Analysis of Opportunity to Learn for Students with Disabilities: Effects of Standards-Aligned Instruction

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Abstract

The paper presents a model for addressing the critical question of opportunity to learn for students with disabilities. The model was tested through a two–year study with schools and teachers in three states. Opportunity to learn analysis is critical in this educational era of push toward access and inclusion. The study results indicate that instruction in grades 4-8 for general education and special education students did not closely align to state content standards. The analysis results indicate that a greater degree of instructional alignment to standards did have a positive impact on student achievement, considering both academic standards and extended standards for students with disabilities. The study findings showed that schools and classrooms providing more inclusive education for students with disabilities had a positive impact on student achievement for all students.

States, local districts, and schools are expected to provide all students with standards-based instruction and inclusive assessments that are well aligned with such instruction. Federal legislation has underscored the right of students with disabilities (SWD) to have access to the general curriculum, instructional content, and tests aligned with standards (IDEA, 1997, 2004; No Child Left Behind Act (NCLB), 2001). We know from annual reports of the U.S. Department of Education that almost all students with disabilities are now participating in annual state student assessments, as specified under NCLB (http://www.ed.gov/esea). The results from recent state assessments show that across all states the average rate of participation was 96 percent of students with disabilities tested in the regular assessment program. However, only 36 percent of these students' scores on the state assessments met their state-defined proficiency level (U.S Office of Special Education Programs, 2013).

The research reported in this paper presents a model for addressing the critical question of opportunity to learn for students with disabilities. The model is tested with results from a two–year research study supported by the U.S. Department of Education conducted with schools and teachers in three states. A priority research question of educators and leaders concerns opportunity to learn, i.e. what is the content of instruction and quality of instructional practices provided in public school classrooms, particularly for students with disabilities in this era of access and inclusion? The research question is operationalized in the present study as: Are students with disabilities, and all students, receiving instruction that is aligned with state standards for learning? And, importantly, what are the differences between the curriculum content and practices taught to students with disabilities as compared to curriculum taught to other students and what are effects on student achievement?

Theoretical Perspective: Research on Opportunity to Learn and Students with Disabilities

Relatively little research has been conducted on the extent to which standards-based instruction at grade level is delivered to students with disabilities, either by general education teachers or special education teachers (Roach, Namisi-Chilungu, et al., 2009). Recent research suggests that students with disabilities in special education classrooms at the same grade level as their general education peers are likely to be getting fewer opportunities to learn expected content (Kurz, Elliott, & Smithson, 2009).

To a large extent, improving instruction and performance of students with disabilities have not been emphasized in standards-based education reform efforts. In the early 2000s, survey research in 34 large school districts found that students with disabilities were not considered in the same way as other students in the context of reforms (Gagnon, McLaughlin, Rhim, & Davis, 2002). Later, Nolet and McLaughlin (2005) summarized their research effort noting that many special educators did not understand the meaning of "curriculum" and saw state content standards and curricular frameworks as too challenging for their students. The study found that many special education teachers reported that it was more important to use instructional time for functional skills than academics; and they showed limited understanding of alternative strategies to meet instructional needs within academically challenging content.

Education policy researchers (e.g., Quenemoen, Thurlow, Moen, Thompson, & Morse, 2003) have noted that students with disabilities have historically had limited access to challenging curriculum, instruction, and assessment. This is sometimes driven by differences in what specific content that access should cover, with some educators believing they need to focus on direct instruction on basic skills and others calling for a full range of rich and challenging grade-level content. Quenemoen et al. (2003) suggest these controversies are intertwined with limited practitioner capacity for effective provision of instructional strategies, interventions, and supports in a standards-based system. Simply put, many special education teachers do not know the content to be taught and many teachers do not know how to teach atypical learners well. Research on opportunity to learn in core academic subjects in general education has developed since the 1990s (Oakes, 1990; Schmidt, et al, 1996). A methodology for use of classroom-based surveys had been tested in several research studies (Porter, 2002; Porter & Smithson, 2001) and evaluations of change in classroom practices were conducted using the survey method and analysis of alignment to state standards (Porter, et al, 2005; Blank, et al, 2006; Smithson &

Blank, 2006). Through collaboration with state specialists, teachers, and researchers and funding support by states and research grants, the Surveys of Enacted Curriculum (SEC) were developed into a web-based system for analyzing and reporting on classroom instructional practices and their relationship to state standards and assessments (Blank, 2010; Blank, et al, 2010). The SEC data tools have been used in over 30 states to analyze math, science and English language arts instruction (see, www.SEConline.org)

In 2010, the Council of Chief State School Officers (CCSSO) responded to the interests of state leaders in special education to develop and submit a successful proposal to the US Department of Education to extend and test the use of the SEC data tools as a model for analyzing opportunity to learn for students with disabilities (Kansas State Department of Education, 2010). The collaborative project led by states and researchers was designed to study opportunity to learn for students with disabilities in comparison to OTL for general education students in the same schools and districts. The project addressed a core need for instruments and data that can assist state and local leaders with a methodology for providing objective evidence of the status of curricular and practice deficits for an at-risk student population and to analyze and report the effects of standards-aligned instruction and opportunity to learn on student achievement. A priority concern voiced by members of CCSSO's State Collaborative on Assessing Students in Special Education identified limited availability of (a) data and appropriate instrumentation for analyzing differences in curriculum and instruction, (b) research-based professional development resources addressing instruction aligned with state standards, and (c) strategies for organizing curriculum and instruction towards improved alignment (see, ASES SCASS state collaborative http://ccsso.org/Resources/Programs/).

