Academic Curriculum for Students with Significant Cognitive Disabilities:

Special Education Teacher Perspectives a Decade After IDEA 1997

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May 2011

Author Note

Support for this research is provided by the National Alternate Assessment Center (www.naacpartners.org) a five-year project funded by the U.S. Department of Education, Office of Special Education Programs (No. H324U040001). The opinions expressed do not necessarily reflect the position or policy of the Department of Education, and no official endorsement should be inferred. An earlier version of this manuscript was presented at the 2008 annual meeting of the American Educational Research Association, New York, NY. Address for correspondence: Meagan Karvonen, Western Carolina University, karvonen@email.wcu.edu

Abstract

In response to federal requirements for general curriculum access and participation in large-scale academic assessments, states have shifted curriculum for students with significant cognitive disabilities from a primarily functional model to one that includes academics. What does academic instruction look like for students with significant cognitive disabilities, ten years after the first requirements for access to the general curriculum in IDEA 1997 and six years after the mandates for assessments of academic content knowledge in NCLB? The purpose of this paper is to present aggregated findings from a teacher self-report curriculum measure administered in five states (N = 123) during the 2006-07 academic year. Findings highlight the curricula being taught to students eligible to take alternate assessments based on alternate achievement standards; gaps in academic instruction; and differences in curricular priorities for students with varying levels of symbolic communication. While students are being taught a wide range of academic content, the most intensive instruction is still grounded in functional academic areas. There are few differences in the content taught to students with different levels of symbolic communication use, although performance expectations differ across those groups. Future researchers may wish to examine the relationships between content taught across multiple strands. Implications for professional development are discussed.

Academic Curriculum for Students with Significant Cognitive Disabilities: Special Education Teacher Perspectives a Decade After IDEA 1997

Students with significant disabilities were first included in large-scale assessment after Individuals with Disabilities Education Act (IDEA) 1997 required alternate assessments be provided for students who could not participate in typical tests, even with accommodations. While the content of alternate assessments was determined by states, IDEA 1997 also called for all students with disabilities to have access to the general curriculum. Final No Child Left Behind (NCLB) regulations stipulated that alternate achievement standards (AAS) must be aligned with a state's academic content standards, promote access to the general curriculum, and reflect the highest achievement standards possible (200.1(d), U.S. Department of Education, 2003). The content of alternate assessments based on alternate achievement standards (AA-AAS) was required to be "clearly related to grade-level content, although it may be restricted in scope or complexity or take the form of introductory or pre-requisite skills" (U.S. Department of Education, 2005, p. 26). Thus, educators charged with teaching academic content to students with significant cognitive disabilities began to identify academic content standards for the grade level in which the student was enrolled and then adapted or "extended" these content standards for instruction to meet individual students' needs.

In order for students to have the opportunity to learn the extended academic content tested through alternate assessments, teachers needed to learn how to effectively translate extended standards into meaningful instruction. Because this shift to academics represented a major curriculum change for this population (Browder, Flowers, Ahlgrim-Delzell, Karvonen, Spooner, & Algozzine, 2004), teachers needed considerable help with curriculum planning; identifying, developing, and adapting materials; and learning how to effectively teach academic skills to students with significant cognitive disabilities.

Since IDEA 1997 and NCLB, the field has made gradual progress in developing the tools to provide meaningful academic instruction for students with significant cognitive disabilities. However, there have been a number of barriers to change. Early surveys revealed that some teachers initially questioned the relevance of this grade level content for students with significant intellectual disabilities (Agran, Alper, & Wehmeyer, 2002) or did not agree that alternate assessment promoted access to the general curriculum standards (Kleinert, Kennedy, & Kearns, 1999). Further complicating this curriculum shift were (1) the lack of research-based strategies for teaching a wide range of academic content to the population (Browder, Spooner, Ahlgrim-Delzell, Harris, & Wakeman, 2008; Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006; Courtade, Spooner, & Browder, 2007); (2) a lack of understanding of academics, especially among special educators who teach students with significant disabilities (Otis-Wilborn, Winn, Griffin, & Kilgore, 2005); and (3) the need to combine academic instruction for alternate achievement standards with individual curricular priorities represented in students' Individualized Education Plans (IEPs). Teachers needed to determine how to balance the demands for academic instruction with other priorities including functional, transition, and therapeutic goals.

Combined with the results of historically low expectations for academic performance (e.g., Smith, 1999; Thompson, Thurlow, Parson, & Barrow, 2000; Ysseldyke, 2001) and some teachers' resistance to include academics in their curricular priorities (Browder, Spooner, Wakeman, Trela, & Baker, 2006), there are challenges to creating instruction related to what is assessed in AA-AAS. To help overcome some of these challenges, numerous resources emerged to help teachers learn how to create opportunities for students to access the general curriculum (cf. Clayton, Burdge, Denham, Kleinert, & Kearns, 2006). Textbooks for preservice educators, which historically included minimal content on functional academic skills, were revised to expand coverage of academics (e.g., Browder & Spooner, 2006; Ryndak & Alper, 2003; Snell & Brown, 2006). In addition, federally-funded research and technical assistance projects focused on developing resources and methods for current teachers (see http://www.cast.org/policy/ncac/index.html, http://www.ihdi.uky.edu/ilssa/, http://education.uncc.edu/access/). However, the availability of resources alone does not guarantee teachers have developed and effectively implemented curricula that create access to academics using high-quality instructional methods. Even with updated textbooks, preservice teacher education programs may not have revised certification/licensure courses in such a way that adequately prepared teachers to teach academics to students who take AA-AAS. Evidence of this potential shortcoming has emerged from studies on new special education teachers. For example, Pogrund and Wibbenmeyer (2008) wrote that even though teachers of students with visual impairments should teach using the core curriculum, special educators training to teach that population of students do not have expertise to do so. In addition, Boe, Shin, and Cook (2007) found a significant difference between the reports of first year special and general education teachers on how well prepared they felt to teach the assigned subject matter. This information confirms the findings of Otis-Wilborn et al. (2005) who studied the perceptions of beginning special education teachers regarding the achievement of the principles and practices outlined in IDEA 1997. One barrier identified in the study was the special education teacher's knowledge of the general education curriculum. The special education teachers reported being unprepared to teach the general education content they were being asked to teach.

One issue related to who is providing the instruction is the context in which a student receives instruction. Soukup, Wehmeyer, Bashinski, and Bovaird (2007) studied the degree which students with development and intellectual disabilities have access to the general curriculum and whether there was a relationship between inclusion status (low, medium, or high) and other classroom variables and access to the general curriculum. Results indicated that students who spent more than half the day in a general education setting (i.e., the medium and high inclusion groups) had more access to the general curriculum and spent more time working on grade level standards versus content standards from any grade level. However, students in the low inclusion group tended to work on IEP goals more often than students in the medium and high inclusion groups. In addition, results indicated that inclusion status was a significant predictor of access to the general curriculum. The authors stated that "inclusion in the general classroom is … a necessary but not sufficient step to promoting access" (p. 118).

Since inclusion rates remain relatively low (Smith, 2007), the reality for many teachers is that they are still responsible for providing academic instruction in non-inclusive settings. Research exists that suggests that students may not need to be in the general classroom setting to receive general curriculum access. Browder, Karvonen, Davis, Fallin, and Courtade-Little (2005) found that special education teachers who taught in self-contained classrooms could be trained to use instructional practices that promoted access to the general curriculum and improved student outcomes on alternate assessments. Browder, Trela, and Jimenez (2007) used a 25 step task analysis to engage middle school students in self-contained classrooms in age appropriate literature. Students in this study increased their independent responding related to vocabulary, comprehension and phonetic skills. In another recent study, students with moderate disabilities in a self-contained classroom were taught to use a nine step task analysis to solve algebraic equations (Jimenez, Browder, & Courtade, 2008). As IEP teams continue to use a continuum of settings when determining least restrictive environment, students in *all* settings will need teachers who are trained to provide sufficient access to the general curriculum, and specifically, meaningful instruction in grade-level content standards.

Regardless of instructional setting, teacher acceptance of academic curriculum remains important for this population, as access to academic content is associated with student performance on alternate assessments (Karvonen & Huynh, 2007; Roach & Elliott, 2006). This population remains, however, very diverse. For example, one of the issues that may influence the degree of access for students is their level of communication for engaging in and responding to general curriculum content. Browder, Flowers, and Wakeman (2008) studied whether or not teachers could describe the population of students they served who participated in the AA-AAS using three descriptors: presymbolic (i.e., those who rely primarily on nonsymbolic communication such as the use of objects or representations combined with picture and written word support in concrete contexts [e.g., presenting a cup for a drink]), concrete symbolic (i.e., those who need symbols to have immediate referents such as pictorial symbols or photographs combined with written words used to refer to everyday objects or events), or abstract symbolic (i.e., those who can communicate with signs and symbols including some written text that may not need an immediate referent). Outcomes of the study demonstrated that all teachers could accurately describe their students using the 3 levels. This variability within the population based upon communication levels was also reported by Towels-Reeves, Kearns, Kleinert, and Kleinert (2009). The authors surveyed teachers in three states who reported that students in their classroom participating in the AA-AAS used written words or signs (average of 66%), or pictures and objects (average of 20%) to communicate or had no clear communication mode (average of 9%). The diversity within the level of symbol use demonstrates that one size does not fit all in creating access to the general curriculum for this population of students.

