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Aligning Instruction With Academic Content Standards: Finding the Link

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For students to have full access to the general curriculum, they need the opportunity to learn academic content that links closely to the standards for their grade level. In this article, we synthesize what we have learned through our research on aligning instruction for students with significant cognitive disabilities with state's academic content standards. In finding these links between state content standards and instruction for students with significant cognitive disabilities, we have discovered that it is important to understand (a) the implications of current federal policy; (b) the evidence for academic learning by this population; (c) the nature of national and state standards; (d) the importance of starting with universal design and general education collaboration; and (e) the concept of alignment.

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In recent years, there has been increasing interest in promoting learning in the general curriculum through teaching content to students with significant cognitive disabilities that links to state standards. This has been especially evident in resources on linking IEPs to state standards (Ahearn, 2006; Courtade-Little & Browder, 2005) and in the curricular frameworks or extensions of standards states have created as an adjunct to their work in alternate assessments (Massachusetts, http://www.doe.mass.edu/mcas/alt/resources.html; South Dakota, http://doe.sd.gov/contentstandards/alternatestandards/index.asp). In this article, we synthesize what we have learned through our research at UNC Charlotte about aligning instruction with a state's academic content standards. Specifically, we have learned that to create these links it is important to understand (a) the implications of current federal policy, (b) the evidence for academic learning by this population, (c) the nature of national and state standards, (d) the importance of beginning with universal design and general education collaboration, and (e) the concept of alignment.

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Preparation to Align Instruction With State Academic Content Standards

Understanding the Policy on Alternate Assessment for the 1%

To understand the increased interest in teaching to state standards, it is important to identify both the purpose of these standards and the federal policies that currently promote their use. A standard, simply stated, is an outcome for learning. In the publication, *A Nation at Risk*, the National Commission for Excellence in Education sharply criticized educational practices for not preparing students for their future and noted the impact this weakness would have on American society (National Commission on Excellence in Education, 1983). In the subsequent educational standards movement, educators and other stakeholders began to define high-quality outcomes for students. One of the original promoters of educational standards, former Assistant Secretary of Education Diane Ravitch (1995), noted that "standards are created because they improve the activity of life" (p. 9). Standards were created to define outcomes for each grade, and for graduation, that would prepare students for adult living in the world of the future.

Although states defined standards for *all* students, their applicability to students with significant cognitive disabilities was not part of these original discussions. In contrast, during this same era (1980s), special educators were creating the first functional curricula for this population. With the increased focus on inclusive education in the 1990s, students with significant disabilities began to have more exposure to academic content, but often the priority for learning was social interaction, applications of functional skills in these contexts, or the use of "access" skills (e.g., motor or communication skills that did not require understanding the content). Although general educators considered academic learning essential to preparation for adult life, as reflected in their state standards, special educators minimized the focus on academics for students who needed to learn skills of daily living.

The question of the past decade has been whether the omission of academic content for students with significant cognitive disabilities is defensible and if not, to what extent current state standards are relevant.

Some have argued that the development of state standards should be revisited with special educators participating in their development (Quenemoen, Lehr, Thurlow, & Massanari, 2001). Special educators have much to contribute to the understanding of what is required to apply school learning to real life contexts. Some states like Oregon and Florida currently define outcomes for all students that include functional domains like job and community skills (Oregon, http://www.ode.state.or.us/teachlearn/testing/admin/alt/ea/altachstnd/stbd_altstds031404C.pdf; Florida, http://www.firn.edu/doe/bin00014/corguide.htm). Linking to these more functional domains builds on past traditions within special education for this population.

In contrast, federal policy has increasingly emphasized including students with significant disabilities in large scale assessment practices that are grounded in academic content standards. The 1997 reauthorization of the Individuals With Disabilities Education Act (IDEA) required that students with disabilities be included in large scale assessment with alternate assessments required by July 1, 2000, for students who could not participate in the general assessments with or without accommodations. IDEA (1997) also required that all students have access to the general curriculum; that is, the state or locally defined course of study. In 2001, the reauthorization of the 1965 Elementary and Secondary Education Act, entitled the No Child Left Behind Act (NCLB, 2001), required states to establish challenging standards, implement assessments that measure students performance against those standards, and hold schools accountable for achievement in reading, math, and science. Final NCLB regulations on including students with the most significant cognitive disabilities permitted states to develop alternate achievement standards for reporting adequate yearly progress for students with significant cognitive disabilities (up to 1% of the general population) but further stipulated that these alternate achievement standards 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]. Subsequent nonregulatory guidance denoted that alternate assessments "should be clearly related to grade-level content, although it may be restricted in scope or complexity or take the form of introductory or prerequisite skills" (U.S. Department of Education, 2005, p. 26). The Individuals with Disabilities Education Improvement Act of 2004 (PL 108-466) reinforced the concepts of alternate assessment and access to the general curriculum stipulated in IDEA (1997) and addressed ideas from NCLB such as academic accountability for all students and expectations of highly qualified teachers for students with disabilities.

By requiring that all students be included in schools' reports of adequate yearly progress (AYP) and specifying that alternate assessments used for this purpose must be linked to grade-level content standards, current policy implies the need to teach language arts, mathematics, and science for NCLB and other content required by the state (e.g., social studies) to provide the educational opportunity to meet AYP. States do not have the option of creating alternate assessments based on functional skills alone to have their assessment practices approved under NCLB (34 C.F.R. § 200.1(d); U.S. Department of Education, 2005, p. 17).