The project design included steps to adapt and improve the SEC data collection instruments to address issues of instructional practices, curriculum, and instructional alignment for students with disabilities (CCSSO, 2010a). The data collected through the project were used to analyze the relationship of standards-based instruction to improvement in student achievement. The participating states, districts and schools received assistance in applying their study data in a school-based professional development model to focus instructional improvement strategies on achievement gaps identified through the data analysis. (see project final report, Blank, et al, 2012).

Design and Methodology

The collaborative proposal submitted by the CCSSO research team including state education specialists from states directly participating in the project focused on three research questions that would drive the study design and the data collection and analysis:

1. What is the fidelity of classroom instruction in relation to state adopted content standards and assessments including instruction for students with disabilities and general education students?
2. What are the differences in instructional practices and content taught between special education and general education?
3. What is the effect of instruction students receive to growth in student achievement in mathematics and English language arts and reading?

The project was designed with educators from the three participating states (Kansas, North Carolina, Ohio), special education consultants, and researchers from CCSSO and the Wisconsin Center for Education Research (WCER). The research questions were intended to be addressed through data collected with participating states, districts and schools, as well as to develop, test, and demonstrate the use of research and data tools related to these questions that would be available to the broader community of educators and researchers. The overall project had multiple objectives and several reports and products are available (Blank, et al, 2012, access online through www.SECsurvey.org). The present paper focuses primarily on analysis of data across the sample of teachers and students from all three participating states.

The methodology was based on analysis of instructional practices and content of instruction in a sample of schools and classrooms from three states. The instructional data were analyzed in relation to the content standards for each state, the Common Core State Standards, and academic and extended assessments for each state. The data collection and analysis methodology was based on the Surveys of Enacted Curriculum tools and procedures (Smithson, 2009; Porter, 2002; Blank, et al, 2010). Each participating state was asked to select four to six school districts that had interest in the study research questions and using the data and analyses with their schools. The study targeted grades 4-8 and teachers of ELA and math. Each district was asked to select at least two elementary or middle schools and all teachers in selected grades were asked to participate. This approach ensured that the study sample would be inclusive of teachers with different certifications and assignments for teaching students with disabilities and regular students. The study sample obtained across the three states included 19 districts, 50 schools and 600 teachers (see attached table B for totals by state). The voluntary sample of districts and schools met the study goal of testing differences in instruction between student populations. To address the study objectives, state representative samples of students, teachers and schools were not required.

Data Analysis

Multivariate data analysis was used to address the three research questions. The analysis incorporated three sources of data from participating schools and teachers. Teachers in the 50 participating schools reported on their instructional practices and curriculum content through the SEC online system in spring and fall 2011. Each teacher reported on instruction in English language arts or mathematics (see attached example survey section). School-level program data including teacher assignments, student demographics, and least restrictive environment (LRE) indicator were collected from principals in spring 2011. Student level reading and math scores on state assessments for school years 2009-2010 (prior year) and 2010-2011 (study year), along with information that allowed linking teacher instructional data with their students' test scores. Student scores for the relevant subject (math or language arts) from the prior year served as a prior achievement measure for the multivariate analyses.

Through linking student data to teacher data the analysis could produce more detailed examination of the role that opportunity to learn (OTL) and instructional activities play in the achievement of students. The multivariate regression models were designed to explain differences in student achievement scores controlling for prior achievement and economic

disadvantage and to measure the relative effects of program inclusiveness, opportunity to learn, instructional practices, and students' disability status.

The project data collected through teacher surveys in spring and fall 2011 allowed the project team to report to state leaders and local educators on the degree of fidelity or agreement between the content of instruction provided in classrooms and the standards for student learning required by each of the three project states (Kansas, North Carolina, Ohio). The analysis of alignment is also provided for the statewide assessments used for all students--both general end-of grade academic assessments and modified or alternate assessments used with students with disabilities. Third, we analyze the degree of alignment between current instruction and the Common Core Standards, including fine-grain analysis within topics by grade.

The example graphic displays below show how SEC instructional survey data were reported to schools and teachers as feedback from the study for participants' own use. One firm commitment of the study team to participating districts and schools was assurance that data collected and analyzed through the research design would be available for their own use in analyzing their instruction in relation to state standards. The online SEC data instruments provide data charts that are designed for use by educators to highlight key relationships between study variables. Leader teams from the participating districts and schools received training on analysis and interpretation of their data using charts and graphs similar to these examples. The two SEC data charts show analysis of the relationship between the content of instruction reported by teachers and standards for their state. The "content alignment" analysis is measured through the SEC content framework and application of SEC coding and analysis procedures (Smithson, 2009). The operational definition of alignment in the SEC methodology includes both content topics and level of expectations for student learning (or cognitive demand). Thus for a specific subject and grade level it is possible to analyze the degree of alignment, or consistency, between instruction provided to students and the state standards. (The study reports to educators also provided alignment between instruction and state assessments, and alignment of standards and assessments). The degree of content alignment is reported as a statistic (varying from 0, *no alignment*, to 1, *perfect alignment*), and using the visual displays which allow direct comparison of differences and consistencies between instruction and standards for content topics and expectations for learning. The content analyses of standards and assessments for the three participating states were conducted by subject specialist teams as a part of the research study in June 2011. Content analyses of the Common Core State Standards included in the study were conducted by cross-state specialist teams (CCSSO, 2010b).