There is little research on what teachers of students with significant cognitive disabilities are currently teaching from the general curriculum content to this population. In addition, there appears to be no information about the priorities or patterns within that instruction. For example, as teachers are familiar with academic skills founded in a functional or daily living domain such as counting money, telling time and sight words, it is important to determine what, if any, relationship exists within the academic content strands for what is being taught to students. Are teachers teaching standards that relate only to functional or daily living skills? Do teachers who teach standards within the strands of Language also teach standards within Composition or Media? The connections teachers make across strands have implications for the development of integrated instruction that bridges between familiar and new content. To see how federal mandates have translated into classroom practice after 10 years, the current study investigated the breadth and depth with which academics were being taught to students with significant cognitive disabilities in five states. The purpose of this paper is to identify the English language arts (ELA), math, and science curriculum taught to students who are eligible to take AA-AAS. Specific questions guiding this study include:

1. What academic curricula do teachers teach to students who are eligible to take alternate assessments based on alternate achievement standards? Where do gaps in academic instruction still exist?
2. What curricular and instructional methods and materials do teachers use to teach academic content to this population?
3. Are there differences in the patterns of enacted curriculum for students who have varying levels of pre-symbolic and symbolic communication?
4. Are there relationships between what is taught across strands (e.g., geometry, algebra, measurement) within a subject (e.g., math)?

These questions are answered using aggregated data from teacher self-reported curriculum measures administered in five states during the 2006-07 academic year.

Methods

States and Participants

Samples of teachers from five states took the short version of the Curriculum Indicators Survey (CIS; Karvonen, Wakeman, Browder, & Flowers, 2006). This group included one northwestern, two midwestern, one northeastern, and one southeastern state. These states participated in larger alignment studies of their AA-AAS systems that included the CIS as a data source. Thus, the current study is based on secondary analysis of data from these alignment studies, rather than a carefully constructed sample typically used in survey research design to maximize representativeness and generalizability to the theoretical population. Three states (State A, State D, and State E) used a performance based format for their AA-AAS; State B used a portfolio format; State C used a checklist with a body of evidence format. Two states identified assessment benchmarks or targets and three states had written extended standards (i.e., prioritized and potentially transformed standards based upon the general education standards within each state).

There were a total of 123 respondents from across the states, with the number of respondents per state ranging from 7 in the least populous state (State C) to 51 (State B). While response rates could not be calculated in all states because of the recruitment methods used, lower bound estimated response rates ranged from 2% to 29% of eligible teachers. Details about respondents' educational backgrounds, teaching experience, and professional development experiences are provided in the Results section.

Instrumentation

The Curriculum Indicators Survey (Karvonen et al., 2006) was developed to measure the enacted curriculum for students with significant cognitive disabilities who participate in alternate assessments based on alternate achievement standards. CISs have been developed in English language arts (ELA), math, and science. The CIS also assesses some information about instructional resources and professional development. The CIS has been subjected to pilot testing, expert reviews, and full field tests (Karvonen, Flowers, Wakeman, & Browder, 2007a). Validity evidence has been documented based on relationships with external curriculum measures (criterion-related) and cognitive interviews (response processes; Karvonen, Wakeman, Flowers, & Browder, 2007b). The

CIS is available in both long and short forms, which may be used depending upon the "grain size" at which stakeholders prefer to receive information. In the current analysis, results are based on the short forms (27 items in ELA, 16 items in math, 21 items in science).

Part 1 of the CIS asks for background information on the teacher (e.g., educational experience, characteristics of case load, instructional influences). In Part 2, teachers provide information about the types of students on their case load, based on students' levels of symbolic communication. They are then asked to select a single student on their case load who will serve as the "target student" for the remaining three parts of the survey. Teachers were instructed to choose a student who was participating in an alternate assessment based on alternate achievement standards (AA-AAS) that year, and whose disability or health had not caused them to be absent for significant parts of the year. Beyond those two criteria, teachers were free to choose any student on their case load.

Parts 3-5 measure the English language arts, math, and science curriculum being taught to the target student during the current academic year. For each academic skill taught, teachers rate three pieces of information:

(1) intensity of coverage of the topic, rated on a scale from 0 (none) to 4 (systematic and intensive, such as daily or nearly daily for the entire year). Teachers could also rate the topic as "planned," meaning they intended to teach it to the target student that year, but had not yet begun doing so when the survey was completed. Not knowing how successful teachers had actually been in reaching their goals for the student, we treated "planned" responses as "0" in the current analysis. Each topic contained a core concept, followed by parenthetical examples of content associated with that concept. Parenthetical examples were drawn from the long version of the CIS and evaluated by content experts as (1) representative of the items and (2) most likely to be familiar to

teachers of students with significant cognitive disabilities. During the alignment studies from which these survey responses were drawn, each state's content standards were linked to the CIS strands by teams of general education content experts in order to confirm that the CIS contents matched state standards, regardless of how each state organized its standards.

(2) highest performance expectation (depth of knowledge, or DOK) of the student on the topic that year. DOK is rated on a 6-point scale that was adapted from Bloom's taxonomy (described in Tileston, 2004) to extend downward for greater sensitivity to the cognitive demand typical of instruction for students with significant cognitive disabilities. The upper end of Bloom's taxonomy was then collapsed in order to reduce response burden, for a final scale ranging from 1 (attend, vocalize, gesture) to 6 (analyze, synthesize, evaluate).

(3) the grade level or band from which activities, materials, and contexts have been adapted for instruction on that skill.

Sample items from the CIS are provided in Figure 1.

The final section in Parts 3-5 consists of a list of instructional methods that teachers rate in two ways. First, teachers indicated on a 5-point scale the range of hours per week the instructional method or best practice activity for this population was used in that subject area with the target student. Response options were *none* (0 hours), *little* (1 hour or less), *some* (2-4 hours), *moderate* (5-7 hours), and *considerable* (8 or more hours) in the past week. If the target student received instruction with that method to any degree (i.e., more than 0 hours), the teacher also rated the level of performance expected of the student using that instructional method or best practice activity on the following scale: *no participation, passive participation, active participation with supports, independent active participation*.

			Intensity of Coverage Indicate here if planned for later this year						Highest Performance Expectation						Grade Level
Item	LANGUAGE	NO													
A1	Discussion (discussion rules, group interactions)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	B
A2	Questioning, Listening, and Contributing (class discussion contributions, gathering information)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	3
A3	Oral Presentation (presentation elements and techniques, presentation preparation)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	

Note: The rating of P for intensity of coverage stands for Planned and the ratings of highest performance expectations are A= Attention; MR= Memorize/Recall; P= Performance; C= Comprehension; APP= Application; and ASE= Analysis/Synthesis/Evaluation.

Figure 1. Sample CIS items from English language arts survey.

This paper incorporates some data related to teacher and student backgrounds from Parts 1 and 2 of the survey, but primarily focuses on the academic content in Parts 3-5. Responses to items from Part 2 of the survey were used to categorize students based on their level of symbol use in communication: presymbolic, concrete symbolic, and abstract symbolic. For this research, we used symbolic communication level rather than disability label because disability categories are not descriptive and finite enough to accurately describe how a student accesses information in the practical terms needed for planning instruction. For example, it would be difficult to accurately pinpoint how a student who has been given the label of autism would interact with academic content due to the heterogeneous abilities of students who qualify for special education services under that disability label. Symbolic level does not imply cognitive ability as students may demonstrate advanced understanding once assistive technology becomes accessible. Also, symbolic level is not static, but may change as students learn symbol use. In addition, all students need the opportunity to learn with pictures, text, and other symbols whatever their current communicative status.

Data Collection Procedures

CISs were completed in each cooperating state within the context of each state's alternate assessment alignment study. Precise procedures for recruiting teachers varied by state, but in most cases recruitment and informed consent information was distributed via email to distribution lists that included eligible teachers (i.e., those who administered at least one alternate assessment based on alternate achievement standards in 2006-07), testing coordinators, and administrators. Surveys were made available in each state for approximately 2-3 weeks. The first state participated in December 2006 and the last state's completion window was in May 2007. Gift cards with small monetary value that varied by the states' wishes (e.g., all teachers who participated receiving a $10 card versus 10 teachers selected randomly to receive a $25 dollar card) were provided as an incentive for teachers to complete all parts of the survey. Participants viewed two online training videos prior to completing the surveys. One video provided an orientation to the instrument and how to take it online, while the other provided detailed training examples to help teachers calibrate their understanding of the three rating scales (intensity, performance expectation, and grade level). An easily-printed reference guide was provided for the intensity and DOK scales in order to help teachers keep the definitions of each anchor point in mind while completing the survey. Surveys were administered online and all data were automatically stored in a database.

Data Analysis Procedures

To answer the first research question (what is taught and where are the gaps), we calculated the frequency and percent of target students who reportedly received instruction in each content area at any level of intensity (ranging from slight to intensive). Items rated as "planned" were excluded from the study. To better identify the content that was given greater emphasis, the frequency and percent of target students to whom the content was taught at 'sustained' or 'intensive' levels (i.e., ranging from 21 times per year to daily instruction) was also calculated (i.e., high frequency). High-frequency and overall rates were compared at the item and strand (i.e., group of items) levels.