Given that federal policy clearly promotes assessment of academic content, the question still must be raised as to whether the consequences of this policy will benefit the population. Early research suggests that the most important benefit will be increased expectations for learning by students with significant cognitive disabilities (Browder, Ahlgrim-Delzell, Courtade-Little, & Snell, 2006; Browder, Spooner, Algozzine, et al., 2003; Flowers, Ahlgrim-Delzell, Browder, & Spooner, 2005; Kleinert, Kennedy, & Kearns, 1999). Although these early outcomes are promising, impact of this policy is still mostly unknown. At least two groups currently are identifying these consequences including the National Alternate Assessment Center (www.naacpartners.org) and the Science Research Institute's National Study on Alternate Assessment (http://www.sri.com/policy/cehs/dispolicy/).

In our work at the UNC Charlotte, we concluded that the policy to include students in alternate assessments linked to grade-level academic content does have the potential for benefit, but that this benefit depends on the quality of their design and supporting professional development. In earlier work, we described how this academic focus is the next logical horizon for the evolving curricular focus for this population (Browder et al., 2004; Browder, Spooner, Ahlgrim-Delzell, et al., 2003). The lack of academic learning, to date, could potentially be an artifact of the lack of opportunity to learn this content. Additionally, there also is no research to indicate that mastering life skills is a prerequisite to learning or that students cannot learn both academic and life skills. What probably is true is that this population will not learn academic content without well-designed instruction.

In summary, to link instruction to academic content standards it is important to understand current federal requirements. States are required to provide alternate assessments for students who cannot participate in large scale assessments with or without accommodations. Alternate assessments that will be judged against alternate achievement standards for students with significant cognitive disabilities must link to the state's academic content standards. Assessing functional skills is not required for NCLB purposes and cannot be substituted for assessing skills that link to the content standards in language arts, mathematics, and science. Functional skills continue to hold importance for this population; these skills can be taught concurrently and tracked through IEP progress monitoring.

Becoming Familiar With Evidence that this Population can Learn Academic Content

Given that federal policy promotes teaching academic content, it is important to know the research-based evidence on whether this population can learn academics and if so the characteristics of effective instruction. As part of the General Curriculum Access Project, we conducted comprehensive reviews in reading, mathematics, and science (Browder, Spooner, Ahlgrim-Delzell, Harris, & Wakeman, 2006; Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006; Courtade, Spooner, & Browder, 2006). In general, we found more research evidence for reading than mathematics, and more about mathematics than science. To a great extent, the evidence is constrained by the field's focus on functional skills for the last two decades. When Nietupski, Hamre-Nietupski, Curtin, and Shrikanth (1997) reviewed curricular trends for this population for 1976–1995, they found a strong focus on functional content and an increasing focus on social skills. Although our reviews spanned nearly another decade (from 1975 to 2005), we did not find an increase in academic studies for students with significant cognitive disabilities. However, we did find evidence that this population can acquire academic skills.

Reading

For the area of reading, we organized the literature using the National Reading Panel's (NRP, 2000) five components of reading instruction (i.e., phonemic awareness, phonics, fluency, vocabulary, and comprehension) with inclusion criteria based on four components: (a) the article had to be published in a peer-reviewed journal in English between 1975 and 2003; (b) the subjects had to include at least one participant with a diagnosis of significant cognitive disability (moderate, severe or profound mental retardation, autism, or developmental disability); (c) the study had to have an intervention that targeted teaching reading or picture identification skills as the primary focus and include experimental data; and (d) the study had to use a recognized experimental or quasi-experimental design (including single subject designs). In total, we found 128 studies in 119 publications that met these criteria (3 articles reported double experiments and a triple experiment was described in 1 article). Overall, we found strong evidence for teaching sight words to students with severe, as well as moderate, disabilities using systematic prompting and fading but inadequate consideration of the other components of reading (Browder, Wakeman, et al., 2006). Surprisingly, even the use of sight words (comprehension), which should be a defining characteristic of functional reading, was rarely taught or measured.

Math

In the area of teaching math skills to students with significant cognitive disabilities, guidelines from the National Council of Teachers of Mathematics (NCTM, 1989) were used to identify studies that addressed content in five main components of math instruction: number and operations, measurement, data analysis and probability, geometry, and algebra. Four criteria were used for inclusion of studies that were similar to our reading literature review (Browder, Wakeman, et al., 2006). We found a total of 67 studies in 65 articles (2 articles had double experiments). A significant proportion of these studies used single subject designs with high school/transition aged students who were labeled moderately mentally retarded, but the studies also included participants identified by the researchers as having severe mental retardation. Most taught was the mathematical component identified by NCTM as measurement (e.g., money) using systematic prompting and feedback in a massed trial format (Browder, Spooner, et al., 2006).

Science

For science, guidelines from the National Science Education Standards (National Research Council, 1996) were used to identify categories of studies based on the strands of science (i.e., physical science, life science, earth and space science, science and technology, science in personal and social perspectives, and history and nature of science). Similar inclusion criteria were applied (e.g., use of experimental design) but studies were selected based on including measures of achievement of science related skills, as indicated by the NSES. A total of 10 studies were identified from the 20 years of literature searched and nine fell in the national standard of Science in Personal and Social Perspectives. These nine studies were actually daily living skills research that happened to include a measure that could be classified as fitting that national science standard. All 10 of the studies used systematic prompting and feedback of specific discrete or task analyzed skills (Courtade et al., 2006).

Although this research is constrained by the limited academic focus of the field to date, it does provide evidence that this population can acquire academic skills and offers some direction for planning broader academic content. In conclusion, students with both moderate and severe mental disabilities have acquired academic content although this content has been limited primarily to sight words and money to date. Effective instruction has been primarily systematic prompting and feedback with repeated opportunities to master specific discrete or task analyzed skills in either community or classroom contexts.