The SEC data reporting in Figure 1 shows an example of instructional alignment analysis of English language arts instruction at grade 6 in Kansas classrooms, with comparison to the KS state standards for grade 6. The chart shows data analyzed for 21 grade 6 teachers. (In total, 72 teachers in grades 4-8 in three KS districts reported on instruction in English language arts in the 2011 SEC data collection). The data report informed Kansas educators on the topics and expectations for which instruction differs from standards--for example, the time on instruction is concentrated primarily on the topics Comprehension and Vocabulary while the state standards place high emphasis on Critical Reasoning and Author's Craft. The greatest emphasis in KS standards in the expectations dimension (vertical) is on Analyze/Investigate while the classroom

instructional data shows time emphasis on Memorize/Recall and Perform Procedures. The alignment of the grade 6 classrooms instruction in language arts to the State standards is .37.

The second example of SEC reporting to educators in Figure 2 shows Ohio grade 7 math instructional alignment analysis. Data were reported by 14 grade 7 teachers and the data are compared to OH state math standards. (A total of 87 teachers of math in four Ohio districts participated in the 2011 data collection.) The data chart reveals a heavy emphasis of instruction at grade 7 on Number sense and Operations, while the Ohio standards for grade 7 place more emphasis on Measurement and Basic Algebra. The expectations for learning dimension reported by teachers focus heavily on Perform Procedures, while the Ohio Standards place more emphasis on expectations for Demonstrate understanding, Conjecture/analyze, and Solve non-routine problems. Several math topics that were emphasized in the grade 7 math state standards were reported as having little instructional time– Geometric concepts, Basic algebra concepts, Data displays, and Statistics and Probability. The statistic of alignment across all topics and expectations is .49. The review of the data indicates that misalignment of instruction is largely due to instruction being reported across many topics but instruction is not concentrated in the areas emphasized by state Standards.

Findings for Research Questions

The multivariate analysis results provide findings regarding answers to the research questions. The study teacher-reported data on instruction was linked to the students they taught, and this analytic step provided a method for instructional alignment data to be compared for students with disabilities vs. general education students.

Alignment of instruction to standards and assessments by teacher certification

The data reported in Table 1 shows the degree to which instruction provided by the study teachers was aligned to state standards and assessments, and the data are disaggregated by teachers with special education certification vs. general academic certification. The data on instructional alignment in English Language Arts & Reading (ELAR) show that teachers in the study sample varied substantially according to their certification, regardless of which alignment target is considered. In each analysis of standards and assessments, Special Education teachers reported significantly lower alignment measures compared to their general education peers (see Table 1), and thus students would have fewer opportunities to learn standards-based content. For example, instruction in ELAR by general education teachers is aligned to the state standards for ELAR at the level of .42 (with 1 being perfect alignment), while instruction by special education teachers is aligned at the level of .35 (a significant and substantial difference). This pattern of significant differences persists even for the state extended standards and the modified assessment, where one might expect special educators to place more emphasis than teachers of students in the general population.

While the data for mathematics teachers show no significant differences in instructional alignment between the teacher groups by certification, it is interesting to note the patterns of alignment for the two groups of mathematics. As one might expect, special education teachers

reported higher alignment to the state extended standards as well as to the state modified assessment. Special education teachers also reported slightly higher alignment to state assessments, while general education teachers were slightly more aligned to Common Core Standards. The data suggest that special education teachers may be somewhat more focused on what is assessed than what is in the state standards. Interestingly, teachers in the study, regardless of certification or subject area, tended to report content coverage more aligned to the Common Core state standards than any other instructional target examined. (Note that teachers reported only on their instruction – analysis of alignment was conducted through statistical analysis.) The other notable pattern that emerges in Table 1 is that in general, mathematics teachers tend to report content coverage that is better aligned to each of the instructional targets than reported by language arts and reading teachers.

Differences in instructional practices for students with disabilities vs. general education students

The charts shown in the tables below provide comparisons of instructional activities used with the two categories of student status, and practices are compared for English language arts/reading instruction and Mathematics instruction. Item responses on instructional activities are reported using several scales (e.g., Test preparation, Evaluate argument and evidence, Generate written text, Analyze information, etc.). The study data on instructional activities (classroom practices) aggregated across schools in all three states indicate several key differences by student category that are statistically significant. First, students with disabilities spend less time in language arts instruction engaged in activities focused on Analyzing information and spend significantly less time engaged in Evaluating/critiquing arguments and evidence when compared to their general education peers. The instructional activities focused on Writing and Demonstrate understanding are lower for students with disabilities (although not significant) and Test preparation time is slightly higher for students with disabilities.

The analysis of mathematics instructional activities shows that students with disabilities on average spend more time during mathematics instruction doing math work involving Performing procedures and Taking/preparing for tests than their general education peers. Students with disabilities spend about the same amount of time in activities involving Analyzing information and Demonstrating understanding as the general education students.

Analysis of opportunity to learn and predictors of student achievement

While it is generally accepted that students' opportunity to learn standards-based content and the instructional practices students experience have an impact on student performance, statistical evidence to support these pre-suppositions are not common. Isolated examples of achievement growth and gap reductions can be found for some states and districts, but large scale indicators that capture elements of practice and policy that contribute to explanations of variation in student achievement are rare. The Survey of Enacted Curriculum (SEC) data collection system was selected for this study in order to provide a broad set of indicator measures describing the instruction delivered to general and special student populations. The results serve to inform teachers, administrators, and other educational stakeholders about current practices and provide opportunities for reflection and discussion about appropriate changes to instruction as a result of

these reflections and discussion. In addition, SEC data serve to answer each of the questions posed for the study, whether considering the alignment of instruction to key instructional targets; the instructional practices and content experienced by students with IEP's; the comparison of key general and special education instructional characteristics; or the relationship of these instructional characteristics to student achievement. SEC data provide the relevant indicator measures.