Curricular and instructional practices used within each subject area (question two) were summarized using frequencies and percentages for each item in all three subject areas. The frequency scale was collapsed to three points (0 hours, 1-4 hours, or 5 or more hours) due to space considerations. Grade level adaptations of activities, materials, and contexts were summarized according to the frequency and percent of respondents adapting from each grade band (preK-2, 3-5, 6-8, 9-12) for at least one strand in a subject area.

The third question (patterns in content across levels of symbolic communication) was answered by examining both the distribution of content across the strands within a subject, and the distribution of DOK at which the content was taught within each strand. Tables summarizing content by DOK were constructed separately for students at each level of symbolic communication. Chi-square was used to determine whether the proportional coverage of each strand was statistically significantly different across the three levels of communication. No inferential tests were conducted on the distributions of DOK.

Correspondence between coverage of content in strands within the same subject area (question four) was explored by creating total coverage scores for each strand. Total coverage scores were weighted totals based on the intensity of coverage responses to items within the strand (4 = intensive, 3 = sustained, 2 = moderate, 1 = slight, 0 = none or planned). For example, a teacher who rated one item within a strand as intensive, two items as sustained, and one as slight, would have a total coverage score of 12 (4 + 6 + 2) for that strand. Pearson's correlation coefficients were calculated for each pair of strands within the subject area. Inter-strand correspondence was explored only for ELA and math, as science content is traditionally taught with a narrow focus that varies by grade level.

Results

Teacher and Student Characteristics

The majority of the 123 respondents were female (89%) and held a Master's degree (65%). Thirty-eight percent (38%) of respondents had 10 or fewer years of teaching experience, while one-third of teachers had between 11-20 years of teaching experience (37%). The remaining respondents had 21-30 years of experience (20%) or more than 30 years (6%).

Respondents were asked to indicate the grade levels at which they taught in 2006-07. Seventeen percent (17%) taught pre-kindergarten through second grade; 35% of teachers taught third through fifth grade; 36% taught sixth through eighth grade; and 32% of teachers taught ninth through twelfth grade. (Some teachers taught students from more than one grade band.) Teachers also varied in how many students were in their class or on their caseload in 2006-07. Fifteen percent (15%) of teachers had between 3 and 5 students; 33% had between 6 and 8 students; 20% had between 9 and 11 students; 13% had between 12 and 15 students; and 19% of teachers had more than 15 students in their class or on their caseload. Although teachers did not answer a question directly about their instructional settings, some information about teaching assignment was included in their job titles. Of the 123 respondents, 16.3% described themselves as teachers in self-contained settings and 9.8% were based in resource classes. Two resource teachers and one additional teacher (2.4% total) also indicated they did inclusion work. Nine teachers (7.3%) described themselves as teachers of life skills, and the remaining 65% provided job titles that did not explain instructional setting.

Almost all respondents (98%) were certified to teach in special education. A small minority of teachers held a teaching license with a concentration in ELA/Reading (13%), Mathematics (9%), or Science (5%). Other certifications held by teachers in the current study were Elementary Education (49%), Middle Education (17%), Secondary Education (11%), and National Board of Professional Teaching Standards (3%).

Responding teachers received varying degrees of professional development in ELA, math, and science content standards and instructional strategies (see Table 1). The majority of teachers reported receiving 0-3 hours of professional development related to science in 2006-07 (82% in instructional strategies, 76% in content standards), and more than half participated in 0-3 hours of development related to math (53% in instructional strategies, 54% in content standards). In contrast, 72% reported receiving four or more hours of professional development in ELA instructional strategies that year, and 63% received at least four hours of training in ELA content standards.

Characteristics of the student population included in the current study were also diverse. The students that teachers chose as their focus for the survey tended to be identified as having abstract

Table 1

Teachers' Professional Development Activities During the 2006-07 School Year (N = 121)

	ELA/Reading				Mathematics				Science			
Hours Engaged in Activities	Instructional Strategies		Content Standards		Instructional Strategies		Content Standards		Instructional Strategies		Content Standards	
0 - 3	34	28%	45	37%	64	53%	65	54%	99	82%	92	76%
4 - 10	34	28%	34	28%	31	26%	29	24%	7	6%	13	11%
11 - 20	18	15%	14	12%	11	9%	11	9%	9	7%	9	7%
21 - 30	14	11%	16	13%	4	3%	7	6%	3	3%	3	3%
31 or more	21	17%	12	10%	11	9%	9	7%	3	3%	4	3%

symbolic communication (75%), followed by presymbolic (14%) and concrete symbolic (11%). Teachers identified the target students as being enrolled in pre-kindergarten to second grade (4.6%), third through fifth grade (26.9%), sixth through eighth grade (36.1%), ninth through twelfth grade (30.6%), and no grade assigned (1.9%). Table 2 summarizes the communication levels reported by grade band.

Table 2

Communication Levels by Grade Band (N=108)

	Communication Level							
Grade Band	Presymbolic		Concrete Symbolic		Abstract Symbolic		Total	
pk - 2	1	0.9%	2	1.9%	2	1.9%	5	4.6%
3 - 5	4	3.7%	4	3.7%	21	19.4%	29	26.9%
6 - 8	6	5.6%	4	3.7%	29	26.9%	39	36.1%
9 - 12	4	3.7%	1	0.9%	28	25.9%	33	30.6%
None	0	0.0%	1	0.9%	1	0.9%	2	1.9%
Total	15	13.9%	12	11.1%	81	75.0%	108	100.0%

The sample of target students was also characterized by their classification of Individuals with Disabilities Education Act (IDEA) disability label for descriptive purposes. More than two-thirds (70%) had a primary label of mental retardation. Twenty-nine percent had a primary label of autism or multiple disabilities, while 24% had a primary label of speech/language impairments. About one-tenth had a primary label of orthopedic impairments (12%) or other health impairments (9%). All other IDEA categories were represented as less than 6% of the sample with the exception of deaf-blindness (0%).

Content Taught and Gaps in Coverage

English language arts. The breadth of ELA curriculum was examined both in terms of overall coverage (i.e., ranging from slight to intensive) and high-frequency coverage (i.e., sustained or intensive) to identify areas of emphasis. Table 3 and Figure 2 provide a summary of ELA coverage.

Table 3

Teachers Reporting Instruction in Specific Content Areas for ELA (N=117)

Content	*Overall*		*High-Frequency*	
	n	%	n	%
Language				
Discussion	104	88.9	84	71.8
Questioning, Listening, and Contributing	107	91.5	82	70.1
Oral Presentation	83	70.9	25	21.4
Vocabulary and Concept Development	95	81.2	56	47.9
Structure and Origins of Modern English	71	60.7	35	29.9
Formal and Informal English	61	52.1	25	21.4
Reading and Literature				
Beginning Reading	102	87.2	84	71.8
Understanding a Text	101	86.3	70	59.8
Making Connections	82	70.1	31	26.5
Genre	78	66.7	25	21.4
Theme	67	57.3	19	16.2
Fiction	92	78.6	43	36.8
Nonfiction	93	79.5	45	38.5
Poetry	72	61.5	13	11.1
Style and Language	63	53.8	12	10.3
Myth, Traditional Narrative, and Classical Literature	53	45.3	8	6.8
Dramatic Literature	48	41.0	6	5.1
Dramatic Reading and Performance	49	41.9	7	6.0
Composition				
Writing	93	79.5	67	57.3
Consideration of Audience and Purpose	59	50.4	15	12.8
Revising	60	51.3	18	15.4
Standard English Conventions	77	65.8	62	53.0
Organizing Ideas in Writing	75	64.1	37	31.6
Research	51	43.6	5	4.3
Evaluating Writing and Presentations	35	29.9	5	4.3
Media				
Analysis of Media	48	41.0	4	3.4
Media Production	56	47.9	6	5.1

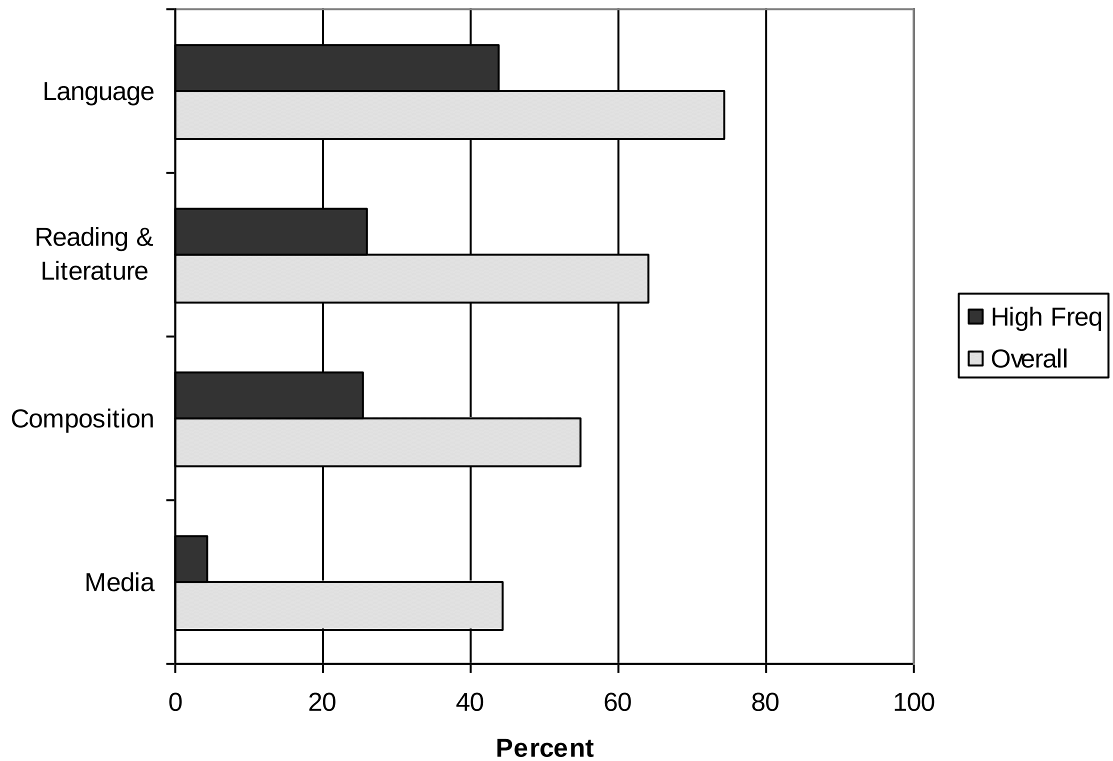

Figure 2. Comparisons of overall and high frequency ELA instruction, by strand.

