 70% of SWDs perform below proficiency on annual statewide reading and mathematics tests (Center on Educational Policy, 2009). Similarly, the NAEP results for 2013 indicated only 8% and 7% of 8th graders with disabilities performed at or above the proficient level on the NAEP reading and mathematics assessments, respectively.
Shift from Achievement Status to Growth

- A number of educational scientists have argued for shifting our accountability metric away from achievement status to students’ achievement growth (e.g., Betebenner, 2008; Hanushek & Raymond, 2005; Schulte & Villwock, 2004).

- The argument for achievement growth is based on the dual premise that (a) schools should be held accountable for achievement outcomes they can control, rather than their prior achievement, and (b) status models incentivize schools to focus on students near the threshold of proficiency rather than focusing on the achievement growth of all students, including those functioning well below these thresholds.

- With high levels of student participation and the systematic collection of individual student annual test data by states, it is possible to conduct longitudinal growth analyses of the academic achievement of all students. Thus, since 2007 the U.S. Department of Education has allowed states to develop growth models that provide longitudinal characterizations of student achievement.
IES’s Call for Research to Answer Questions

In 2010, IES put out an RFA for a National Special Education Research and Development Center on Assessment and Accountability. It stated:

“At minimum, however, to raise academic achievement for students with disabilities, schools need data that will accurately measure individual student progress from year to year and some means to gauge whether or not individual students are making reasonable progress. Understanding the yearly progress made by students will provide teachers and schools with information necessary to make important instructional and programmatic decisions for students with disabilities. Measuring progress for students with disabilities raises many questions about what is expected for their achievement over the course of a year. The recent emphasis on accountability has raised expectations for the performance of students with disabilities to achieve the same academic standards as their peers without disabilities. It could also be argued however, that by nature of having a disability, students with disabilities cannot be expected to learn at the same rate as their peers without disabilities. Questions remain as to what progress can be expected within a specified time frame.” (IES, 2010, p. 10)
NCAASE’s Role

- As specified by the IES call, NCAASE focuses “on conducting a program of research that identifies the academic growth trajectories of students with disabilities, and develops and tests practical and relevant methods of accurately measuring academic growth for students with disabilities to be used in accountability systems. The ultimate objective of such work would be to develop assessment methods that schools can use to (1) accurately assess the academic progress of students with disabilities and (2) improve the quality of education provided to students with disabilities to lead to improved student outcomes. …In addition … the … Center will conduct supplementary studies and engage in national leadership activities relevant to assessment of students with disabilities” (IES, 2010, p.11)

- Goals for this meeting are to
  - Share NCAASE research
  - React to this research by addressing questions such as: What are the implications of this work for educational policies? Educational practices? Future research?
Research on Growth

Six Research Questions

Two Critical Concepts
Six Areas for Research

1. What is the natural developmental progress in achievement for students with disabilities?

2. What models best characterize achievement growth for students with disabilities who are participating in general achievement tests?

3. How do various growth models represent school effects for students with and without disabilities, and how do results compare to those derived from status models now in use?

4. What are the reliability and validity of estimates of school effectiveness for students with disabilities produced by alternative growth models and how are these estimates influenced by contextual differences among schools and students?

5. How do results from different types of interim assessments of students’ achievement meaningfully contribute to a model of academic growth for students with disabilities?

6. How can information about opportunity to learn and achievement growth be used to enhance academic outcomes for students with disabilities?
Capacity

- Partnerships at Various Levels
  - States: OR • NC • AZ • PA
  - IHEs: UO (5 faculty • 5 Doc Students) and ASU (3 faculty • 1 Doc Student)
  - Consultants (3) and Advisors (7)
  - IES (NCSER)

- Three Individuals Critical for Success
  - Jackie Buckley (IES) for guidance and support
  - Raina Megert (UO) for contracts and finances
  - Aaron Glasgow (UO) for technology backbone
Resolution
Running the numbers – Chris Jordan

http://www.chrisjordan.com/gallery/rtn/#prison-uniforms-set
## Resolution

### Running the Numbers – NCAASE

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Resolution for NCAASE

Findings are at the end of a long logic chain

- From State Accountability Systems
  - Standards based test development process
  - Integrity in data collection systems
  - Assemblage of data with directories

- From NCAASE Researchers
  - Data rendering with... missing data • varying participation rates • time varying changes in categories (e.g., disabilities and/or English language status) • cohort configurations • test and policy changes....
Mathematics and Reading Growth Across Grades

Ann C. Schulte
Arizona State University
Basic questions about the population of students with disabilities and their achievement growth have yet to be answered.