Mathematics achievement. The sample for mathematics achievement analysis comprises 5,004 students across 276 classrooms. Data provided by the states include mathematics and reading achievement scores for students in participating schools for the target year (2011) as well as student achievement data for the prior year (2010). In addition students were flagged on disability status (SWD), and economic disadvantage status (EDS). Identifiers were also provided that permitted students to be associated with the relevant mathematics or language arts teacher to which they were assigned. The data analysis results summarized in Table 3 report findings for multiple indicators of opportunity to learn, as well as several scale measures related to classroom activities. The basic model employed controls for prior achievement, economic disadvantage status, disability status, and the proportion of special education students assigned to category A in the school.

A simple multivariate linear regression model based on these variables yielded an adjusted R^2 of 0.568, with all variables contributing significantly to the model. Adding alignment to the state's content standards increases the adjusted R^2 slightly (to 0.573) and the inclusion of the instructional practice scale measures further increases the adjusted R^2 to 0.587. Thus the addition of these classroom measures provide a modest but positive improvement to the predictive model. While modest, the models indicate that the teacher reports of practice using the SEC instruments do contribute to predicting student achievement, suggesting that the measures have some predictive validity, and in turn increasing confidence in the validity of the teacher self-report data. In order to appreciate the relative impact, the table for Mathematics analysis reports the standardized coefficient for each variable in the model.

The results reported in the table in Table 3 indicate that OTL does have a positive impact on achievement, though at a level somewhat less than the negative effects of economic disadvantage or disability. The model also indicates that schools with higher proportions of students with disabilities spending more time in general education classrooms tend to have higher math achievement scores (i.e. level of inclusion = .048). Each school in the study reported the LRE indicator for the school (LRE=least restrictive environment average percentage of school day with inclusion for SWDs). Among the five scales of instructional practices surveyed, analyzing information represents the one instructional practice that shows a positive impact on student achievement relative to other variables in the analysis.

While the effects are modest, they do indicate that the instruments capture important elements of practice that are linked to achievement, and increase confidence that at the level of school and classroom practice the data has the potential to yield actionable information for teachers that can contribute to increased student performance.

Language arts & reading achievement. The multivariate analysis of student achievement in language arts and reading, comprised 4,004 students in 303 classrooms in the sample from participating schools across three states. The results of the analysis are shown in Chart 4. The analysis results for ELAR achievement look quite different than the results reported for mathematics. In general, multivariate regression models in language arts tend to report higher adjusted R^2, however this is largely due to the greater predictive power of prior achievement in language arts (adj. R^2= .70 versus .58 for math). While classroom practices and standards alignment measures do provide statistically significant contributions to the predictive model (e.g., Generate written text = .22), the direction of the influence varies from one indicator to another and in ways that may appear to be counter-intuitive (alignment to state standards = -.178). This may in part be due to state achievement tests being primarily tests of student reading scores. The results do support the assertion that opportunity to learn and pedagogical indicators can contribute to explaining variations in student achievement gains and thus inform curriculum decisions designed to optimize student performance. The model also indicates that schools with higher proportions of students with disabilities spending more time in general education classrooms tend to have higher achievement scores (i.e. level of inclusion = .048)

The adjusted R^2 for the equation represented in the language arts/reading Table is .701. The results for ELAR analysis represent a better model fit than the results for mathematics. Among the classroom practice measures, generating written text tends to be the best predictor of achievement. Each of the measures of opportunity to learn have a positive impact on achievement and the combined Standardized Beta Coefficients exceed the negative effects of economic disadvantage and disability status.

Conclusions

The analysis results from the study of opportunity to learn in a sample of classrooms, schools and districts across three states provide several types of important evidence that contribute to understanding of the relationship of instruction to student achievement. First, the data analysis identified where and how instructional practices and content of instruction in the 50 sample schools differed from the standards established by their states. Across the focus grades 4-8 for this study, the instruction reported by teachers for general education and special education students did not closely align to state content standards, both in distribution of instructional time by topic and in the expectations for learning that are emphasized. However, the analysis did show that a greater degree of instructional alignment to standards did have a positive impact on student achievement. And, the positive relationship of alignment to standards to achievement held for both regular academic standards and extended standards for students with disabilities. Second, evidence was provided regarding questions raised by special education experts about the extent to which students with disabilities are receiving a standards-based education. Schools and classrooms providing more inclusive education for students with disabilities had a positive impact on student achievement for all students. However, overall, students with disabilities had average achievement scores that were significantly lower than general education students. The study data also identified several areas of instructional practices in which students with disabilities receive different levels of instructional time and emphasis than general education students, including less time on writing, analysis of information, and evaluating evidence and arguments, and more time on test preparation.

The study results also demonstrated the use of the Surveys of Enacted Curriculum data instruments for use in special education research and analysis of differences in opportunity to learn. The study had a practical benefit for participants in that school teams participating in the study received school reports with graphic displays that provided a baseline picture of instructional practices in ELA and mathematics in classrooms. The data charts were used to analyze instruction by classroom student composition, teacher preparation, and variation instructional content by grade in relation to prior state standards as well as the new Common Core Standards that were being introduced as the study took place. Further extension of the research is possible since the research model and data tools can be used to track changes in instructional practices over time, and analyze effects of instructional improvement initiatives. The multivariate data analyses indicated that opportunity to learn, classroom activities and inclusion policies all contribute to student performance to some degree. The cross-state data provide a descriptive baseline while suggesting dynamics and relationships that deserve further investigation. A basic question underlying all of the results is the degree to which the findings from this study are generalizable. Considering the diversity of teachers and programs represented in the data-set, collected from approximately 300 teachers in each subject across the three states, there is good reason to believe the results are reflective of the conditions for teaching in special education more broadly, and the relationship of instruction to student achievement. However results from further studies and other data collection efforts are needed to either confirm or alter the picture of special education portrayed in this report.