According to teacher reports, the most frequently taught content in the *Language* strand occurred in the content area of "Questioning, Listening, and Contributing" (91.5%), followed by "Discussion" (88.9%) and then "Vocabulary and Concept Development" (81.2%). For *Reading*, the most frequently taught content was "Beginning Reading" (87.2%), "Understanding a text" (86.3%), and "Nonfiction" (79.5%). Under *Composition*, teachers focused most on "Writing" with 79.5% of teachers reporting teaching this content to the target student. In general, the *Media* strand was taught at a lower rate than other strands, but most ELA content was taught at fairly high rates across the sample of target students.

When restricted to the high-frequency responses, clearer priorities within ELA content emerged. The most frequently taught content included "Beginning Reading" (72%), "Discussion" (72%), and "Questioning/Listening/Contributing" (70%). Only three other topics ("Understanding

Text", "Writing", and "Standard English Conventions") were intensively taught to more than half of the target students. Several topics, including certain "Genres of Literature", "Research and Evaluation in Writing", and "Media", were rarely taught, suggesting these topics were not prioritized in the target students' curricula that year.

Math. The breadth of math curriculum was examined both in terms of overall coverage (i.e., ranging from slight to intensive) and high-frequency coverage (i.e., sustained or intensive) to identify areas of emphasis. The coverage of topics within the five math strands is summarized in Table 4 and Figure 3.

Table 4

Teachers Reporting Instruction in Specific Content Areas for Math (N=115)

	Overall		*High-frequency*	
Content	n	%	n	%
Number Sense and Operations				
Number Sense	98	85.2	83	72.2
Operations	74	64.3	59	51.3
Computation and Estimation	72	62.6	41	35.7
Patterns, Relations, and Algebra				
Patterns, Relations, and Functions	91	79.1	55	47.8
Algebra	39	33.9	11	9.6
Relationships and Mathematical Models	55	47.8	15	13.0
Variables and Change	26	22.6	4	3.5
Geometry				
Characteristics of Geometric Shapes	81	70.4	37	32.2
Spatial Relationships/ Coordinate Geometry	46	40.0	8	7.0
Transformation/Symmetry	46	40.0	4	3.5
Visualization/Spatial Reasoning/Geometric Modeling	52	45.2	9	7.8
Measurement				
Measurement Tools	94	81.7	68	59.1
Concepts and Attributes of Measurement	85	73.9	32	27.8
Formulas of Measurement	38	33.0	9	7.8
Data Analysis, Statistics, & Probability				
Data and Statistics	56	48.7	11	9.6
Probability	42	36.5	8	7.0

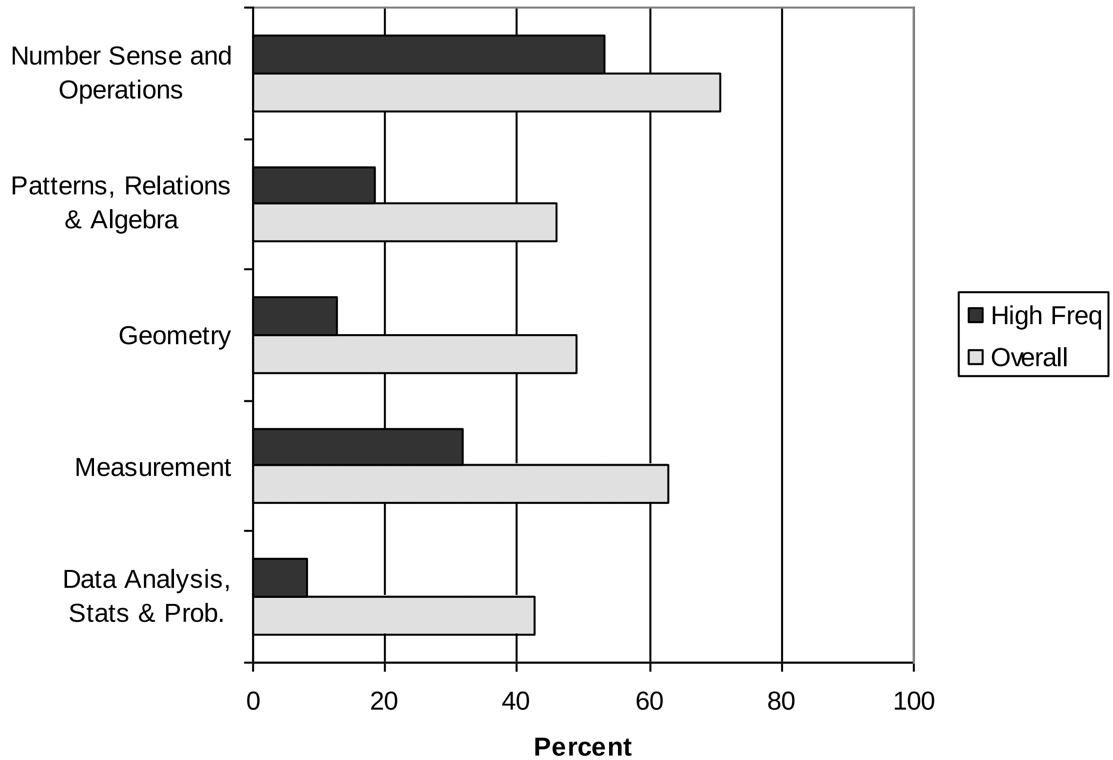

Figure 3. Comparisons of overall and high frequency math instruction, by strand.

In general, *Number Sense and Operations* and *Measurement* had higher rates of endorsement across topics than the other strands. Overall, the most frequently reported topic of instruction for *Number and Sense Operations* was "Number Sense" with 85.2% of teachers reporting they taught this content area. For *Patterns, Relations, and Algebra*, the most frequently taught topic was "Patterns, Relations, and Functions" (79.1%) and in *Geometry*, "Characteristics of Geometric Shapes" was the most frequently taught (70.4%). For *Measurement*, teachers focused most on "Measurement Tools" (81.7%). "Data and Statistics" within the *Data Analysis, Statistics, and Probability* strand was the more frequently taught topic within its category (48.7%).

When narrowed to the content taught with high frequency, the priorities appeared to be in "Number Sense" (72%), "Measurement Tools" (59%), "Operations" (51%), and "Patterns, Relations and Functions" (48%). Half of the topics were taught with high frequency to fewer than 10% of the target students.

Science. The breadth of science curriculum was examined both in terms of overall coverage (i.e., ranging from slight to intensive) and high-frequency coverage (i.e., sustained or intensive) to identify areas of emphasis. Table 5 and Figure 4 provide a summary of science coverage.

Table 5

Teachers Reporting Instruction in Specific Content Areas for Science (N=115)

Content	*Overall*		*High-frequency*	
	n	%	n	%
Earth And Space Science				
Structure and energy in the Earth's system	87	75.7	37	32.2
History, origin, and evolution of the earth and the universe	34	29.6	4	3.5
Earth, the Solar System, and objects in the sky	59	51.3	13	11.3
Life Science (Biology)				
Characteristics of organisms	78	67.8	26	22.6
Life cycles of organisms	58	50.4	9	7.8
Organisms and environments, populations, and ecosystems	67	58.3	9	7.8
Cellular and molecular basis of life	35	30.4	5	4.3
Reproduction/heredity, diversity, adaptations, evolution	34	29.6	5	4.3
Regulation and behavior of organisms	50	43.5	6	5.2
Matter, energy, and organization in living systems	48	41.7	7	6.1
Personal and Community Health	84	73.0	32	27.8
Physical Science (Chemistry & Physics)				
Properties of matter	68	59.1	23	20.0
Chemical and physical changes in matter	49	42.6	11	9.6
Motion and forces	35	30.4	5	4.3
Energy	53	46.1	12	10.4
Atomic theory	11	9.6	0	0.0
Technology/Engineering				
Materials and Tools	61	53.0	22	19.1
History/Nature of Science				
Science as a human endeavor	25	21.7	1	0.9
Nature of science	45	39.1	3	2.6
History of science	19	16.5	0	0.0
Science as Inquiry				
Understanding of / abilities necessary to do scientific inquiry	61	53.0	7	6.1

According to teacher reports, the most frequently taught content in the *Earth and Space Science* strand was "Structure and energy in the Earth's system" (75.7%). For *Life Science*, the most frequently taught topic was "Personal and community health" (73%), followed by "Characteristics of organisms" (67.8%). Under *Physical Science*, the most frequently taught topic was "Properties of matter" (59.1%).