Becoming Fluent in the Domains of Academic Content Found in National and State Standards

In collaborating with curriculum content experts at the UNC Charlotte (general education researchers), we quickly discovered how important it was to become fluent with national and state standards. Most IEP teams for students with significant cognitive disabilities can quickly

identify the domains of functional curricula such as community, vocational, recreational, and so on and can provide multiple examples of activities and skills that relate to these domains. Similarly, teams need fluency in understanding the major domains of academic content as well as the specific standards within each area.

An excellent resource for understanding the major domains of academic content is the Web sites of professional organizations. For science, The National Research Council (1996) detailed eight standards (one process standard and seven content standards) for science including scientific inquiry, physical science, life science, earth and space science, science and technology, science in personal and social perspectives, and history and nature of science. These standards were created to outline what students need to know, understand, and be able to do to be scientifically literate. The National Council of Teachers of English (NCTE, 1996) described what students should know and be able to do in English Language Arts (ELA) across six standards (i.e., reading, writing, speaking, listening, viewing, and visually representing). The National Council of Teachers of Mathematics (http://standards.nctm.org/document/appendix/numb.htm) detailed five content standards which are numbers and operations, algebra, geometry, measurement, and data analysis and probability. They also describe process standards including problem solving, reasoning and proof, communication, connections, and representation.

Most state grade-level content standards begin with these same or similar domains to define standards and performance objectives or indicators. For example, one of the strands for English/Language Arts in South Carolina (South Carolina Department of Education, 2002) is Reading—"The student will draw upon a variety of strategies to comprehend, interpret, analyze, and evaluate what he or she reads." The state then breaks the strands into content standards (e.g., "Reading Process and Comprehension—The student will integrate various cues and strategies to comprehend what he or she reads"). At the next level are performance objectives (e.g., "Demonstrate the ability to use a variety of strategies to derive meaning from texts and to read fluently").

Some states have created extended or adapted standards for their students with significant cognitive disabilities. In fact, guidance on alternate assessment encourages states to have curricular frameworks or extensions of their standards (U.S. Department of Education, 2005). For example, South Dakota (South Dakota Department of Education, 2005) created alternate standards in ELA, math, and science. The state retained the general education goal: "Students will apply statistical methods to analyze data and explore probability for making decisions and predictions," and indicators of the goal: "Use statistical models to gather, analyze, and display data to draw conclusions." In creating extensions, they transformed the standard from the general education version—" Students are able to ask and answer questions from data represented in bar graphs, pictographs, and tally charts" to an alternate version—"Students are able to answer simple questions from data represented in a graph." The state went further to provide target skills that students could demonstrate at each of the alternate achievement levels for the state's alternate assessment (e.g., *Advancing*: Students are able to create a graph from gathered data; *Target skills*: Represents data sets in more than one way; labels data accurately).

In summary, states have standards that are organized by the major domains or strands of academic curricular content and may have created extensions of these for professional development related to alternate assessments. It is important to be fluent with the major domains of each academic content area and to know the state standards for the student's grade level. If a state has a curricular framework or extensions of academic content standards, these are an important resource for instructional planning.

Collaborating With General Educators and Promoting Universal Design for Learning

One of the risks that can occur as special educators create curricular frameworks or extensions of state standards is misunderstanding the content. Collaboration with general educators is essential to creating access to the general curriculum in planning state resources of this type and to the ongoing planning for students in the IEP team. Much has been written about the potential benefits of, and processes for, general and special education collaboration (Brownell, Adams, Sindelar, Waldron, & Vanhover, 2006; Friend & Bursuck, 2002; Friend & Pope, 2005; Jitendra, Edwards, Choutka, & Treadway, 2002). One important target for this collaboration is for instruction to be inclusive of all learners through Universal Design for Learning (UDL). The universally designed classroom uses the concepts and designs from the universal design of architecture (Burgstahler, 2001) in order to help teachers prepare their classrooms "before the fact" as opposed to "after the fact." For example, in the world of architecture, easy accessible structures (e.g., cut-away curbs, captions on televisions, automotive doors) are created to accommodate a variety of users. All patrons are taken into consideration before the plan is initiated. Similarly, all learners are considered in planning the educational context.

The Center of Applied Special Technology (CAST, 1998) has described three general principles for UDL to help guide general and special education teacher's planning that include (a) representation, (b) expression, and (c) engagement. *Representation* refers to modifications that can be made to classroom materials. These modifications make materials more accessible to students with disabilities (e.g., modified books, larger print,

digital text, etc.). The next component, *expression*, designates alternate methods of communication for students with limited speech (e.g., use of augmentative devices, computers, graphic programs, etc.). This component takes into consideration the way each individual student expresses themselves. This may be by answering questions by using a voice output device or holding up word cards in order to communicate within the classroom setting. The third component, *engagement*, is the use of strategies that involve students with disabilities in the learning process (e.g., providing repetition, familiarity, opportunities to respond, etc.).

In one of the studies in our General Curriculum Access Project, we explored embedding these principles of UDL in ongoing preservice training for candidates for elementary or special education teacher licensure (Spooner, Baker, Harris, Ahlgrim-Delzell, & Browder, in press). Prior to the training, we found that 87% of the 72 participants were unfamiliar with UDL. To measure skill in UDL planning, participants were given a brief case study about a student with a significant cognitive disability and told to write a lesson plan, using the North Carolina state standards, to include this student into the general education classroom. A different case study was given for pre- and posttesting. After a brief lecture on the principles of UDL, both the general and special education teacher candidates were able to improve their inclusive planning. Although much more research is needed on how to make UDL planning a reality in public schools, the study does suggest that giving teachers a concrete format for planning can expedite their ability to develop ideas for inclusive instruction.

