Evidence-Based Practices for Students with Severe Disabilities and the Requirement for Accountability in "No Child Left Behind"

Diane M. Browder, *University of North Carolina at Charlotte*
Karena Cooper-Duffy, *Western Carolina University*

To define what is special about the education of students with severe disabilities, this article provides a snapshot of research-based practices that are relevant to the "No Child Left Behind" (NCLB) focus on accountability. The NCLB requirement to assess all students in reading, math, and science is contrasted to the functional approach typical of skill acquisition research for this population. The concept of adequate yearly progress is addressed by reviewing the types of instructional strategies that would most likely yield progress. Information is also provided on the extent to which teachers use research-based strategies. We conclude that prior research provides guidance for how to select and teach skills even though new applications for academics are needed.

The literature reflects several approaches to defining the unique educational needs of students with severe disabilities. One method is to define professional consensus through national surveys (Kleinert & Kearns, 1999; Meyer, Eichinger, & Park-Lee, 1987). For example, in defining criteria for Kentucky's alternate assessment, Kleinert and Kearns asked respondents to rate the importance of several performance indicators. Some of the highest rated indicators were integrated environments, functionality, age appropriateness, choice making, and the use of multiple settings for instruction. A second option is to use the research summaries typical of major texts on educating this population (e.g., Cipani & Spooner, 1994; Ryndak & Alper, 1996; Snell & Brown, 2000; Westling & Fox, 2000). For example, Snell and Brown described the importance of the supportive school practices of inclusion; collaborative teams; integrated therapy; systematic, activity-based instruction; data-based decision making; and positive behavior support. A third alternative is to consider legal mandates, such as the 1997 amendments to the Individuals with Disabilities Education Act (IDEA; see Shriner, 2000), and litigation, such as that for an extended school year (Etscheidt, 2002.) A fourth approach would be to consider the literature that highlights the perspectives of families (Erwin & Soodak, 1995) or students with disabilities themselves (Ruef & Turnbull, 2002.)

Given these alternatives, it is beyond the scope of this article to describe fully what is special about the education of students with severe disabilities. Instead, we offer a snapshot of best practice against the backdrop of current educational reform reflected in the No Child Left Behind Act (NCLB). NCLB contains numerous provisions with implications for special education, but the two that will be considered here are (a) the requirement to assess students in reading, math, and then later, science and (b) the expectation for yearly progress. Whereas IDEA '97 requires that all students participate in state- and district-wide assessments, NCLB requires annual performance assessments in reading and math in Grades 3 through 8. Both IDEA '97 and NCLB allow alternate assessments with accommodations for students who cannot participate in state- or district-wide assessments. Most states have now developed specific alternate assessment procedures (Thompson & Thurlow, 2001) and many include reading and math categories (Browder, Ahlgrim-Dezell, et al., in press). Although research is now emerging on states' alternate assessment practices, many questions remain about how best to measure the progress of students with severe disabilities on state academic standards (Browder, Spooner, et al., in press).

The Council for Exceptional Children has noted that one of the most significant ways NCLB will affect policy is through the requirement for adequate yearly progress (AYP; "No Child Left Behind," 2002). NCLB states that within 12 years, schools must demonstrate that students in Grades 3 through 8 are making AYP toward 100% proficiency in reading and math. In addition to its strong emphasis on assessment outcomes, NCLB also includes more than 100 references to "scientifically based research." The law requires that federal grantees use their funds on evidence-based strategies, putting

Address: Diane M. Browder, Dept. CSPC, Special Education, University of North Carolina at Charlotte, 9201 University City Blvd., Charlotte, NC 28223-0001; e-mail: DBrowder@email.uncc.edu

educational research in an unprecedented spotlight (Feuer, Towne, & Shavelson, 2002).

This article considers the evidence-based strategies for educating students with severe disabilities as they relate to (a) assessing progress on academic content standards and (b) demonstrating AYP. At the time this article was developed, draft regulations for AYP permitted states to define achievement standards that align with state academic content standards and reflect professional judgment of the highest learning standards possible for students with significant cognitive disabilities (U.S. Department of Education, Draft AYP Regulations; [Section 200.13](c)(1)). In defining expectations for this population, it is important to consider what the research literature reflects about the students' educational needs. Specifically, how does the expectation to assess progress in academic content standards compare with the curriculum reflected in the last 20 years of skill acquisition research? In addition, what types of instructional support will these students need to demonstrate annual progress?