Slightly more than half of the target students received instruction in the *Technology/Engineering* and *Science as Inquiry* strands. Endorsement of items under *History and Nature of Science* was generally lower (16.5% - 39.1%) compared with other strands.

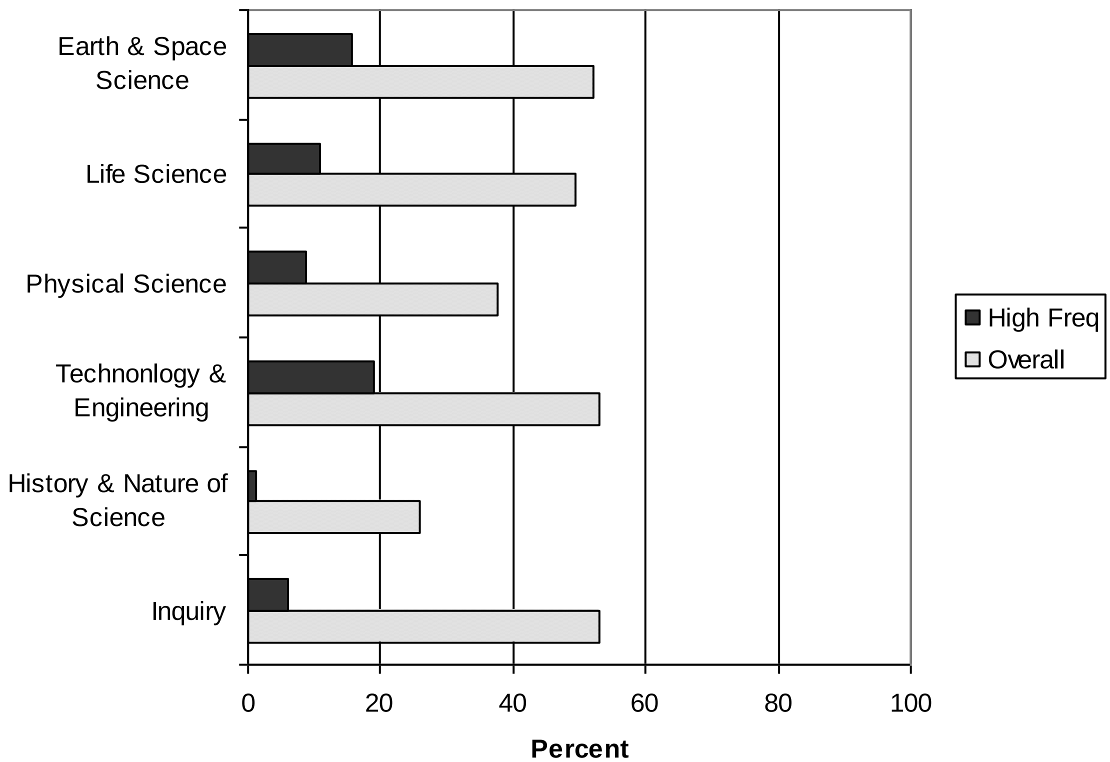

Figure 4. Comparisons of overall and high frequency science instruction, by strand.

When restricted to the high-frequency responses, the rates at which science content was taught decreased considerably. None of the topics in any strand was taught intensively to more than one-third of the target students. For two-thirds of the items, the content was taught with high frequency to fewer than 10% of the students. Thus, while a broad range of science was taught to some degree, very little science was emphasized through frequent or daily instruction.

Curricular and Instructional Methods and Materials

Results for this question included information related to grouping arrangements for students, the pivotal skill or purpose within the activity, or the expectation of performance within instruction. The grade bands from which materials, activities, and contexts were adapted in each subject are also reported.

English language arts. Use of practice was examined for hours of instruction in the past week and the level of participation expected by the students in ELA. Results are presented in Table 6. Teachers rated indicators of best practice for this population (e.g., demonstrate skills in repeated opportunity/direct instruction trials, practice skills in a different setting and with a variety of similar materials, receive instruction with prompts or scaffolded support) as part of their instruction (at least one hour within the week) at a higher percentage than those activities that may be more common for students without significant cognitive disabilities (e.g., taking a test, engaging in a speech or presentation, using a work center, learn to use resources).

If teachers indicated they spent one or more instructional hours during the week using the practice, they were asked to rate the expected level of participation of students within that practice. Surprisingly, at least one teacher rated "none" for level of participation for each of the 18 practices. In addition, the practice and the level of participation indicated by some teachers were at times contradictory. For example, the practices of "practice skills in different setting" and "perform assessment skills for data collection/grading" were rated by 31% of the teachers as either none or passive levels of participation. In contrast, teachers overwhelming rated the practices considered to be best practice for this population as either "active with supports" or "active independent" (range of 69% to 90%).

Table 6

ELA Instructional Activity Time in Past Week and Expected Level of Target Student Participation (N= 115)

	Hours of instructional activity in past week n (%)			Level of participation[a] n (%)			
	0	1-4	≥ 5	N	P	AS	AI
Receive individualized instruction	4 (3.5)	43 (37.4)	68 (59.1)	3 (2.7)	11 (9.9)	85 (76.6)	12 (10.8)
Receive instruction in a small group	8 (7.0)	33 (28.7)	74 (64.3)	1 (0.9)	17 (15.9)	72 (67.3)	17 (15.9)
Collect, summarize, or analyze information	31 (27.0)	65 (56.5)	19 (16.5)	16 (19.0)	30 (35.7)	36 (42.9)	2 (2.4)
Engage in writing process	25 (21.7)	52 (45.2)	38 (33.0)	6 (6.7)	12 (13.3)	67 (74.4)	5 (5.6)
Learn to use resources	38 (33.0)	65 (56.5)	12 (10.4)	9 (11.7)	26 (33.8)	39 (50.6)	3 (3.9)
Use hands-on or manipulatives	8 (7.0)	28 (24.3)	79 (68.7)	2 (1.9)	8 (7.9)	76 (71.0)	21 (19.6)
Receive instruction with prompts or scaffolded support	8 (7.0)	31 (27.0)	76 (66.1)	6 (5.6)	13 (12.1)	82 (76.6)	6 (5.6)
Use computers or other assistive technology	10 (8.7)	62 (53.9)	43 (37.4)	4 (3.8)	14 (13.3)	59 (56.2)	28 (26.7)
Work independently	17 (14.8)	79 (68.7)	19 (16.5)	15 (15.3)	16 (16.3)	42 (42.9)	25 (25.5)
Perform assessment skills for data collection/grading	32 (27.8)	60 (52.2)	23 (20.0)	13 (15.7)	16 (19.3)	43 (51.8)	11 (13.3)
Take a test	60 (52.2)	49 (42.6)	6 (5.2)	2 (3.6)	10 (18.2)	33 (60.0)	10 (18.2)
Practice skills in different setting	22 (19.1)	70 (60.9)	23 (20.0)	1 (1.1)	28 (30.1)	59 (63.4)	5 (5.4)
Practice skills with a variety of similar materials	16 (13.9)	70 (60.9)	29 (25.2)	4 (4.0)	22 (22.2)	68 (68.7)	5 (5.1)

[a] Excludes students with 0 hrs instruction. N = None, P=Passive, AS = Active with supports, AI = Active independent.

Table 6, continued

	Hours of instructional activity in past week n (%)			Level of participation[a] n (%)			
	0	1-4	≥ 5	N	P	AS	AI
Engage in read aloud activities	25 (21.7)	57 (49.6)	33 (28.7)	5 (5.6)	21 (23.3)	55 (61.1)	9 (10.0)
View multi media presentations	38 (33.0)	63 (54.8)	14 (12.2)	6 (5.1)	31 (40.3)	25 (32.5)	15 (19.5)
Engage in speech or presentation	69 (60.0)	35 (30.4)	11 (9.6)	9 (19.6)	11 (23.9)	23 (50.0)	3 (6.5)
Use work center	46 (40.0)	51 (44.3)	18 (15.7)	3 (4.3)	20 (29.0)	38 (55.1)	8 (11.6)
Learn/demonstrate skills in repeated opportunity/direct instruction trials	14 (12.2)	54 (47.0)	47 (40.9)	4 (4.0)	19 (18.8)	66 (65.3)	12 (11.9)

[a] Excludes students with 0 hrs instruction. N = None, P=Passive, AS = Active with supports, AI = Active independent.

The rates at which respondents adapted materials, activities, and contexts from each grade band for ELA instruction are described in Table 7. The highest rates of adaptation were from preK-2 (71%) or grades 3-5 (59%), followed by grades 6-8 (37%) and high school grades (13%). Totals exceed 100% because teachers reported adapting from more than one grade band.