Prior to planning instruction that links to academic content standards, collaboration is needed between general and special education. Collaboration to promote access to general curriculum will include consideration of both what the standard means and how the content is typically taught so that adaptations for learners with significant disabilities have high-quality content. Universally designed classrooms will include planning for all students' learning "before the fact" rather than "after the fact."

Understanding the Concept of Alignment

Collaboration with general educators helps to ensure that assessment and instruction retain fidelity with the original content. This fidelity or match between instruction, standards, and assessment is called "alignment" and is important to educational planning for all students. The National Research Council (2001) described the difficulty in achieving alignment due to decisions being made at various levels within the process. For example, state content standards may be written by various content teams using different formats and language making them difficult for teachers to interpret. Systems may adopt a curriculum that does not match the state content standards. Assessments may be developed by outside agencies who may not fully understand the content of the standards. Since the early stages of large scale assessments, states have used various models to evaluate their alignment to state standards (Bhola, Impara, & Buckendahl, 2003).

In the research at the UNC Charlotte, we discovered that states especially have struggled with alignment for alternate assessment systems. Browder et al. (2004) examined the alignment of the content of alternate assessments to academic standards and functional life domains through expert review of state extended standards provided in state alternate assessment materials (i.e., performance indicators). Results indicated that of the 31 states' alternate assessment ELA and math performance indicators which were reviewed, some of the states did and did not demonstrate a clear link between the performance indicators and the content area. Browder, Spooner, Ahlgrim-Delzell, et al. (2003) examined the curricular philosophies reflected in state alternate assessments using six nominated states as either having clear, weak, or mixed links to the content areas. Over half (54%) of all the performance indicator tasks for all the states reflected an academic focus although the most frequent context for the tasks was functional (63%). In contrast, states nominated as having clear alignment had a stronger academic focus for both tasks and contexts. Finally, Flowers, Browder, and Ahlgrim-Delzell (2006) examined the match between three states' alternate assessments and their state academic content standards. Results of this study indicated that a narrowed range and depth of the academic content standards were being addressed in state alternate assessments and none of the alternate assessments had the range or balance of content recommended for general assessments. Other researchers have explored the alignment of alternate assessments and found mixed outcomes. Roach, Elliott, and Webb (2005) applied Webb's model to one state's AA-AAS and found that the assessment did meet the criteria for alignment as indicated by expert coders. Almond and Bechard (2005) examined the alignment of two types of alternate assessments to expanded benchmarks in reading, writing, math, and science using a modified Webb model. Results indicated that three of the four content areas had adequate alignment between both assessments and the content standards, but that the depth of knowledge of the expanded benchmarks was exclusively in the lower two levels. Range and breadth of knowledge were also limited.

One of the requirements states face is to build a validity argument for the technical quality of their alternate assessments including evidence that these systems link to state content standards. To build this argument, states usually contract with an expert or test company to conduct an alignment study. Some use the model of Norman Webb (2002) who defined alignment as the

degree to which expectations and assessments are in agreement and serve in conjunction with one another to guide the system toward students learning, what they are expected to know, and the skills they are expected to perform. Webb's (1997) model uses a set of statistics that describes the degree of intersection, or alignment, between the content embedded in state content standards and the content in state assessments. Some use the Survey of Enacted Curriculum Model by Porter and Smithson (2001) which reviews alignment among three elements: (a) the intended curriculum, typically represented in content standards or curriculum frameworks; (b) the assessed curriculum; and (c) the enacted curriculum, or what is actually taught in the classroom.

As part of the work of the UNC Charlotte partnership with the National Alternate Assessment Center, Flowers, Browder, Wakeman, and Karvonen (2006) developed a methodology unique to reviewing alternate assessments based on alternate achievement standards for their alignment both with state standards and classroom instruction. Their methodology was based on a conceptual framework for what it means to link to state academic content standards developed with a team of coauthors that included experts in curricular content, instruction of students with severe disabilities, and measurement (Browder et al., in press). In their alignment, reviewers consider seven criteria for the link between the assessment, standards, and instruction: (a) the content is academic; (b) the student's assigned grade level is the point of reference; (c) the achievement level differs from grade level; (d) there is differentiation in achievement across grade levels/bands; (e) the system promotes access to grade-level activities, materials, and contexts; (f) skills targeted for instruction have centrality with the content of the state standard and, when possible, performance centrality; and (g) the system provides for multiple levels of access to general curriculum for students at different levels of symbolic communication. The first four criteria (a–d) were derived from the federal policy (U.S. Department of Education, 2005). The three additional criteria were based on unique characteristics of students with significant cognitive disabilities.

To illustrate, the first criteria requires familiarity with state standards, the major strands of math, science, and language arts, and ongoing collaboration with general education for high-quality curricular planning. Next, the student's assigned grade level is used to identify the specific standards that are the point of reference. Then achievement is defined for the student that differs from grade-level achievement while remaining true to the content to the greatest extent possible. For example, in a middle school class students may be required to write a summary using a fishbone diagram to summarize the elements of a story they read. A target for alternate achievement might be to select pictures for the fishbone diagram after hearing the story read.