Curriculum Considerations in Research on Skills Acquisition

In the late 1970s, experts like Lou Brown (Brown et al., 1979) revolutionized the field by challenging professionals to use the "criterion of ultimate functioning" to select skills for instruction for students with severe disabilities. Teaching teams began to consider whether skills were functional (i.e., usable in daily life) and age appropriate (i.e., typical of same-age peers who are nondisabled) before including them on the Individualized Education Program (IEP). Nearly all curricular models that followed (Browder, 1987; Falvey, 1989; Ford et al., 1989; Giangreco, Cloninger, & Iverson, 1998; Neel & Billingsley, 1989; Wilcox & Bellamy, 1987) shared two common characteristics: (a) the identification of life domains for curriculum planning (e.g., community, vocational, home, recreation) and (b) some type of prioritization process to select skills for a student based on preferences and functional use. Research on skill acquisition has also reflected this focus on functional skills. In a comprehensive review, Snell (1997) identified 123 studies that demonstrated successful acquisition of functional skills by students with intellectual disabilities. Nearly half of the participants in these studies had severe mental retardation (45%). Demonstrations of functional skill acquisition included all major life domain—vocational, leisure, home, community—and embedded skills, such as communication, choice making, functional academics, and motor skills.

Despite this large volume of research, careful inspection reveals that few studies have included participants with combinations of severe cognitive, motor, and sensory disabilities who may need ongoing support in their daily routines. For students with multiple disabilities, the educational goal may be partial participation in routines through learning specific responses that increase choice and personal control in daily routines (Ferguson & Baumgart, 1991). Some research supports this partial participation approach. For example, Snell, Lewis, and Houghton (1989) reported that students with limited motor skills (e.g., students with quadriplegia) learned to open their mouths to signal readiness for help in having their teeth brushed. Kennedy and Haring (1993) taught students with significant disabilities to make choices in social interactions.

Taken together, these studies on teaching functional life skills and partial participation provide a strong research foundation for teaching students the skills necessary to participate in their daily routines. What is less clear from the research on skill acquisition is how to meet the newer expectation to demonstrate progress on state academic content standards. In reviewing the research from 1976 to 1995 on students with severe disabilities, Nietupski, Hamre-Nietupski, Curtin, and Shrikanth (1997) identified 785 articles; fewer than 10% of these articles focused on cognitive/academic skills, and there was an overall decrease in the number of articles with this focus from the early to latter years. Instead, the curricular area of greatest growth reflected in this body of research in the early 1990s involved social skills and social inclusion, which showed a 231% increase.

Two areas evident in the research that may have the closest link to academic content standards are functional reading and math. Functional reading includes sight-word instruction with real-life application, and functional math focuses on such practical skills as using money and telling time (Browder, 2001). In a research review, Browder and Grasso (1999) identified 43 studies on teaching money skills; 10 of these included individuals with severe mental retardation. In these studies, the math expectations were minimal; students learned either to use money without counting it or to count to less than 20. Browder and Xin (1998) located 48 studies on teaching sight words, several of which included participants with severe mental retardation or autism. Only a few focused on acquiring sight words in general education. In Schoen and Ogden (1995), the general education teacher taught sight words to a small group of students with and without disabilities. In Wolery, Werts, Snyder, and Caldwell's (1994) study, peer tutors effectively provided sight-word instruction. In addition to having few examples in general education contexts, most functional reading research also lacks measures of comprehension (Browder & Xin, 1998.)

An alternative to teaching specific academic content is to use functional skills to access the general curriculum (Downing, 1996; Ryndak & Alper, 1996). For example, a student may set the table for six people to practice counting in math. Alternatively, some experts recommend focusing on basic skills as access skills (e.g., grasp/release, choice making) that students can practice in the context of any activity, including general education lessons (Kearns, 2001). In one study, Hunt, Staub, Alwell, and Goetz (1994) found evidence that students with significant cognitive disabilities can acquire access skills in the context of a lesson in a general education class.

Although past research has demonstrated that students with severe disabilities can master functional skills and some academic responses, such as sight words, critical limitations include the following:

1. sparse literature with students with complex, multiple disabilities;
2. limited range of functional academics and lack of reading comprehension measures; and
3. lack of research on teaching a broader range of academics to this population (e.g., science).