Table 7

Frequency and Percent of Respondents Adapting Materials, Activities, and Contexts from each Grade Band in at least One Strand per Subject

	ELA (N = 117)		Math (N = 115)		Science (N = 115)	
Grade Band	n	%	n	%	n	%
preK-2	83	70.9	71	61.7	63	54.8
3-5	69	59.0	43	37.4	47	40.9
6-8	43	36.7	22	19.1	29	25.2
9-12	15	12.8	4	3.5	14	12.2

Math. Use of practice was examined for hours of instruction in the past week and the level of participation expected by the students in math. Results are presented in Table 8. A similar pattern to the ratings for ELA was found in math for the hours of instruction and level of participation. Practices identified as best practice for this population were rated more frequently as being utilized in the hours of instruction than those practices that may be more common for students without significant cognitive disabilities. While 16 of the 17 practices for math were rated as "none" for students by at least one teacher, the number of teachers indicating a level of participation as "none" or "passive" for students was reduced when compared to ELA for many of the practices (e.g., the practice of "work independently" was rated by 31 teachers at "none" or "passive" in ELA as compared to 19 teachers in math). In addition, teachers again overwhelmingly rated the practices considered to be best practice for this population as either "active with supports" or "active independent" (range of 73% to 92%). Teacher adaptation of math materials, activities, and contexts was primarily from grades preK-2 (62%) or grades 3-5 (37%; see Table 7).

Table 8

Math Instructional Activity Time in Past Week and Expected Level of Target Student Participation (N= 101)

	Hours of instructional activity in past week n (%)			Level of participation[a] n (%)			
	0	1-4	≥ 5	N	P	AS	AI
Receive individualized instruction	2 (2.0)	48 (47.5)	51 (50.5)		8 (8.1)	83 (83.8)	8 (8.1)
Receive instruction in a small or large group	12 (11.9)	32 (31.7)	57 (56.4)	1 (1.1)	14 (15.7)	66 (74.2)	8 (9.0)
Collect, summarize, or analyze information	37 (36.6)	59 (58.4)	5 (5.0)	9 (14.1)	19 (29.7)	35 (54.7)	1 (1.6)
Complete symbolic math problems	33 (32.7)	47 (46.5)	21 (20.8)	1 (1.5)	13 (19.1)	46 (67.6)	8 (11.8)
Learn to use resources	36 (35.6)	52 (51.5)	13 (12.9)	2 (3.1)	17 (26.2)	44 (67.7)	2 (3.1)
Use hands-on or manipulatives to count or solve mathematical problems	11 (10.9)	35 (34.7)	55 (54.5)	1 (1.1)	6 (6.7)	67 (74.4)	16 (17.8)
Receive instruction with prompts or scaffolded support	9 (8.9)	40 (39.6)	52 (51.5)	1 (1.1)	12 (13.0)	74 (80.4)	5 (5.4)
Use computers, calculators or other assistive technology	17 (16.8)	50 (49.5)	34 (33.7)	3 (3.6)	8 (9.5)	51 (60.7)	22 (26.2)
Work independently	26 (25.7)	57 (56.4)	18 (17.8)	4 (5.3)	15 (20.0)	38 (50.7)	18 (24.0)
Perform assessment skills for data collection/grading	35 (34.7)	51 (50.5)	15 (14.9)	8 (12.1)	13 (19.7)	40 (60.6)	5 (7.6)
Take a test	58 (57.4)	38 (37.6)	5 (5.0)	3 (7.0)	9 (20.9)	26 (60.5)	5 (11.6)
Practice skills in different setting	26 (25.7)	57 (56.4)	18 (17.8)	2 (2.7)	18 (24.0)	53 (70.7)	2 (2.7)
Rote count	28 (27.7)	50 (49.5)	23 (22.8)	5 (6.8)	7 (9.6)	43 (58.9)	18 (24.7)

[a] Excludes students with 0 hrs instruction. N = None, P=Passive, AS = Active with supports, AI = Active independent

Table 8, continued

	Hours of instructional activity in past week n (%)			Level of participation[a] n (%)			
	0	1-4	≥ 5	N	P	AS	AI
Practice skills with a variety of materials	8 (7.9)	59 (58.4)	34 (33.7)	3 (3.2)	18 (19.4)	63 (67.7)	9 (9.7)
Apply mathematical concepts to real world applications	13 (12.9)	64 (63.4)	24 (23.8)	4 (4.5)	18 (20.5)	60 (68.2)	6 (6.8)
Use work center	51 (50.5)	37 (36.6)	13 (12.9)	4 (8.0)	9 (18.0)	25 (50.0)	12 (24.0)
Learn/demonstrate skills in repeated opportunity/direct instruction trials	12 (11.9)	53 (52.5)	36 (35.6)	5 (5.6)	9 (10.1)	68 (76.4)	7 (7.9)

[a] Excludes students with 0 hrs instruction. N = None, P=Passive, AS = Active with supports, AI = Active independent.

Science. Use of practice was examined for hours of instruction in the past week and the level of participation expected by the students in science. Results are presented in Table 9. While once again all 18 practices were indicated by teachers as not being included in their weekly practices (i.e., zero hours of instruction), a large increase was found in the percentage of teachers who rated the practices in this manner (18% for "receive instruction in a small group" to 76% for " engage in speech or presentation"). While practices identified as best practice for this population were rated more frequently as being utilized in the hours of instruction than those practices that may be more common for students without significant cognitive disabilities, the difference for science was minimal. The range of percentages of teachers who rated the expected level of participation of students as either "none" or "passive" was 23% to 53%. Interestingly the practice rated as the highest for these levels of participation was "engage in inquiry processes". The percentage of teachers who rated the practices considered to be best practice for this population as either "active with supports" or "active independent" ranged from 51% ("receive individualized instruction") to

77% ("practice skills in a different setting"). As illustrated in Table 7, more than half of respondents (55%) reported adapting some science materials, activities, and contexts from the preK-2 grade band, and 41% adapted from grades 3-5. One-fourth adapted from grades 6-8 and one-eighth adapted from high school grades. (Again, teachers tended to adapt from multiple grade bands, so the totals exceed 100%).

Table 9

Science Instructional Activity Time in Past Week and Expected Level of Target Student Participation (N= 115)

	Hours of instructional activity in past week n (%)			Level of participation[a] n (%)			
	0	1-4	≥ 5	N	P	AS	AI
Receive individualized instruction	27 (24.5)	63 (57.3)	20 (18.2)	3 (3.6)	21 (25.3)	56 (48.7)	3 (2.6)
Receive instruction in a small group	20 (18.2)	60 (54.5)	30 (27.3)	2 (2.2)	23 (25.6)	61 (67.8)	4 (4.4)
Collect, summarize, or analyze information	48 (43.6)	58 (52.7)	4 (3.6)	5 (8.1)	2 (30.6)	28 (61.3)	
Engage in inquiry processes	52 (47.3)	54 (49.1)	4 (3.6)	13 (22.4)	18 (31.0)	27 (46.6)	
Learn to use resources	51 (46.4)	47 (42.7)	12 (10.9)	9 (15.3)	13 (22.0)	36 (61.0)	1 (1.7)
Use hands-on materials or manipulatives	24 (21.8)	64 (58.2)	22 (20.0)	4 (4.7)	17 (19.8)	59 (68.6)	6 (7.0)
Receive instruction with prompts or scaffolded support	25 (22.7)	62 (56.4)	23 (20.9)	3 (3.5)	17 (20.0)	63 (74.1)	2 (2.4)
Use computers or other assistive technology	47 (42.7)	49 (44.5)	14 (12.7)	2 (3.2)	13 (20.6)	40 (63.5)	8 (12.7)
Work independently	55 (50.0)	49 (44.5)	6 (5.5)	10 (18.2)	16 (29.1)	22 (40.0)	7 (12.7)

[a] Excludes students with 0 hrs instruction. N = None, P=Passive, AS = Active with supports, AI = Active independent

Table 9, continued

	Hours of instructional activity in past week n (%)			Level of participation[a] n (%)			
	0	1-4	≥ 5	N	P	AS	AI
Perform assessment skills for data collection/grading	62 (56.4)	45 (40.9)	3 (2.7)	3 (6.3)	17 (35.4)	26 (54.2)	2 (4.2)
Take a test	72 (65.5)	34 (30.9)	4 (3.6)	3 (7.9)	9 (23.7)	20 (52.6)	6 (15.8)
Practice skills in different setting	61 (55.5)	42 (38.2)	7 (6.4)	2 (4.1)	9 (18.4)	37 (75.5)	1 (2.0)
Practice skills with a variety of similar materials	46 (41.8)	56 (50.9)	8 (7.3)	5 (7.8)	12 (18.8)	47 (73.4)	
Engage in read aloud activities	48 (43.6)	52 (47.3)	10 (9.1)	7 (11.3)	19 (30.6)	34 (54.8)	2 (3.2)
View multi media presentations	59 (53.6)	43 (39.1)	8 (7.3)	3 (5.9)	19 (37.3)	25 (49.0)	4 (7.8)
Engage in speech or presentation	83 (75.5)	25 (22.7)	2 (1.8)	4 (14.8)	9 (33.3)	14 (51.9)	
Use work center	70 (63.6)	33 (30.0)	7 (6.4)	3 (7.5)	11 (27.5)	24 (60.0)	2 (5.0)
Learn/demonstrate skills in repeated opportunity/direct instruction trials	45 (40.9)	54 (49.1)	7 (6.4)	5 (7.7)	14 (21.5)	46 (70.8)	

[a] Excludes students with 0 hrs instruction. N = None, P=Passive, AS = Active with supports, AI = Active independent.

Patterns of Enacted Curriculum, by Communication Level

The third question (differences in curriculum based on level of symbolic communication) is based on matrices of content coverage by strand and DOK, constructed separately for students identified as communicating at one of the three levels (i.e., presymbolic, concrete, or abstract) previously described. The purpose of these comparisons is to determine if there are emphases or gaps unique to these groups of students.