Discussion

The research analysis from this study of opportunity to learn based on analysis of instructional alignment to standards provides results that can be generalized to the larger population of teachers and students, potentially providing insights into basic elements of mathematics and reading instruction that have relevance for teachers, administrators and researchers beyond the boundaries of the schools, districts and states that participated in the study. Through prior collaboration with many state education specialists and teachers, the CCSSO researchers and state education leaders had identified a specific need for instruments and data that can assist state and local leaders with objective evidence of the status of curricular and practice deficits for students with disabilities.

With the adoption of the Common Core Standards by many states, leaders identified the need to improve methods of professional development for local leaders and teachers that would highlight the key transitions in instruction needed for implementation of the Common Core. They also sought research-based evidence of the gaps in student achievement and enacted curriculum in classrooms that would drive the argument for improving practices through professional development with all teachers. The model provided by this study can now be used by state and local education leaders to advance their work to align instruction and curriculum consistent with the Common Core Standards. The tools for measuring and reporting on the variation in instruction aligned with standards demonstrated by the analysis model will serve educators and researchers in further efforts to align instruction to standards. When combined with student achievement data that can be associated with specific teachers reporting their practice using the SEC instruments, the SEC data-set provides a unique opportunity to examine the predictive

properties for a variety of OTL and classroom activity measures in explaining variation in student achievement scores. One of the largest successes of the study then has been acquiring access to student achievement data from participating states for the schools in the study in a manner that permitted making the connection of SEC teacher reports with performance data for the students in their class during the time of the study.

The evidence from this study also highlight the need to carefully analyze and specify the differences in instructional practices and content being delivered to students with disabilities as compared to instruction provided for general education students. The evidence from this study show that the specific differences are related to differences in tested achievement outcomes.

References

Blank, R., Smithson, J., Porter, A., Nunnaley, D., & Osthoff, E. (2006) Improving instruction through
school wide professional development: Effects of the data-on-enacted-curriculum model, *ERS Spectrum*, Spring.

Blank, R., (2010) Surveys of Enacted Curriculum and the Council of Chief State School Officers Collaborative, in *Research and Practice Pathways in Mathematics Education*, Tate, King, Anderson (eds), 2011, Reston, VA: NCTM, pp.21-32.

Blank, R., Smithson, J., Deeter, T., (2010) *Improving methods of aligning instruction to standards and*
assessments for English language learners and analyzing the relationship of alignment to student achievement. Final report: Iowa SEC ELL State Consortium Project, Study Conducted under a grant from U.S. Department of Education. CCSSO, Washington, DC.

Blank, R., Matthews, D., Smithson, J. (2012) *Closing the Opportunity Gap for Students with Disabilities:*
Analyzing Alignment of Instruction and Standards in English Language Arts and Mathematics, Summary Report. Kansas EAG State Consortium SEC Special Education Project (US ED grant #S368A100013) Council of Chief State School Officers, Washington, DC, December 2012.
http://www.ccsso.org/Resources/Programs/Surveys_of_Enacted_Curriculum_(SEC).html go to SECPD Online.

CCSSO (2010a) Project design prospectus: Develop instrumentation to analyze fidelity of instruction for students with disabilities in relation to standards and assessments and report on opportunity to learn and student achievement. Council of Chief State School Officers, Washington, DC, November 2010.

CCSSO (2010b) Description of SEC Content Analysis of Common Core State Standards and Initial Data Analysis Results, CCSSO SEC State Collaborative, Washington, DC.

Gagnon, J. C., McLaughlin, M. J., Rhim, L. M., & Davis, G. A. (2002). Standards-driven reform policies at the local level: Report on a survey of local special education directors in large districts. *Journal of Special Education Leadership, 15*(1), 3-9.

Kansas State Department of Education (2010) Project proposal: Develop instrumentation to analyze fidelity of instruction for students with disabilities in relation to standards and assessments and report on opportunity to learn and student achievement. Proposal for Enhanced Assessment Grant to U.S. Department of Education, May 2010.

Kurz, A., Elliott, S. N., & Smithson, J. L. (2009). *Alignment of the intended, planned, and enacted curriculum in general and special education and its relation to student achievement.* Manuscript submitted for publication.

Nolet, V. & McLaughlin, M. J. (2005). *Accessing the general curriculum: Including students with disabilities in standards-based reform (2nd ed.).* Thousand Oaks, CA: Corwin Press.

Oakes, J. (1990). *Multiplying inequalities: The effects of race, social class, and tracking on opportunities to learn mathematics and science*. Santa Monica, CA: Rand.

Porter, A.C. & Smithson, J. (2001). Are content standards being implemented in the classroom? A methodology and some tentative answers. In S.H. Fuhrman (Ed.), *From the capitol to the classroom: Standards-based reform in the states.* Chicago: National Society for the Study of Education.

Porter, A. C. (2002, October). Measuring the content of instruction: Uses in research and practice. Edu*cational Researcher 31*(7), 3-14.

Porter, A. C., Blank, R. K., Smithson, J. L., & Osthoff, E. (2005). Place-based randomized trials to test
the effects on instructional practices of a mathematics/science professional development program for teachers. *The Annals of the American Academy of Political and Social Science, 599*(1), 147–175.

Quenemoen, R., Thurlow, M., Moen, R., Thompson, S., & Morse, A. B. (2003). Progress monitoring in an inclusive standards-based assessment and accountability system (Synthesis Report 53). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Roach, A. R., Namisi-Chilungu, E., LaSalle, T. P., Talapatra, D., Vignieri, M. J., & Kurz, A. (2009). *Alternate assessment based on modified achievement standards: Opportunities and options for facilitating and evaluating access to the general curriculum for students with disabilities*. Manuscript submitted for publication.