This information needed to form the basis for an accountability system that includes SWDs, but actually captures schools’ performance with the students, not construct irrelevant variance.

Select results from three longitudinal studies presented—tracking mathematics and reading growth across 5 years.
Illustrative Complexities

- Identification as a SWD is not stable from year-to-year (Ysseldyke & Bielinski, 2002)
  - *Export* the success stories to general ed
  - *Import* struggling students from general ed
- Specific exceptionality can change across years
- Mobility and grade retentions affect interpretation of outcomes, and SWDs are likely to have elevated levels of both
## The Grade 3 LD Diaspora

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Study 1: Once, Sometimes, or Always in Special Education

- What is the impact of entrances and exits from special education on portrayal of mathematics achievement gap and growth?

- **Cross sectional**
  - **Current Year**: As in NCLB, annual determination

- **Longitudinal**
  - **Wave 1**: SWD or non-SWD at initial data collection time point
  - **Ever in Special Education**: Student presence in special education at any time during grades 3-7
  - **Always in Special Education**
### Special Education Membership
Grades 3-7

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<th>SWD Subgroup Identification Method</th>
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Stable Subgroup Membership Matters

Effect Size

Mathematics Achievement Gap

-△ Special Education in Current Year SWD
-● Special Education at Wave 1 SWD

Grade
Observed Means by SWD Identification Method

- ▲ - Wave 1 NonSWD
- ○ - Wave 1 SWD

- ▲ - Ever in Special Education Non-SWD
- ○ - Ever in Special Education SWD
- △ - Always in Special Education Non-SWD
- ▲ - Always in Special Education SWD

Mathematics Scale Score vs. Grade

Grade: 3, 4, 5, 6, 7

Studies 2 & 3: Growth Across Grades

- Examine the developmental progress in mathematics and reading comprehension for general education students (GE) and students in specific exceptionality groups on a statewide achievement test.

- Two longitudinal cohorts followed across grades three to seven.

- Entire state cohorts, N > 100,000; N > 90,000 for analytic samples.

- Students never taking general assessment, retained, or where exceptionality category N <100 were excluded.
Mathematics Growth by Exceptionality

Mathematics Scale Score

Grade

General Education
Speech-language Impairment
Autism
Other Health Impairment
Hearing Impairment
Specific Learning Disability
NC Proficiency Cutpoint
Reading Growth by Exceptionality

Reading Scale Score vs Grade for General Education, Speech-language Impairment, Autism, and Other Health Impairment. The NC Proficiency Cutpoint is also indicated.
Reading Growth by Exceptionality

Reading Scale Score vs. Grade
- General Education
- Speech-language Impairment
- Autism
- Other Health Impairment
- Hearing Impairment
- Specific Learning Disability
- NC Proficiency Cutpoint
Individual Differences and Achievement Gaps in Math and Reading for SWD

Joe Stevens
University of Oregon
Purpose

- Purpose of this presentation to summarize a number of our study results that focus on individual differences in academic performance
- Draw attention to and quantify achievement gaps in mathematics and reading especially for students with and without disabilities (SWD and SWoD)
- A central goal of NCLB and RTTT is universal proficiency and the reduction of achievement gaps between SWoD students and protected subgroups including SWD
Mathematics Achievement Gaps

- What is the size of the achievement gap in mathematics for students in specific exceptionality categories?
- Does the gap increase, decrease or stay the same over time?
- Previous research on achievement gaps has limitations:
  - Often gaps are not evaluated empirically, visual inspection rather than statistical testing; no common, empirical metric (effect size) to describe differences
  - Interactions not tested (more on this below)
Figure. Mathematics achievement growth effect size at each grade transition by student group (from Stevens et al., in press).
Mathematics achievement gap effect sizes between all SWoD and each exceptionality group by grade (from Stevens et al., in press).
Reading Achievement Gaps

- What is the size of the achievement gap in reading for students in specific exceptionality categories?
- Does the gap increase, decrease or stay the same over time?
Figure. Reading achievement gap effect sizes between all SWoD and each exceptionality group by grade (from Schulte & Stevens, manuscript submitted for publication).
Interactions of SWD status and Other Student Characteristics