The fourth consideration is that there is increasing expectations for achievement across the grade levels. A student who can summarize a story by selecting pictures in elementary school should be challenged to do more in the upper grades. For example, the student may learn to compare and contrast the elements of a story with pictures, or use assistive technology to help generate written summaries of the story, or contrast the point of view of characters in a story. Linking to the standards of the grade level, versus borrowing from earlier grade standards, can help in this sequential planning. Creating these targets for achievement should begin with the activities, materials, and contexts of general education. It may be difficult to plan ways to link to a standard on identifying character's point of view. Preplanning with the general education teacher might reveal "doable" ideas like use thinking maps to classify point of view. For example, a beginning point for linking to this activity might be to classify preferences of the characters with a thinking map (who liked the dog; who did not like the dog or who was happy; who was angry). Giving consideration to students' current use of symbols is also important in creating this link. For example, some students may be able to read and write some words and phrases making it feasible to use the same or similar worksheets or materials other students are using for activities like fishbone diagrams or thinking maps. Students who primarily use concrete symbols may need to supplement or replace these with pictures or objects that are familiar to them. Some students may primarily respond with an object or action (e.g., facial expression for happy). In contrast, it will be important to give students opportunities to learn with symbols by pairing these with these alternative responses (e.g., after student makes an expression for happy, peer helps student put a picture symbol for happy on thinking map). Once the target for achievement is pinpointed as a target skill for instruction and assessment, it is important to be sure the link to the standard is not lost. For example, to address the standard "identifies characters' point of view," the objective "While hearing a story read, Charles will point to a feelings picture to show how the character is feeling at that point in the story" is closer to the standard than, "Charles will identify pictures of feeling words" by retaining the content of the story context.

To summarize, in creating links to general curriculum content it is important to consider the match between the state standards, the assessment, and instruction. In a well-aligned educational program, students with significant disabilities have opportunities for learning academic content that is well matched to what their peers at that grade level are learning although the amount of material to be learned, method of responding, or overall depth of knowledge to be demonstrated may be adapted. Alternate assessment is well linked to both state standards and this instruction.

Research on Instruction That Links to the Academic Content Standards

Once educators understand current policy, evidence-based practice for academic learning by this population, the nature of standards, the role of general education, and the concept of alignment, there is a strong foundation for planning an educational program with links to the state's academic content standards. In our work at UNC Charlotte, we have been conducting research on specific interventions designed to link to state standards. Three of these will be highlighted here to illustrate the process to be described next and to offer some preliminary research evidence that students can learn grade-appropriate content.

Three Studies on Teaching Grade-Appropriate Content

Middle School Literature

In our first study, we focused on how to adapt middle school literature and promote literacy learning for students who were participating in the state's alternate assessment. Our intervention was to give teachers a template for planning a literacy lesson and guidelines for adapting books *versus* general training in literacy. An example of this template can be found in the chapter by Browder, Courtade-Little, Wakeman, and Rickelman (2006). In our first group study, teachers who were randomly assigned to the template training significantly increased the opportunities they gave students to make literacy responses, but student changes in behavior were not captured in this pre/posttest design. Subsequently, we chose a single subject study to try to capture individual student progress. Browder, Trela, and Jimenez (2006) recruited three middle school teachers of students with moderate and severe disabilities (classified with mental disabilities or autism) to implement story-based lessons using the planning template. The researchers provided adapted books with controlled text, picture symbols, and a repeated story line that were summaries of grade-level literature from the cooperating school district's supplementary reading list. The books were provided in a three ring binder and had multiple chapters that paralleled the original text (for examples, see http://education.uncc.edu/access). The intervention consisted of a 25-step task analysis designed to provide opportunities for students to build on early literacy skills while participating in the reading of the books. Teachers were also instructed to use the task analysis as a self-monitoring tool to track the opportunities given to students to respond during the reading of the text. As teachers increased these opportunities and provided ongoing instruction with the books, the six participating students (two target students per special education teacher) increased independent responses such as identifying vocabulary in text, reading a repeated story line, turning the page independently at the appropriate time, blending sounds to read new vocabulary words, and answering questions by referencing text.

Algebra

One component of math that had not been addressed in research with students with significant cognitive disabilities was algebra. To examine how this population of students might access algebra at the high school level, Jimenez, Browder, and Courtade (2006) used a nine step task analysis with systematic prompting procedures to teach three high school students with moderate disabilities to solve a one variable algebraic equation (solve for x). In this study, all three students learned to follow the task analysis independently, demonstrating skills such as using a number line to count the difference between two given numbers in order to identify the unknown variable (i.e., in the problem, $3 + x = 7$, students used a number line to locate three and seven, then counted the spaces between them to arrive at the answer, "4"), naming the unknown variable x, and representing concrete amounts with numerals. One student required a booster session with training in a simplified task analysis in order to be successful. Results of this study suggested a functional relationship between the use of systematic prompting with a task analysis and students' ability to independently solve one variable algebraic equations. Such instruction may be one way to access higher level math lessons for students with significant disabilities.

Science

Courtade (2006) developed an intervention that focused on using inquiry-based science lessons. Four middle school special education teachers of students with moderate mental disabilities were recruited to learn the methodology that was adapted from middle school science. The participating teachers not only learned the inquiry based methodology but were also able to implement the method across science standards. In addition, the eight participating students increased the skills of asking questions related to the topic, identifying methods of inquiry (i.e., conduct an experiment, look in a book, look on the Internet) to locate information, participating in a science experiment (i.e., observe objects dropped into a liquid to identify those that sink from those that float), recording observations (i.e., select a picture to show what happened in an experiment), and telling what they learned from the experiment.

Implications and Limitations

All three of the studies demonstrated that the students could acquire skills linked to middle and secondary content. The outcomes should be viewed with caution due to three limitations: (a) the lack of social validation, (b) the special education context, and (c) the limited number of participants. First, the meaningfulness of these skills to parents and participants was not formally evaluated. Informally, students indicated an eagerness to participate. For example, teachers did not need

extra incentives for students to complete these lessons and students sometimes requested the lessons at other times during their day (e.g., by taking materials to the teacher). Future research should include social validation measures such as student preference assessments and parental satisfaction surveys. These measures are especially important given the current lack of information on the long-term impact of more academically focused instruction for this population.