In contrast, current federal requirements challenge educators to bring about achievement of a wide range of state academic content standards in reading, math, and science for *all* students. Given the research to date, it is not surprising that many states have used real-life (i.e., functional) indicators specifically for reading and math content standards in developing their alternate assessments (Browder, Ahlgrim-Dezell, et al., in press). For example, in Oregon's Extended Career and Life Role Assessment System, students demonstrate reading and math skills in the context of daily routines (Arick, Nave, & Hoffman, 2003). Certainly, assessing whether students can demonstrate academic skills in a functional context is an important starting point for documenting skills in reading and math. However, research is also needed to demonstrate ways students with severe disabilities can master more varied academic content to show progress on state standards.

Instructional Strategies to Promote Annual Progress

A second issue to consider in the era of early implementation of NCLB is that of adequate yearly progress. As described in the previous section, numerous studies exist that demonstrate that students with significant cognitive disabilities can acquire new skills (e.g., Nietupski et al., 1997; Snell, 1997). In many of these studies, students learned to perform the skill without prompting and did so in less than a year. For example, in Snell et al.'s (1989) study, students with multiple disabilities learned to perform the responses for their toothbrushing routine without verbal and physical prompting through the instructor's use of a prompt-fading strategy.

One of the keys to successful yearly progress is team planning. Research has shown that the use of teams can be an effective means to involve general educators in developing positive behavior supports (Ellingston, Miltenberger, Stricker, Galensky, & Garlinghourse, 2000) and to eliminate barriers to inclusive practices (Salisbury, Evans, & Palombaro, 1997). A person-centered team approach can also promote parental involvement (Miner & Bates, 1997). The use of alternate assessment may similarly be enhanced through involvement of the IEP team. General educators bring to the team their knowledge of state standards and the general curriculum. Parents can offer insight into how to build on the student's ability by finding ways to document progress on state standards. Special educators have experience in developing empirically supported individualized instructional strategies to promote learning. These strategies (a) define target responses, (b) promote skill acquisition through systematic prompting and fading, (c) enhance generalization, and (d) incorporate the use of assistive technology as needed.

One of the most difficult challenges in documenting progress on state standards is defining the specific responses to measure. In the past, researchers have taken several different approaches to defining the target skill. In one approach, this skill is defined as a single, discrete response, such as choice making (e.g., Kennedy & Haring, 1993); a set of discrete responses, such as sight words (e.g., Collins, Branson, & Hall, 1995); or a chained response, such as the task analysis to do laundry (e.g., McDonnell & McFarland, 1988). This skill may also be a generalized response that can be used across more than one context, such as requesting (e.g., Chadsey-Rusch & Halle, 1992) or street crossing (e.g., Horner, Jones, & Williams, 1985). Some researchers have focused on a "pivotal response" that will enable the student to make a broader range of responses. For example, Hughes, Hugo, and Blatt (1996) taught students to problem solve in the context of daily living skills. Koegel, Koegel, Shoshan, and McNerney (1999) demonstrated through long-term outcome data that teaching the pivotal response of self-initiation had an important influence on a variety of postintervention outcomes (e.g., school performance, friendships).

Once the response is identified, the teaching team needs to develop strategies to promote acquisition in the specified time frame (e.g., adequate yearly progress). In a review of instructional research with students with severe disabilities, Ault, Wolery, Doyle, and Gast (1989) identified several effective prompting systems, including time delay, least intrusive prompts, and graduated guidance. In time delay, the instructor gives immediate assistance for errorless responding and then delays this prompt by a few seconds over teaching trials. In least intrusive prompts, the instructor uses graduated assistance (e.g., from verbal direction to a model to physical guidance) until the student makes the target response. Graduated guidance involves providing progressive physical assistance as needed. Several other authors have also provided comprehensive reviews that support the effectiveness of these methods (Demchak, 1990; Schoen, 1986). Research has additionally shown that effective interventions are characterized by defined feedback, which includes descriptive praise for a correct response and instructive error correction (Werts, Wolery, Holcombe, & Gast, 1995). For example, if a student reads the word *milk* correctly, the teacher may say, "Good, *milk*" or may expand this to include additional feedback, "Good, *milk* is found in the dairy section of the store." If read incorrectly, the teacher may say, "No, the word is *milk*." Or add further instruction by saying, "No, the word is *milk*. M-I-L-K. *Milk*. Now you say it."