Schmidt, W.H., McKnight, C.C., Valverde, G.A., Houang, R.T., & Wiley, D.E. (1996). *Many visions, many aims: A cross-national investigation of curricular intentions in school mathematics.* Analysis of TIMSS Data. Boston: Kluwer Academic Publishers.

Smithson, J., & Blank, R. (2006). Indicators of quality of teacher professional development and

instructional change using data from surveys of enacted curriculum: Findings from NSF MSP-RETA project. Washington, DC: Council of Chief State School Officers. Retrieved from http://jsmithson. wceruw.org/reference/indicators_tchrpd_smithson-blank.pdf

Smithson, J.L. (2009) Coding procedures for curriculum content analysis, WCER, University of Wisconsin-Madison. www.SEConline.org

Figure 1

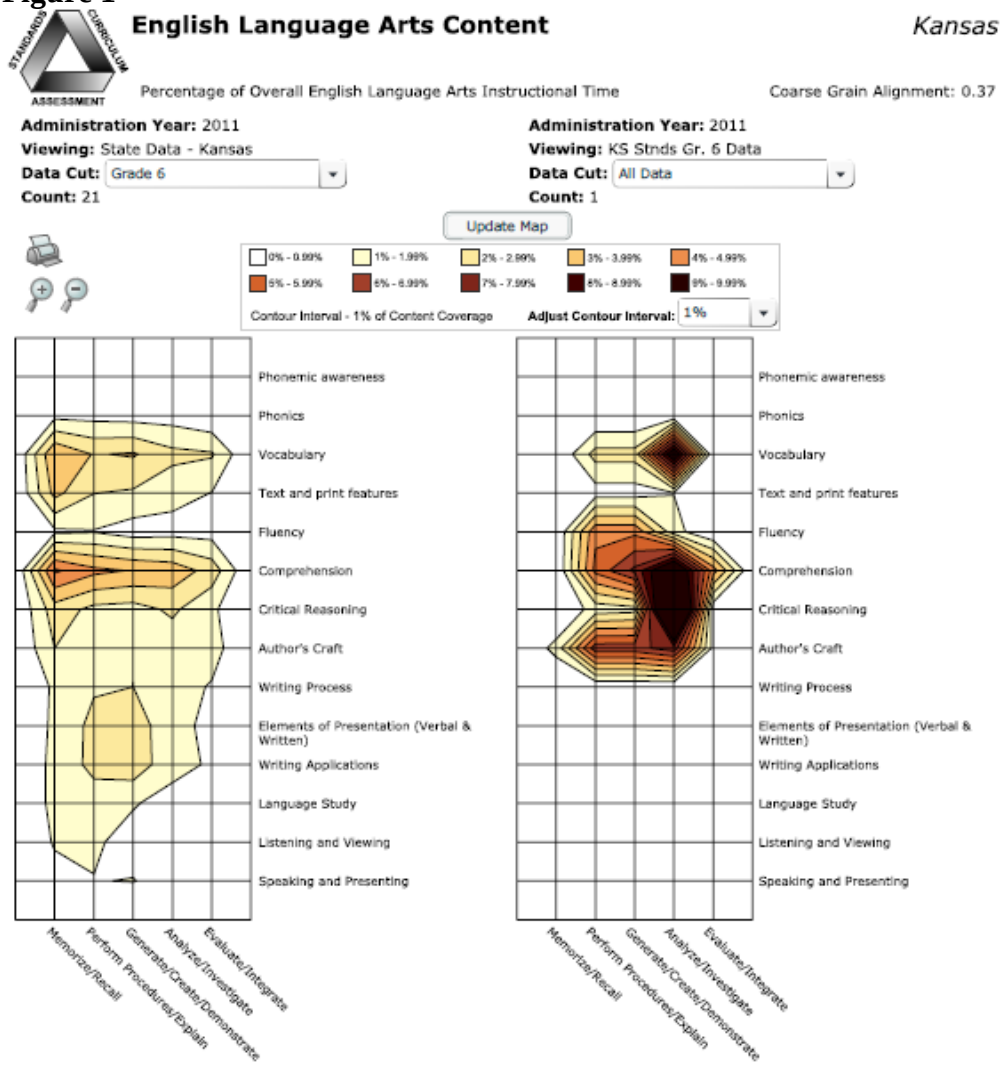


Figure 2

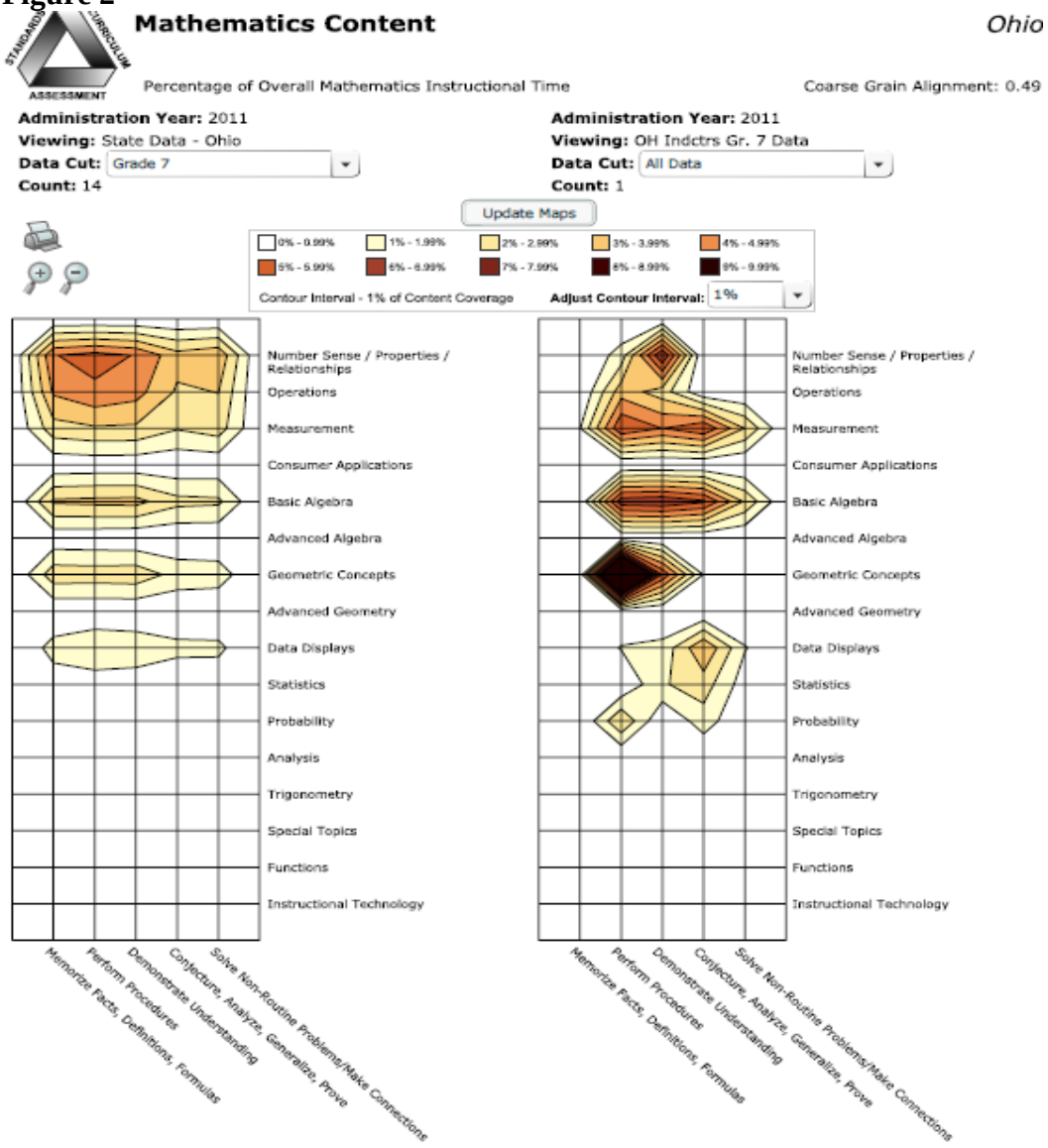
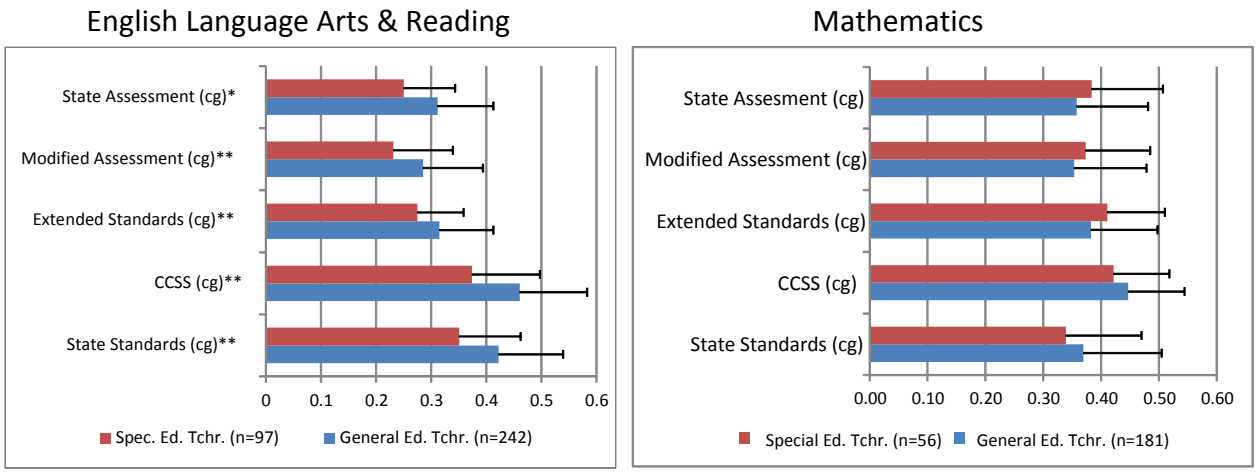
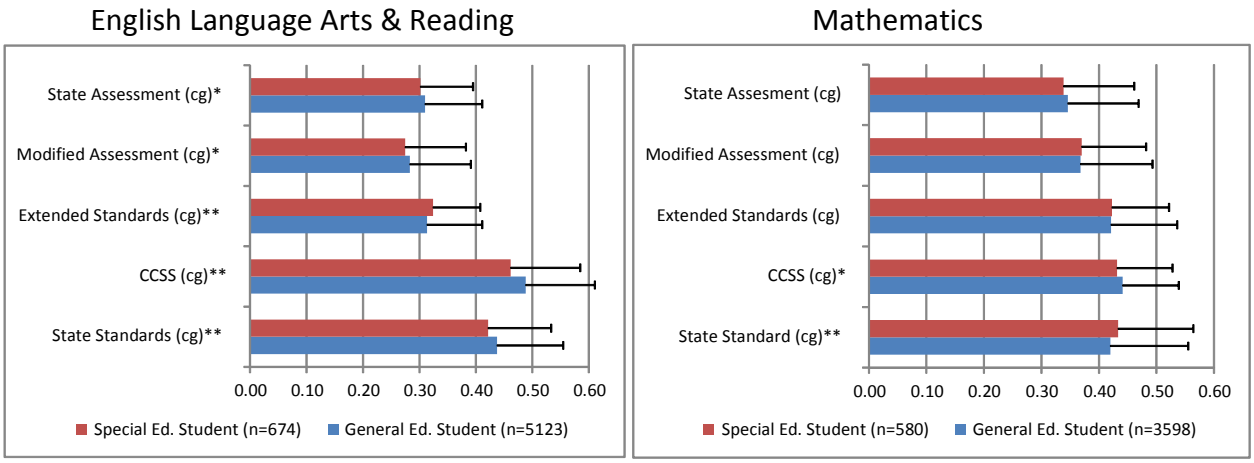