A second limitation is that all three studies were conducted in self-contained special education classrooms. Although the training included collaboration with general education (e.g., we included general education teacher partners in the training days), this was not enough to promote the building level decision-making needed for students to participate in general education classrooms. Although most of the participating students had times built into their days for interaction with nondisabled peers (e.g., lunch, media center), they did not have ongoing placement in academic classes like mathematics and science.

A third limitation was the small number of participants which limits the generality of the findings. This shortcoming of single subject research can only be addressed through replications. To be evidence based, Horner et al. (2005) recommend that an intervention needs to be demonstrated across a range of studies, researchers, and participants to allow for confidence in the effect (i.e., minimum of five single-subject studies, studies conducted by at least three different researchers across at least three different geographical locations, and that the five or more studies include a total of at least 20 participants). Taken together, the three studies on middle school literature, algebra, and science suggest a promising practice but one that needs additional research to be considered evidence-based.

Given that these studies suggest a promising practice, it is important to note that the common feature of all three was the creation of a generic task analysis that could be used with systematic prompting and feedback for mastery of an "academic routine" and then applied across changing content. For example, the middle school novel changed monthly while the students continued to master a routine for participating in reading the adaptations of these books. Additionally, the students learned picture and sight word vocabulary and some letter sound recognition specific to each book. In science, by learning a series of steps to find out about an unfamiliar material or concept, students could then apply these steps to gain information from a variety of science content. These generic task analyses are similar to the general case instruction demonstrated by Horner, Jones, and Williams (1985) and Horner, Williams, and Stevely (1987) to teach skills like street crossing and generalized telephone use. In our work, the students learned a chain of responses that focused on the critical features of the academic activity (e.g., reading a chapter book; doing a science experiment; solving an equation) and to generalize these steps to changing academic content.

Steps to Follow in Planning the Link

In professional development on creating access to the general curriculum, it can be helpful to provide the foundational information described earlier in the section on "Preparation to Align…" and then to illustrate with specific examples. Although we gave examples on teaching grade-linked academic content from our research, many more can be found in books on academic interventions for this population (Browder & Spooner, 2006; Downing, 2005; Kennedy & Horn, 2004; Ryndak & Alper, 2003). Examples of skills that link to state standards can also be found on the National Alternate Assessment Web site (http://www.naacpartners.org/Products/Pre/slide7.htm). With this foundational knowledge, educators have the conceptual framework needed to plan the links to access grade-level content. Although there are multiple ways to create this link, we found the following steps to be especially helpful in training teachers to access general curriculum content. These steps begin with the general curriculum content and end with specific IEP priorities.

Step One: Identify the Academic Domains for Planning

The first step to plan the links to state standards is to identify the domains for planning. Often the state standards will be written in curricular categories. For example, science may have strands like physical science, earth science, and so on. Mathematics may have categories like geometry, algebra, data compilation, etc. If a student is to have balanced access to the general curriculum, some planning should occur in each of the major strands of the general curriculum content for that student's grade level. To begin, the planning team may want to make a chart with the major strands or categories of the content. This chart is then used in the following steps to outline the curricular priorities for the student in the coming year.

Step Two: Identifying the State Standards for the Student's Grade Level

Next, the team focuses more specifically on the student's assigned grade level. If the student is served in an un-graded class, this is based on the chronological age of the student. The standards for the student's grade level should be down loaded from the state Web site or otherwise made accessible to the planning team. The team may want to take some time to go through the standards to identify which are most important for this student. In some states, the grade-level standards may have been prioritized at the state level in a curricular framework or extended standards resource. If so, the team should also review these priorities because they likely will be reflected in the state alternate assessment. To make the next steps manageable, it also can be helpful to have the general educators on the team highlight which standards are central to learning the overall con-

tent at that grade level. One way to determine this is to ask the content expert what the three most critical things students at this grade level learn. For example, in making this exploration with geometry teachers for high school planning, we discovered that points in a plane form the core for much of the learning about geometry. Similarly, being able to determine patterns (alike/not alike) was a key in posing an explanation in scientific inquiry. Under each academic domain taught for the grade level, the team will try to identify at least one "big idea" for the student's learning in the coming year.

Step Three: Plan With General Educators to Focus on Typical Materials, Activities, and Contexts

The big ideas taken from the standards help to pinpoint some priorities within the grade-level curriculum. Next, the team will want to consider how these standards are typically taught. Planning that leaps from the state standard to a teachable skill often results in a target that may bare little resemblance to the original standard, what is typically taught, or what can have meaning to the student's life. To develop the IEP, the team may want to fill in some typical activities and materials for each of the standards listed for each strand of the content areas. These would not be meant to be all inclusive, but to enrich the team's understanding of the content and how the skills are taught. This preplanning can set the stage for the ongoing planning between the general education teacher and special education teacher for lessons inclusive of all students (universal design of learning) and for individualization for the student with disabilities. Teachers in self-contained settings also need the opportunity to pair with general educators to develop deeper understanding of the content and how skills are typically taught.

Step Four: Plan Alternate Achievement Targets, Consider the Students' Symbolic Level

The planning team needs to be clear on the difference between content standards and achievement standards. The goal is to link to the grade-level content standards while pinpointing some alternative to grade-level achievement. One way we have found useful to do this is consider the student's current use of symbols. Students may currently use abstract symbols (e.g., words, pictures, objects used for abstract meaning for students who are legally blind), concrete symbols (e.g., familiar pictures, objects used for requesting, object or picture schedules), or rely primarily on presymbolic communication (e.g., touching object of choice; looking towards person of interest). Although teachers will want to be sure to use abstract symbols with all students (e.g., words, pictures, numbers), some students may need to have these paired with objects and familiar activities for initial understanding. Others may also need to be able to express understanding using nonsymbolic options (e.g., performing an activity versus selecting a picture or word). Sometimes it is difficult to plan ways to adapt or extend activities from grade-level achievement to students who use few symbols. Table 1 provides examples of extending the typical grade-level activity to three levels of difficulty for three different content areas (see Table 1).