English language arts. The distribution of ELA content at each communication level is summarized in Table 10. In general, the greatest coverage of ELA content was in the *Reading and Literature* strand for students at all three symbolic levels (ranging from 44% for abstract symbolic to 50% for concrete symbolic). Most of the remaining emphasis was in the *Language Composition* strands. There was no statistically significant difference in the distribution of ELA content coverage across strands, by communication level, χ^2 (6, N = 1664) = 9.45, p = .15. However, there was a clear pattern of differences in DOK at which the content was taught for the three groups. Frequency distributions for DOK among students with abstract symbolic communication were more evenly distributed from the attention to the application level, with a few teachers even indicating they taught content to those students at the analysis/synthesis/evaluation level. The range of DOK was narrower for students with concrete symbolic communication. The majority of students at the presymbolic level were being expected to learn their ELA content at the attention level.

Table 10

Distribution of ELA Content, by DOK and Communication Level

			Attention		*Memorize*		*Perform*		*Comprehend*		*Apply*		*An/Syn/Eval*	
	n[a]	%	n	%	n	%	n	%	n	%	n	%	n	%
Abstract Symbolic														
Language	354	26.3	45	12.7	85	24.0	109	30.8	45	12.7	64	18.1	6	1.7
Reading and Literature	594	44.2	126	21.2	177	29.8	119	20.0	91	15.3	65	10.9	16	2.7
Composition	322	24.0	39	12.1	80	24.8	117	36.3	31	9.6	47	14.6	8	2.5
Media	74	5.5	23	31.1	28	37.8	11	14.9	7	9.5	4	5.4	1	1.4
Concrete Symbolic														
Language	42	29.0	22	52.4	3	7.1	10	23.8	2	4.8	5	11.9	0	0.0
Reading and Literature	73	50.3	43	58.9	11	15.1	15	20.5	3	4.1	1	1.4	0	0.0
Composition	21	14.5	10	47.6	2	9.5	5	23.8	3	14.3	1	4.8	0	0.0
Media	9	6.2	5	55.6	1	11.1	2	22.2	0	0.0	1	11.1	0	0.0
Presymbolic														
Language	48	27.4	36	75.0	6	12.5	6	12.5	0	0.0	0	0.0	0	0.0
Reading and Literature	86	49.1	57	66.3	17	19.8	10	11.6	1	1.2	1	1.2	0	0.0
Composition	31	17.7	18	58.1	6	19.4	6	19.4	1	3.2	0	0.0	0	0.0
Media	10	5.7	8	80.0	0	0.0	2	20.0	0	0.0	0	0.0	0	0.0

[a]n = number of content items taught, calculated out of total items per strand x number of respondents

Math. The distribution of math content at each communication level is summarized in Table 11. In general, coverage of math content was relatively evenly distributed across *Number Sense and Operations, Algebra, Geometry,* and *Measurement* strands, while *Statistics and Probability* was emphasized to a lesser degree. There was no statistically significant difference in the distribution of math content coverage across strands, by communication level, χ^2 (8, N = 828) = 2.14, p = .98. However, the pattern of differences in DOK at which the content was taught for the three groups was similar to the pattern seen in ELA. Frequency distributions for DOK among students with abstract symbolic communication were more evenly distributed from the attention to the application level, with a few teachers even indicating they taught content to those students at the analysis/synthesis/evaluation level. The range of DOK was narrower for students with concrete symbolic communication. The majority of students at the presymbolic level were being expected to learn their math content at the attention level.

Table 11

Distribution of Math Content, by DOK and Communication Level

			Attention		*Memorize*		*Perform*		*Comprehend*		*Apply*		*An/Syn/Eval*	
	n[a]	%	n	%	n	%	n	%	n	%	n	%	n	%
Abstract Symbolic														
Number Sense & Ops	165	25.3	14	8.5	18	10.9	56	33.9	22	13.3	47	28.5	8	4.8
Algebra	138	21.2	30	21.7	24	17.4	44	31.9	15	10.9	21	15.2	4	2.9
Geometry	148	22.7	31	20.9	42	28.4	34	23.0	22	14.9	16	10.8	3	2.0
Measurement	141	21.7	25	17.7	21	14.9	43	30.5	13	9.2	36	25.5	3	2.1
Statistics/Probability	59	9.1	17	28.8	19	32.2	13	22.0	5	8.5	1	1.7	4	6.8
Concrete Symbolic														
Number Sense & Ops	15	21.1	6	40.0	2	13.3	4	26.7	1	6.7	2	13.3	0	0.0
Algebra	15	21.1	8	53.3	1	6.7	4	26.7	1	6.7	1	6.7	0	0.0
Geometry	16	22.5	6	37.5	2	12.5	8	50.0	0	0.0	0	0.0	0	0.0
Measurement	16	22.5	8	50.0	3	18.8	5	31.3	0	0.0	0	0.0	0	0.0
Statistics/Probability	9	12.7	3	33.3	2	22.2	2	22.2	2	22.2	0	0.0	0	0.0
Presymbolic														
Number Sense & Ops	25	23.6	13	52.0	5	20.0	7	28.0	0	0.0	0	0.0	0	0.0
Algebra	20	18.9	12	60.0	4	20.0	3	15.0	1	5.0	0	0.0	0	0.0
Geometry	24	22.6	15	62.5	6	25.0	3	12.5	0	0.0	0	0.0	0	0.0
Measurement	25	23.6	20	80.0	3	12.0	1	4.0	1	4.0	0	0.0	0	0.0
Statistics/Probability	12	11.3	11	91.7	1	8.3	0	0.0	0	0.0	0	0.0	0	0.0

[a]n = number of content items taught, calculated out of total items per strand x number of respondents

Science. The distribution of science content at each communication level is summarized in Table 12. In general, the greatest emphasis was placed on *Life Science*, followed by *Physical Science* and *Earth and Space Science*. There was no statistically significant difference in the distribution of science content coverage across strands, by communication level, χ^2 (10, N = 936) = 6.14, p = .80. The pattern of differences in DOK at which the content was taught for the three groups was similar to the other subject areas, except that the range was slightly more restricted. Distributions for DOK among students with abstract symbolic communication primarily ranged from attention to comprehension. The range of DOK was narrower for students with concrete symbolic communication (mostly attention to performance), while the expectation for students at the presymbolic level tended to be the attention level.

Table 12

Distribution of Science Content, by DOK and Communication Level

			Attention		*Memorize*		*Perform*		*Comprehend*		*Apply*		*An/Syn/Eval*	
	n[a]	%	n	%	n	%	n	%	n	%	n	%	n	%
Abstract Symbolic														
Earth/Space Science	118	16.6	22	18.6	36	30.5	18	15.3	28	23.7	11	9.3	3	2.5
Life Science	306	43.0	87	28.4	97	31.7	46	15.0	54	17.6	15	4.9	7	2.3
Physical Science	135	19.0	45	33.3	37	27.4	22	16.3	23	17.0	4	3.0	4	3.0
Tech & Eng	41	5.8	11	26.8	13	31.7	4	9.8	5	12.2	6	14.6	2	4.9
History/Nature of Sci	67	9.4	28	41.8	18	26.9	13	19.4	5	7.5	2	3.0	1	1.5
Science as Inquiry	45	6.3	15	33.3	12	26.7	9	20.0	4	8.9	3	6.7	2	4.4
Concrete Symbolic														
Earth/Space Science	21	18.9	10	47.6	5	23.8	5	23.8	1	4.8	0	0.0	0	0.0
Life Science	44	39.6	23	52.3	3	6.8	16	36.4	1	2.3	1	2.3	0	0.0
Physical Science	27	24.3	12	44.4	3	11.1	9	33.3	3	11.1	0	0.0	0	0.0
Tech & Eng	5	4.5	0	0.0	0	0.0	3	60.0	1	20.0	1	20.0	0	0.0
History/Nature of Sci	9	8.1	7	77.8	1	11.1	1	11.1	0	0.0	0	0.0	0	0.0
Science as Inquiry	5	4.5	3	60.0	0	0.0	2	40.0	0	0.0	0	0.0	0	0.0
Presymbolic														
Earth/Space Science	18	15.9	11	61.1	2	11.1	3	16.7	0	0.0	0	0.0	2	11.1
Life Science	48	42.5	37	77.1	3	6.3	8	16.7	0	0.0	0	0.0	0	0.0
Physical Science	28	24.8	19	67.9	1	3.6	7	25.0	1	3.6	0	0.0	0	0.0
Tech & Eng	7	6.2	5	71.4	0	0.0	2	28.6	0	0.0	0	0.0	0	0.0
History/Nature of Sci	6	5.3	1	16.7	2	33.3	2	33.3	0	0.0	0	0.0	1	16.7
Science as Inquiry	6	5.3	4	66.7	1	16.7	1	16.7	0	0.0	0	0.0	0	0.0

[a]n = number of content items taught, calculated out of total items per strand x number of respondents.

Relationships among Content within a Subject

The fourth research question (relationships among strands within a subject) was asked to determine if there are patterns in the content that tends to be taught to individual students. Using teachers' ratings of intensity of coverage, total scores for each strand were calculated. Pearson's correlation coefficient was used as a measure of association between each pair of strand scores. In ELA, the strongest relationships were among language, composition, and reading and literature (r = .68 to .71, $p < .001$). Media was more weakly associated with the other three strands, although the correlations were statistically significant (see Table 13).