Mathematics Content
Ohio
Percentage of Overall Mathematics Instructional Time
Coarse Grain Alignment: 0.49
Administration Year: 2011
Viewing: State Data - Ohio
Data Cut: Grade 7
Count: 14
Administration Year: 2011
Viewing: OH Indctrs Gr. 7 Data
Data Cut: All Data
Count: 1
Update Maps
0% - 0.99%
1% - 1.99%
2% - 2.99%
3% - 3.99%
4% - 4.99%
5% - 5.99%
6% - 6.99%
7% - 7.99%
8% - 8.99%
9% - 9.99%
Contour Interval - 1% of Content Coverage
Adjust Contour Interval: 1%
Number Sense / Properties / Relationships
Operations
Measurement
Consumer Applications
Basic Algebra
Advanced Algebra
Geometric Concepts
Advanced Geometry
Data Displays
Statistics
Probability
Analysis
Trigonometry
Special Topics
Functions
Instructional Technology
Memorize Facts, Definitions, Formulas
Perform Procedures
Demonstrate Understanding
Conjecture, Analyze, Generalize, Prove
Solve Non-Routine Problems/Make Connections

Table 1
Instructional Alignment to Standards and Assessments by Teacher Certification



** Significant at p < 0.05* *** Significant at p < 0.01* *Whisker = 1 Standard Deviation*

Table 2
Instructional Alignment by Students' Disability Status



** Significant at p < 0.05* *** Significant at p < 0.01* *Whisker = 1 Standard Deviation*

Table 3
Mathematics Multivariate Regression Equation Explaining Student Achievement Scores

Variable	Standardized Beta Coefficient	Significance
Prior achievement	0.70	0.000
Disability status	-0.096	0.000
Economic Disadvantage	-0.069	0.000
Level of SWD inclusion	0.048	0.001
State Standard (pre-CCSSM)	0.065	0.000
CCSSM	-0.073	0.000
NCTM	0.132	0.000
Analyzing Information	0.040	0.000

English Language Arts & Reading regression equation explaining student achievement scores

Variable	Standardized Beta Coefficient	Significance
Prior Achievement	.777	.000
Disability Status	-.076	.000
Economic Disadvantage	-.065	.000
Level of SWD inclusion	.045	.000
State Standard	-.178	.000
CCSS	.090	.000
State Mod. Test	.062	.000
State Ext. Standard	.030	.004
Generate Written Text	.022	.037

Appendix A

Section of SEC teacher survey—Mathematics instructional practices

AMOUNT OF INSTRUCTIONAL TIME

0 - None
1 - Little *(Less than 10% of instructional time for the school year)*
2 - Some *(10-25% of instructional time for the school year)*
3 - Moderate *(26-50% of instructional time for the school year)*
4 - Considerable *(More than 50% of instructional time for the school year)*

How much of the mathematics instructional time in the target class do students use to engage in the following tasks?		*None*	*Little*	*Some*	*Moderate*	*Considerable*
IP.1	Listen to the teacher explain, or observe the teacher demonstrate or model a math procedure or solve a problem	⓪	①	②	③	④
IP.2	Read and comprehend mathematics information from multiple sources	⓪	①	②	③	④
IP.3	Collect, summarize, and/or analyze information or data from multiple sources	⓪	①	②	③	④
IP.4	Present or demonstrate to others	⓪	①	②	③	④
IP.5	Work *individually* on mathematics assignments	⓪	①	②	③	④
IP.6	Participate in whole-class discussions about mathematics	⓪	①	②	③	④
IP.7	Engage in a writing process to support arguments with evidence	⓪	①	②	③	④
IP.8	Use hands-on materials	⓪	①	②	③	④
IP.9	Work in pairs or small groups on mathematics exercises, problems, investigations, or tasks	⓪	①	②	③	④
IP.10	Engage in learning activities outside the classroom	⓪	①	②	③	④
IP.11	Use computers, calculators, or other technology to learn, practice or explore mathematics	⓪	①	②	③	④
IP.12	Maintain and reflect on a portfolio of their own work	⓪	①	②	③	④
IP.13	Practice test-taking strategies	⓪	①	②	③	④
IP.14	Take a quiz or test	⓪	①	②	③	④

Appendix B

KS EAG Consortium Project: Study Sample by State

	Districts	Schools	Teachers		
			ELA	Math	SwSCD
Kansas	3	15	63	72	11
North Carolina	5	16	86	88	23
Ohio	4	19	87	115	10

Note: The table reports the number of school districts, schools, and teachers participating in the study during 2011 to 2012. Teacher sample numbers indicate the number of teachers in grades 4-8 completing the SEC teacher survey on classroom instructional practices. Teacher survey categories = English language arts, Mathematics, and Students with significant cognitive disabilities.