Step Five: Review Content and Performance Centrality

For several standards in each strand of each content domain, the team now has several specific achievement targets. At this next step, the team makes sure that the original content retains high quality after it has been translated for this student.

This is called content centrality. For example, if the standard of focus is "Explain how the sun affects the Earth," the team may decide to teach the student what the sun provides the Earth (e.g., heat, light). Notice that the content matches: (a) both focus on the sun and (b) both focus on what the sun gives the earth. Because of this match, the activity is said to have "content centrality." In contrast, if the target for instruction were to point to the picture of the sun, this would be a "far link" because although one aspect of the content is present (the sun), it does not provide instruction about what the sun's effect is on the earth.

Every standard not only has content, but also performance. In the above example, the content is the sun's effect on the earth. The performance is to "explain" this effect. This best adaptation will be one in which the student learns to communicate an explanation. In making this accessible, the student may refer to a concrete referent (e.g., "Feel the air. Touch the ground. What makes the earth warm today?" Answer—"the sun."). Contrast this explanatory answer to performance that is only identification, not explanation ("Look in the sky. What is that?" Answer—the sun).

Step Six: Enhance the Skills by Applying Long-Standing Values

Before moving into the specific objectives for the IEP, this sixth step ensures that some of the long-standing values for teaching this population are reflected in the priorities chosen. This is the step that can bring meaning and "delight" to the targets for learning. For example, Courtade-Little and Browder (2005) described aligning IEPS with state standards by focusing on ways to promote literacy, self-determination, the use of assistive technology, and functional applications. For example, stories and texts might be used to promote literacy while working on an achievement target in science. Choice, self-awareness, and other self-determination skills should be promoted while teaching the target skill of data compilation. Assistive technology might make it possible to indicate more understanding of the concept, for example, by selecting a picture for a correct response. The skills may also be linked to functional activities. For example, the discussion of the sun's warming of the earth might be paired with planting flowers or vegetables. The team may also consider ways the activities can be enhanced through cooperative learning with typical peers or parental involvement (e.g., "homework").

Table 1
Examples of Seventh Grade Standards Made Accessible to Students' Current Symbol Use

		Planning alternate achievement		
Examples of state standards for seventh graders	A typical grade-level activity and achievement	For students who use a variety of abstract symbols	For students who use a few symbols; and need a concrete referent	For students who are learning that symbols have meaning
English/Language Arts: The learner will respond to various literary genres using interpretative and evaluative process.	Students will compare the characters from the literary works of *The Cay* and the *Diary of Ann Frank*. Students will use a Venn diagram to show similarities and differences between characters during the World War II era.	Students will use the Venn Diagram to indicate different characters, settings, and plots under the correct story. Students are given a list of words/phrases to use in completing the activity.	Students complete Venn Diagram by classifying picture/word cards; cards are introduced with objects and activities familiar to student (e.g., diary has events like your home-school log). The students are provided with story summaries written with picture symbols; finds what is same/different from self.	Student points to picture of self after looking in mirror before reading story. Students finds picture of main character immediately after the story is complete. Student is assisted to compare two pictures (e.g., Ann is a girl; you are a boy); you live now (modern clothes); Ann lived in WW II (40s era clothes).
Algebra: The learner will demonstrate an understanding of linear relations and fundamental algebraic concepts.	Students will develop fluency in formulas. Students will be able to use the correct order of operations to evaluate algebraic expressions (e.g., $3(2x + 5)^2$).	A task analysis will be used to solve each step of a single algebraic equation (e.g., $5 + x = 10$). The equation is broken into a number of steps to assure student mastery of each step.	The task analysis is used to solve each step of a single algebraic equation using picture cues combined with number symbols. The picture cues provide the students with a visual as they progress through the problem (e.g., a picture may be given to the student showing 5 subtracted from 10 in order to solve for x).	Tangibles (e.g., counting blocks) used in order for the student to distinguish between equal and less. The student will complete the task or answer (e.g., with an AAC device) if the same number of blocks were taken away from the right side of the equation.
Life Science: The learner will conduct investigations, use models to build an understanding of the human body system.	Students will write narratives about the function and importance of the 10 major organ systems in the human body. Students will label the major organs using a life size skeleton.	Student demonstrates knowledge of how the human body works by matching organ words with the corresponding organ on the life size skeleton. Students generalize where each organ is located in their own body by briefly stating that particular organs purpose.	Students identify three to four major organs in the human body by pointing to location on their body when shown picture (Where's this—your heart?). Match pictures/words for these major parts with model of systems.	Students identify two to three key organs (e.g., heart, stomach) by pointing on self and pointing to another person; then pointing to model.

Step Seven: Identify Pivotal Skills for the IEP and Balance With Other Priorities

After completing the first six steps, the planning team will have a difficult IEP to create unless they conduct one more critical step in the process. This is to determine what core or pivotal skills are common to many of the achievement targets. These will become the IEP objectives, along with other priorities in functional domains, therapy goals, and social goals. Trying to have a one-to-one correspondence between one grade-level standard and one IEP objective will lead the team down the path of writing a plan with far too many skills for documenting ongoing progress and one that is more of a curriculum than an individualized plan. Instead, the team can focus on target skills that are applicable across core content areas.