Although these studies offer clear guidance on defining and teaching target skills, they are less clear on how to do so in general education settings. As Snell (1997) noted, most intervention research has occurred in self-contained special education classrooms or schools, although some studies have been conducted in community settings. Surveys show that most experts have recommended using systematic instruction in inclusive school contexts (Jackson, Ryndak, & Billingsley, 2000), but these strategies may not currently be endorsed by general educators in these contexts (Billingsley & Kelley, 1994). McDonnell (1998) noted that general educators may rely on curriculum-focused strategies, rather than individual student-focused strategies, because of the need to cover content with a large group of students.

During the last decade, limited evidence has emerged providing models for embedding individual student-focused strategies in general education settings. One option is to train peer tutors. In studies by both Collins et al. (1995) and Wolery et al. (1994), peers who were nondisabled learned to use systematic prompting methods, which resulted in the students with disabilities mastering new skills. A second option is to embed this instruction in the context of a cooperative learning group. In Hunt et al.'s (1994) study, students with significant cognitive disabilities learned basic skills, such as reaching and grasping, in the context of a general education group activity. A third alternative is to use observational learning. For example, in a study by Werts, Caldwell, and Wolery (1996), students learned daily routines by watching their peers perform these tasks. General education teachers may also be able to make slight modifications in their style of group instruction to promote learning. Collins, Hall, Branson, and Holder (1999) found that students with moderate cognitive disabilities were able to learn factual statements that the general education teacher presented repeatedly throughout a group lecture.

Students may also learn to use self-instructional strategies, such as following picture cues (Wehmeyer, Agran, & Hughes, 1998). For example, in a study by Krantz, MacDuff, and McClannahan (1993), students with autism learned to participate in family routines by following picture activity schedules. Students may also learn to follow audiotaped cues to perform each step of a daily routine (Grossi, 1998). Whether using pictures or audiocues, the student learns to refer to the prompt and then perform the activity without assistance. Recently, Agran, Blanchard, and Wehmeyer (2000) demonstrated a self-determined model of learning in which students learned to identify a problem, potential solutions to a problem, barriers to solving the problem, and consequences to their solution. For example, the teacher may begin by having the student consider the question "What do I want to learn?"

To satisfy state requirements through alternate assessments, students may have to demonstrate generalization, as well as acquisition, of skills. Both North Carolina and Kentucky require generalization across settings in their alternate assessments. One empirically supported method to promote generalization for students with severe disabilities is general case instruction, in which the teacher selects a set of examples that sample the variations students will encounter in their daily routines (Horner, McDonnell, & Bellamy, 1986). After training across settings (e.g., following directions), the teacher assesses performance in untrained contexts (e.g., novel streets) to determine if generalization has occurred. Research has also shown that classroom simulations of a community activity, such as using an automated teller, can be effective when paired with some opportunities for community practice (Browder & Bambara, 2000). To demonstrate generalization of academic responses, teachers may use a variety of teaching materials. For example, to work on a state reading standard on gaining information from text, students may use a new sight word to locate information in a newspaper headline, textbook caption, or teacher handout.

To make adequate yearly progress, students may also benefit from the use of augmentative and alternative communication (AAC; Blischak, Loncke, & Waller, 1997; Mirenda, 1990). Kozleski (1991) used time delay to teach individuals with severe cognitive and physical impairments to match objects with pictures on a communication board and then to use these pictures to make requests. Similarly, Dyches (1998) used a system of least intrusive prompting to teach four elementary school children with autism and severe cognitive disabilities to use communication switches. Researchers have also taught students to use unaided AAC systems, such as sign language. McNaughton and Light (1993) taught a young woman with severe cognitive disabilities to use manual signs in naturally occurring contexts throughout her day, and Venn et al. (1993) taught three children with autism and severe disabilities to use sign language during snack time.

Research has also shown that the introduction of AAC can decrease problem behavior through what is called *functional communication training* (Carr & Durand, 1985; Durand & Carr, 1991). Researchers have taught students to request attention by signing for help (Horner & Day, 1991) or pressing a button that yields the statement "I need help" (Horner, Sprague, O'Brien, & Heathfield, 1990) and to request an object (Durand & Kishi, 1987) or a break (Bird, Dores, Moniz, & Robinson, 1989) with sign language. AAC has further been shown to improve interactions between students with severe disabilities and their peers when peers receive instruction in eliciting conversational turn taking (Hunt, Alwell, & Goetz, 1991; Hunt, Alwell, Goetz, & Sailor, 1990).