- Many studies do not directly test the interaction of SWD status and factors thought to be related to student performance (e.g., LD status and sex of student)
- When these factors are included in statistical models (especially regression and HLM models), only partial regression effects not the actual interactions are analyzed
- This can be very misleading and result in incorrect interpretations
- We explicitly test interactions of SWD with student characteristics
Figure. Mean mathematics achievement by grade and LD status (note increasing achievement gap; Stevens & Schulte, manuscript submitted for publication).
Figure. Interaction of LD Status With Black Race/ethnicity on Mathematics Achievement Growth (almost identical results for interaction of LD and FRL status; from Stevens & Schulte, manuscript submitted for publication).
Figure. Interaction of SWD and ELL status on interim assessment performance for Tempe, AZ middle school students (from Stevens & Schulte, manuscript in preparation).
Mathematics Achievement Gaps for Elementary and Secondary Students: The Influence of Opportunity to Learn and Special Education Status

Stephen N. Elliott
Arizona State University
Specific research questions motivating the study were:

1. Do students with and without disabilities who received instruction in the same general education classrooms have an equal opportunity to learn mathematics?

2. What is the relationship among five instructional variables (characterized as OTL) and within year academic growth on an interim assessments?

3. What is the predictive relationship among five instructional OTL variables and students’ end-of-year mathematics achievement?
Opportunity to Learn (OTL) the Intended Curriculum

Definition: Opportunity to Learn

The degree to which a teacher dedicates instructional time and content coverage to the intended curriculum objectives emphasizing higher-order cognitive processes, evidence-based instructional practices, and alternative grouping formats.

(Kurz, 2011)

A unified conceptualization of OTL based on 50+ years of empirical research.
Multiple Measures Study Design*

Teachers (N = 67; AZ 35, OR 32) and students (N = 261; 136 SWD + 125 SWoD) from AZ & OR schools grades 4th-8th

* A 3-year study with longitudinal student cohorts
Year 1 Findings

- We observed very similar instructional processes for students with and without disabilities learning mathematics in the same elementary or secondary classrooms in AZ and OR schools. Significant achievement gaps between these groups of students, however, existed on the four interim CBM assessments and the end-of-year achievement state test.

- We found that the collection of five MyiLOGS scores, along with grade level and special education status, accounted for a substantial amount (i.e., 43% to 44%) of the variance in student’s end-of-year mathematics scores. A subset of OTL indices explained a statistically significant, although relatively small portion of unique variance in the end-of-year mathematics scores. The particular OTL scores found to be significant contributors varied across AZ and OR.
Comparison of OTL Indices

Oregon Elementary SWOD vs. SWD
Comparison of MyILOGS Indices

Oregon Secondary SWOD vs. SWD
Comparison of MyILOGS Indices
Comparison of Interim & End-of-Year Test Results

Oregon Elementary SWOD vs. SWD Comparison of EasyCBM & State Test

Oregon Secondary SWOD vs. SWD Comparison of EasyCBM & State Test
Within Year Standardized Mathematics CBM Growth
Conclusion

Offering students with disabilities the same amount of instruction on the same content standards in the same general education classrooms was found to offer the same historic results—large and persistent gaps in achievement -- in comparison to students without disabilities.

If the findings in Year 1 of this study are replicated in subsequent years and other studies, it indicates that students with disabilities will need more instructional time on the intended curriculum, and perhaps more differentiated instruction to increase their rate of achievement enough to close gaps that currently exist between them and students without disabilities.
Influence of Testing Procedures on Documenting Growth

Joseph F. T. Nese
University of Oregon
Influence of Testing Procedures on Documenting Growth

1) Testing Students with Significant Cognitive Disabilities: Patterns of Participation in a General or Alternative State Assessment

2) Is Once Enough? The Effects of Multiple Administrations of a State Achievement Test
Influence of Testing Procedures on Documenting Growth

- Testing Students with Significant Cognitive Disabilities: Patterns of Participation in a General or Alternative State Assessment
  - Jessica L. Saven, Daniel Anderson, Joseph F. T. Nese, Dan Farley, Gerald Tindal

- Purpose
  - Explore how students with significant cognitive disabilities switch between the General and Alternate state assessments over time.
Patterns of Participation: General (GA) or Alternative Assessment (AA)

- States may develop AA based on alternate achievement standards.
- 9% of SWD, or 1% of all students.
- AA must meet technical adequacy requirements, and link with state academic content standards.
- Eligibility criteria and implementation vary; so some students “switch” test types between years.
- Accountability implications.
Patterns of Participation: General (GA) or Alternative Assessment (AA)

- We tracked test participation for two cohorts (elementary and middle school) of students with a documented disability over three years.
  - Students with intellectual disabilities (ID), autism (ASD), or learning disabilities (LD).