Illustration of the Outcome From the Seven Steps

To illustrate the seven steps, consider the fictional character Nick, a 12-year-old, seventh grade student with visual, motor, and moderate cognitive disabilities. Nick uses a power wheelchair for mobility and a variety of assistive technology to access information and produce work. He recognizes initial letter sounds associated with familiar names and words that represent activities in his daily schedule (i.e., "N" for Nick, "L" for lunch). Nick can count up to five objects with 1:1 correspondence. He has a sight vocabulary of 15 words, related

to daily activities and names of family members. Nick participates in general education content classes with adult and peer support (i.e., program assistive writing software with key vocabulary and picture symbols, manage materials for lessons, personal hygiene assistance). He can match picture representations of objects that relate to key concepts in each core content area (i.e., picture of a tree paired with a block of wood to represent concept of "natural resource" in science unit).

As shown in Table 2, this year's IEP team decided to help plan ways to promote more academic content learning for Nick that links to his seventh grade context. First, they defined the domains of academic learning. In seventh grade, Nick will be taking algebra in mathematics, American literature for language arts, and physical science. These are the "strands" of content for which the team will plan. In Nick's blocked four class schedule, he will spend his fourth block taking a computer class and doing community-based instruction (not shown here). Next, the IEP team reviews the state standards for each of these content areas (not shown). With the help of the general education teacher and their state's curricular frameworks, they target priority standards for each academic content area (one priority is shown for each academic content area in Table 2). With the help of the mathematics, language arts, and science teachers, the team also pinpoints the typical expectation for learning (fourth column). Next, the team identifies an achievement target for Nick in these areas. Next, they consider how other values can be applied to enhance this

Table 2
Case Study for Nick With Academic Domains, Expectations, Supports, and IEP Goals

Subject	Domain	Standard	Typical expectation	Expectation for Nick	Enhancing the expectations and meaning
Math	Algebra	Demonstrate understanding of linear relationships (e.g., Ax + By = C) and fundamental algebraic concepts (e.g., Letters, such as x, may represent unknown quantity in algebraic equation).	Develop fluency in use of formulas to solve problems.	Solve one step equations with pictorial and object representation for numerals and scaffolded support.	Solve story problems by using switch-activated tape-recorded stories about familiar experiences (assistive technology). Transfer answers to worksheet with peer help (peer interaction). Use large key/visual display "talking calculator" to check answers (self-evaluate).
English/ Language Arts	Literature	Respond to various literary genres using interpretive and evaluative processes.	Compare and contrast characters from various literary genres.	Match characters with their symbols. Match characters with their concepts (e.g., Old Yeller and heroic, Anne Frank and bravery). Retell story.	Select videos of stories to view with peers (choice; gives story meaning). Peer reads written story summaries. Use word prediction with text to speech and switch access writing software for story retell (AT). Use pictures/word phrases to create stories of daily experiences; compare with characters in stories (self-instruction/meaning).
Science	Life Science	Understand complementary nature of the human body systems.	Compare and contrast functions of human systems.	Identify major body organs.	Use adapted science text summaries with pictures and switch activated tape recording (self-instruction). Create model with human systems with peer group. Develop summary about self using writing software to share with health care providers; communicate "keep confidential" (AT, self-awareness; self-advocacy).

IEP goals (pivotal skills that cross curricular planning):
Apply purposeful use of switch to begin and end tape-recorded text in three different classes.
Use 5 new picture symbols/word phrases each week that are used to demonstrate understanding of content; retain at least 50 of these new symbols by end of year.
Choose picture cues to complete class notes during instruction.
Use graphic organizer to summarize a three part "story" with first, next, last (math problem, literature, science event).
Identify AT needed to complete assignments.

learning such as assistive technology and participation with peers. Finally, they look across the learning in these three content areas to pinpoint pivotal IEP goals.

Summary

To link instruction to state's academic content standards, educators need three types of information. First, they need foundational information about academic content. As described in the first section of the paper, we propose that this include information on state and federal policy, domains of academic content, research on academic learning by this population, and understanding of state standards, strategies to collaborate with general education, and an overview of the concept of alignment. Due to space constraints, we introduced each of these topics briefly with references to resources that can be used in planning professional development.

Educators also need examples of how to teach skills that link to state standards, especially for middle and secondary students. We chose to highlight three studies that were part of our research and provide references to the work of others who have also described how to create these links. Although research does exist that this population can learn academics as described earlier in this article, this evidence is constrained by the limited focus of past instruction for this population. The field does not yet have "evidence-based practice" for how to teach skills that link to grade-level standards. In contrast, this same criticism could be posed for many of the innovations that are now well documented in research. For example, there were few examples of teaching this population, functional skills for community contexts in 1979. What is important, now, is to generate this research to identify effective practices. Currently, research also does not exist on the outcomes that will be attained with an increased academic focus. For this reason, student and parent participation in IEP planning and social validation of research outcomes are critically important to ensure that new skills attained are meaningful to consumers.

Finally, educators need guidelines for how to develop instructional plans and IEPs that have this new standards-based focus. We offered one model in which the IEP team does some curricular planning prior to targeting pivotal skills for the IEP that are useful across academic standards. Some teams may prefer to have some IEP goals that are more specific to academic content. Others may want to indicate functional activities in which the skills also will be used.

In summary, although there are multiple aspects of promoting learning in general education, our work focuses on how to define the content for learning so that it links to grade-level standards. In taking this direction, we have tried to build on the research and values that provide for quality educational services. The intent is not to abandon what we know to be important for serving students with severe disabilities such as promoting social inclusion, self-determination, and community participation, but to promote increased educational access to general curriculum content as an additional indicator of quality in services for this population.

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