AAC may also help students participate in inclusive classrooms (Mirenda & Calculator, 1993). For example, research has shown that when peers receive instruction in eliciting conversational turn taking, AAC can improve interactions between students with severe disabilities and their peers (Hunt et al., 1991; Hunt et al., 1990). Although research has supported using AAC with students who have severe intellectual disabilities to improve communication and replace problem behavior, additional research is needed to understand how AAC can help students access the general curriculum.

Use of Evidence-Based Practices

Although research on skill acquisition offers many examples of effective practices, practitioners do not always actually implement these practices. Ayres, Meyer Erevelles, and Park-Lee (1994) surveyed special education teachers in five states in regions known for their efforts to develop quality educational programs for students with severe disabilities. Teachers' self-reports revealed that the presence of best practice indicators (e.g., inclusion, data-based instruction, home–school communication) was related to both teacher skill and implementation difficulty. Teachers described time constraints and administrative support as two major obstacles in implementing research-based practices. For example, teachers found it difficult to give students the individualized instruction they needed.

Surveys of general educators also have found mixed levels of implementation of evidence-based practices. Agran and Alper (2000) surveyed general education teachers to identify the instructional strategies they used with students with disabilities in their classes. The general education teachers reported using a few evidence-based procedures, such as providing students with increasing or decreasing assistance as needed, but they used few targeted strategies, such as time delay and picture cues.

Teachers appear to find it challenging to create access to the general curriculum and assess students on state standards. In a survey conducted by Agran, Alper, and Wehmeyer (2002), special education teachers ranked grooming, social, communication, choice-making, and problem-solving skills as more important than academic skills in creating access to the general curriculum for their students with severe disabilities. Although their students were involved in general education classes, the teachers did not necessarily consider access to the general curriculum appropriate for them and did not think their students should be held accountable to the same standards as their peers. It is not clear whether these findings reflect the recent emphasis on access to the general curriculum. Williams, Fox, Thousand, and Fox (1990) found that teachers were more favorable about inclusive practices if they had experience with them. Thus, it is plausible that teachers will change their perspective on assessing students on academic content standards as they gain experience with this practice.

Building on Evidence-Based Practices

The limited research on academic content instruction for this population creates a challenge for practitioners seeking examples from the literature. In spite of NCLB's numerous references to evidence-based practices, the inclusion of students with significant cognitive disabilities in expectations for progress on states' academic content standards appears to be a values-based, rather than an evidence-based, policy. Yet, as a values-based policy, it challenges educators to take inclusion to a higher level by creating ways for students with severe disabilities to not only access the general curriculum but make progress within it. To achieve this goal, educators can use the instructional supports for which scientific evidence has been obtained, as well as seek new approaches. In this article, we have focused on two of these instructional supports: how skills are defined and how skills are taught.

In defining skills aligned with academic content standards, educators can build on the research foundation available for functional skills by targeting specific skills for mastery. As noted earlier, the target skill can be a pivotal response; a response chosen for partial participation; a chained response; or a single, discrete response. Although future research may demonstrate ways for students with severe cognitive disabilities to learn complex concepts and large chunks of varied academic material, to date, research has suggested that yearly progress may best be documented through focusing on specific, meaningful responses that are taught to mastery. Based on prior evidence that students with severe disabilities can learn skills related to daily routines, it might also be important to link these academic responses to specific functional uses. The requirement to address standards in reading, math, and science does not preclude a continued focus on functional skills. Future IEPs for student with severe disabilities will undoubtedly contain a blend of academic and functional objectives.

Although students with severe disabilities can benefit from whole-group instruction or cooperative learning activities within a typical class, they also may need individualized instruction with systematic prompting and fading to meet expectations for yearly progress. Moreover, students may need opportunities to practice skills across a variety of settings. An augmentative communication system and other assistive technology may also be needed to provide students a means to expand their use of symbolic communication related to reading, math, and science.

In summary, we have provided a snapshot of special education for students with severe disabilities in this article by focusing on two requirements of NCLB. It is not yet clear how states will define progress for students with significant cognitive disabilities related to state standards in reading, math, and science. In the interim, planning teams will continue to devise IEPs for these students. When based on research evidence, these IEPs will include skills that promote students' participation in their daily routines through the use of systematic teaching strategies. In the future, educators can expect to see increased emphasis placed on the infusion of academic objectives linked to state standards and the use of criteria for mastery that incorporate new definitions of adequate yearly progress.

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