Research Questions

1. What is the likelihood of test switching on the reading portion of the AA and the GA across consecutive years, over a three-year span for students with intellectual disabilities, autism, or learning disabilities?
2. Do students performing highly on the AA or poorly on the GA (i.e., students on the "bubble") have an increased likelihood of switching test type as compared to other students with the same disability?
3. Is the observed pattern the same across cohorts of students in middle school as compared to elementary school?
Grade 3 \((n = 3,048)\) & Grade 6 \((n = 3,911)\) Cohort

Test Patterns 2009/10 – 2011/12

- **GA Always**
- **AA Always**
- **Switch**

- **Grade 3 Cohort**
- **Grade 6 Cohort**
Grade 3 \((n = 3,048)\) and Grade 6 \((n = 3,911)\) Cohort
Test Patterns 2009/10 – 2011/12

NCAASE National Center on Assessment and Accountability for Special Education
Advancing research on growth measures, models, and policies for improved practice
Implications

Mechanisms must be found to include SWSCDs and ensure appropriate participation in the testing program over time. Otherwise, high percentages of students switching test types necessarily limit the accuracy of estimates of growth for these students and complicates interpretations of students' levels of proficiency and growth.
Influence of Testing Procedures on Documenting Growth

- Is Once Enough? The Effects of Multiple Administrations of a State Achievement Test
  - Joseph F. T. Nese, Gerald Tindal, Joseph Stevens, Stephen N. Elliott
The Effects of Multiple Administrations of a State Achievement Test

- No reference to multiple tests in ESEA.
- Multiple tests on NCLB summative tests (e.g., Delaware, Oregon).
- Multiple administrations may increase validity, decrease the false negative results, and increase false positive results.
The Effects of Multiple Administrations of a State Achievement Test

- **Purpose:** Explore outcomes from the use of multiple test administrations in reaching proficiency.
  1. Are student characteristics associated with how many times a student takes the state test?
  2. For various student subgroups, what is the likelihood of passing the test given previous failure(s)?

- Performance of students on the “bubble” of proficiency (potential false-negatives).
The Effects of Multiple Administrations of a State Achievement Test

1) Are Multiple Administrations More Likely For Certain Students?
   - non-LEP vs. LEP students;
   - GenEd vs. SpEd students; and
   - Bubble vs. Below Bubble students.
   - These results were consistent across grades and subjects in direction, magnitude.

2) More Likely to Pass On Successive Attempts
   - Females (reading); Males (math)
   - White vs. Hispanic students.
     - No difference in passing rates between Whites vs. Other ethnic minority students
   - Non-FRL vs. than FRL students
   - Non-LEP vs. LEP students
   - GenEd vs. SpEd students
   - Bubble vs. Below-Bubble students
Estimated probabilities of passing the Grade 3 math or reading test for specific student subgroups

a) Mathematics

b) Reading

Reference = White, male, non-FRL (free/reduced priced lunch recipient), non-LEP (limited English proficiency status), GenEd (general education), BelowBubble (lower than one standard error of measurement below the proficiency cut score on the previous test).

FRL = White, male, FRL, non-LEP, GenEd, BelowBubble.

LEP = White, male, non-FRL, LEP, GenEd, BelowBubble.

SpEd = White, male, non-FRL, non-LEP, Special Education, BelowBubble.

Bubble = White, male, non-FRL, non-LEP, GenEd, Bubble (one standard error of measurement below the proficiency cut score on the previous test).
Implications

A multiple test policy can provide improved prospects for additional instruction, opportunity to learn, student development, and success for students and schools, but it remains uncertain whether large-scale state achievement are meaningful learning events. Multiple test opportunities may enable more fair and equitable proficiency reports and decrease the likelihood of false negatives.
Upcoming NCAASE Studies

Joe Stevens
University of Oregon
One of our central goals is to compare different models of estimating school performance.

We will compare commonly used models of school performance to determine how model choice and model characteristics impact characterizations of school performance.

We begin this work this fall using Oregon data.

We will then replicate using AZ, NC, and PA data.
Models of School Performance

- Status; gain and residual scores; projection models
- Transition matrix
- Value-added models
- Student Growth Percentiles
- Hierarchical linear growth models
- Latent Growth curve models
Model Variations

- Two grade levels studied: elementary schools, middle schools
- Focused study of impact of models on schools serving SWD
- Three cohorts studied for each analysis to determine cohort stability
- Unconditional vs. conditional models (school size, student composition of school)
- For some models different estimation methods examined (OLS, EB, Fully Bayesian)