Table 13

Correlations for Relationships among ELA CIS Strands

Content	1	2	3	4
1. Language	-	.71*	.68*	.38*
2. Reading & Literature		-	.69*	.42*
3. Composition			-	.41*
4. Media				-

*p < .001.

In math, the strongest relationships were between numbers and operations and measurement (r = .67, $p < .001$), followed by geometry with measurement (r = .59, p < .001) and geometry with algebra (r = .53, $p < .001$). Probability and statistics was generally less related to other strands (see Table 14).

Table 14

Correlations for Relationships among Math CIS Strands

Content	1	2	3	4	5
1. Number Sense & Operations	-	.42**	.47**	.64**	.12
2. Algebra		-	.53**	.27*	.37**
3. Geometry			-	.59**	.41**
4. Measurement				-	.39**
5. Statistics/Probability					-

*p < .01. ** p < .001.

Discussion

Curriculum has long been the purview of states. Rather than focus on cross-state differences in the enacted curriculum for this population, the purpose of this study was to provide a snapshot of what parts of the core academic subjects are taught to students who have only recently begun to be taught academics that link to state standards. Even in light of the study's limitations (i.e., low response rates, only five states represented, no pre-1997 baseline data), this study has the potential to provide information about what progress the field has made in shifting from primarily a functional curriculum of the 1980s and 1990s to one that includes the academic priorities required under NCLB. Thus, the goal was to understand how academic content has been addressed and identify areas in which teachers may still need assistance to help their students access a broader range of academic content.

On the whole, target students in this study received instruction in a broad range of content in each subject area. Although this study did not evaluate how ratings in each state compared with individual state standards, content experts did evaluate the match between CIS content and each state's standards. Thus, the CIS content reflected a broad range of options that might reasonably be expected to be taught across the five states, even if named or organized differently from each state's content standards. This study revealed that teachers are exposing students with significant cognitive disabilities to academics that were not historically part of their curricula (e.g., physics, algebra, literature). Science was covered to a lesser extent than ELA and math, although that may be attributed to the timing of federal mandates for the content of AA-AAS. While states implemented AA-AAS in ELA and math beginning in 2000, science was first required in 2006-07. Teachers may have been targeting their instruction to the assessed academic subject areas.

When viewed with a narrower lens, the content that received the greatest emphasis is still rooted not only in a functional academics approach, but possibly even in a developmental, early childhood approach (Browder, Spooner, et al., 2008; Browder, Wakeman, et al., 2006) as the content in ELA focused on beginning reading skills, discussion and questioning and listening tasks; in math primarily focused on shapes, patterns, and numeracy; and in science there was very little content coverage at all. For example, the high frequency with which beginning reading was taught at all grade levels may be related to the historic emphasis on signs and sight words or it may reflect a developmental approach to this content. The emphases on numbers and measurement tools may indicate students are still learning basic counting and money skills, or there may be a reliance on early childhood approaches to mathematics (e.g., counting, naming coins).

While these early academic skills are very important for elementary students, these findings suggest that teachers may not know how to adapt grade level content for alternate achievement for middle and secondary grades. Indeed, the high rates at which teachers reported adapting materials and activities from preK and elementary grades (Table 7), compared with the distribution of enrolled grades report for the target students (Table 2), suggests teachers are adapting from materials at lower grade levels. Students may be able to advance early literacy and numeracy skills concurrently with learning grade-appropriate content. These adaptations require what Browder, Spooner, et al. (2006) term “grade appropriate” academic instruction that includes the involvement of general educators.

For example, a 7th grader might be learning to conduct a character study for a middle school novel, to follow a task analysis to solve algebraic equations, and to use pictures to identify human body systems (Browder, Spooner, et al., 2008). Some research indicates that students can learn these grade-appropriate skills (Browder et al., 2007; Jimenez et al.,2008). While students may also benefit from some remedial academic work to promote overall literacy and numeracy skills, this can supplement, or be embedded in, adaptations of grade level content. Without training in grade level adaptations, teachers may be borrowing from early childhood sequences or relying on only functional academic skills like sight words, counting, and money to plan instruction regardless of the actual state standard.

Interestingly, instructional practices in both ELA and math were comparable as far as use in instruction and the level of participation expected for students. The percentage of teachers who indicated passive or no participation for students is somewhat disconcerting. These percentages were even higher in science. This outcome indicates a continued need for emphasis in professional development for teachers on how to engage students in all content areas and instructional practices. For example, teachers can implement science lessons that engage students in the process of inquiry (Courtade, 2006). Teachers may especially need training in principles of universal design of instruction (http://www.cast.org/). The overreliance on passive participation may suggest that teachers need skills to plan multiple ways to present material and multiple ways for students to respond to show learning. Teachers may also need support to extend their long-standing skills (i.e., some of the best practices they reported using) to new content. For example, teachers may not yet recognize ways to task analyze and apply systematic prompting for the acquisition of skills like analyzing a poem or plotting a graph.

Although content coverage was generally similar across students with all levels of symbolic communication, there seemed to be a relationship between the level of expectation (DOK) and students' communication levels. One of the most difficult aspects of planning instruction that links to grade level standards is determining what level of expectation to set for student achievement. An easy mistake would be to plan lessons rich with content, but with little to no expectation for students to master the constructs. The "attention" level used in our rating scale was developed not as a recommended instructional practice, but because we observed in our prior work that some teachers were not expecting students to do much more than be present for academic lessons. Teachers reported overreliance on the attention level for presymbolic students. While students who are just beginning to use symbols can be the most challenging for grade level content adaptations, active student learning can be targeted. For example, the student may learn to point to (eye gaze towards) a picture for the main character or an object for the primary theme as the teacher reads a story.

While the teachers' focus on passive skills is disconcerting for students at the presymbolic level, it is even more baffling that teachers of students at the abstract level were targeting simply attention to the tasks. Again, teachers need help to understand how to target skills for learning, versus simply engaging students in activities. One way to do this is through the use of embedded systematic instruction. For example, Polychronis, McDonnell, Johnson, Riesen, and Jameson (2004) embedded time delay instruction of grade level content vocabulary words including some science terms in the context of general classroom instruction. Another consideration related to creating active engagement for all students relates to the use of Universal Design for Learning when designing instruction. The Center for Applied Special Technology (CAST, 1998) outlined considerations for the representation of the content, the expression of how students would demonstrate their learning, and the engagement of students in the instructional tasks. By using materials that match student need such as adapted books or digitized texts, allowing students to participate using their preferred communication level such as a student's use of eye gaze, objects, or assistive technology, and engaging students with multiple opportunities to respond as independent as possible, teachers will promote not only active student engagement using accessible methods but improved student understanding of the content within the instruction.

It is important to remember that the sample of students upon whom this research is based primarily used abstract symbols to communicate. Teachers may have chosen these target students because of the relative richness of their academic curricula (i.e., they were the students on the case load who were being taught the most academics), and it is possible that the curriculum described here represents the best case scenario in terms of general curriculum access in these states. However, the sample selected by teachers does reflect findings of other researchers regarding characteristics of students who participate in AA-AAS (Towles-Reeves et al., 2009). Given that most students in AA-AAS already have abstract symbolic communication skills, the potential for expanding their academic learning is strong once teachers know how to develop these adaptations.

Although this study revealed patterns about the range of content and DOK that provide useful information for professional development, the analysis of relationships among strands provided only an initial glimpse into the ways in which teachers may be combining content. More information is needed before determining whether such relationships exist. For example, item-level relationships could provide a more fine-grained picture of content correspondence that could inform planning of professional development and materials. Also, the CIS responses from these states may be compared with cognitive interviews conducted in an earlier study (Karvonen, Wakeman, Flowers, & Browder, 2007b) in order to better understand how teachers decide to combine instruction in certain areas or tend to avoid teaching other content.

Finally, this paper was not intended to make judgments about what academic curriculum teachers *should* be teaching to students who take AA-AAS. The low rates of endorsement of certain items may reflect states' priorities, rather than a failure to teach all possible content within a subject.

Instead, the goal was to examine potential areas in which teachers may still need help developing the expertise or capacity to access the general curriculum. In other words, a narrowed focus on certain curriculum should be driven by teacher and state priorities rather than by a lack of knowledge or resources.

While teachers in the current study did not indicate where the target student received instruction in the general curriculum, instructional context would be an important factor to consider in future studies. For example, additional research is needed to determine if there is a difference in the degree of access to the general curriculum based upon the context in which students receive their instruction, when controlling for teacher understanding of the content and use of instructional strategies. In addition, research that examines if there is a relationship between the number of students on a teacher's caseload and the amount of access opportunities available to students may help outline factors that influence general curriculum access. Finally research that focuses on training teachers of this population is also needed to determine what changes occur in teacher perceptions of their understanding and ability to teach general content standards, in the alignment of their instruction to the content standards, in student opportunities for accessing the curriculum, and in student performance on academic tasks.

Future analysis of these survey responses will draw upon teachers' responses to other parts of the CIS that indicate what factors influence their curriculum choices. Ideally, professional development would help teachers create seamless continua that support increased expectations so that all students may work toward higher levels of depth of knowledge. Teacher training may also focus on ways to capitalize on relationships among topics within the curriculum. In what ways may different elements of curriculum (within or across subjects) be integrated to broaden what students are taught? Eventually, these findings might also inform the design of courses on general curriculum access for all students in preservice teacher education programs.

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